A STUDY RELATED DOCUMENTS

A1 Salt Marsh Restoration Plan from USACOE

Santa Ana River Tide Gates

- o There are two tide gates installed in the east levee: one at Sta. 17+80 (approximately 100' upstream of the PCH bridge) and the other at Sta. 32+87 (approx. 1300' upstream of the PCH bridge).

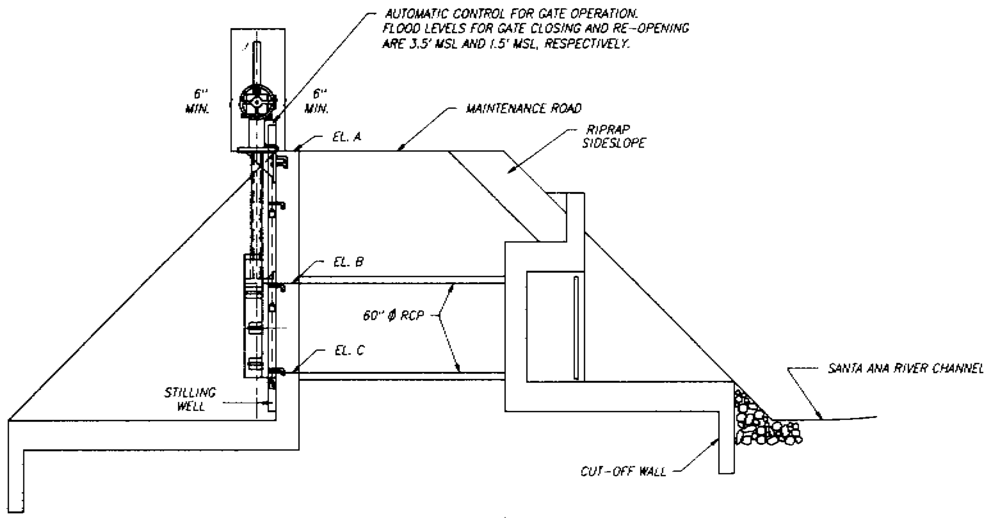
- o The purpose of the gates is allow the circulation of natural tidal flows in and out of the marsh restoration area **and** to prevent increased inflow of the river's storm water into the marsh. (The term "increased" is used because as the river stage rises, some storm flow will enter the marsh until the water surface reaches the elevation that triggers closing of the gates). Please refer to the table below for the design actuating elevations.

- o The natural position of the gates is **open**, assuming natural tidal ebb and flows.

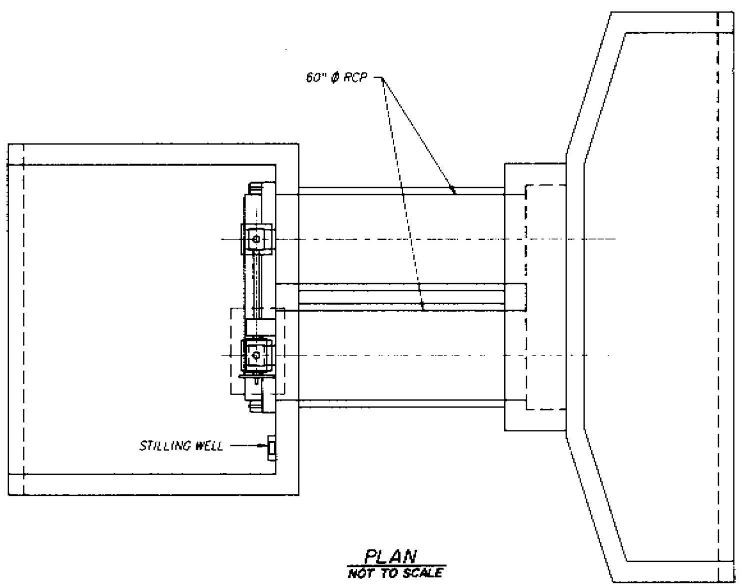
- o The water level in the marsh controls the opening and closing of the gates, not the stage in the river. However, during a rising river stage (open gate), the water surface elevation on the marsh side of the gate will be equal to the river stage, so in a way, a rising river stage can close the gate. Once closed, only the drop in water level on the marsh side could re-open the gate. Please refer to the table below for the design actuating elevations.

- o There are nine outlet pipes at sta. 19+00 (seven, 42" RCPs included in the original plans and two, 48" RCPs built by change order) which are flapgated on the river side constructed to drain the marsh when the tide gates are closed and river storm flow stage subsides sufficiently.

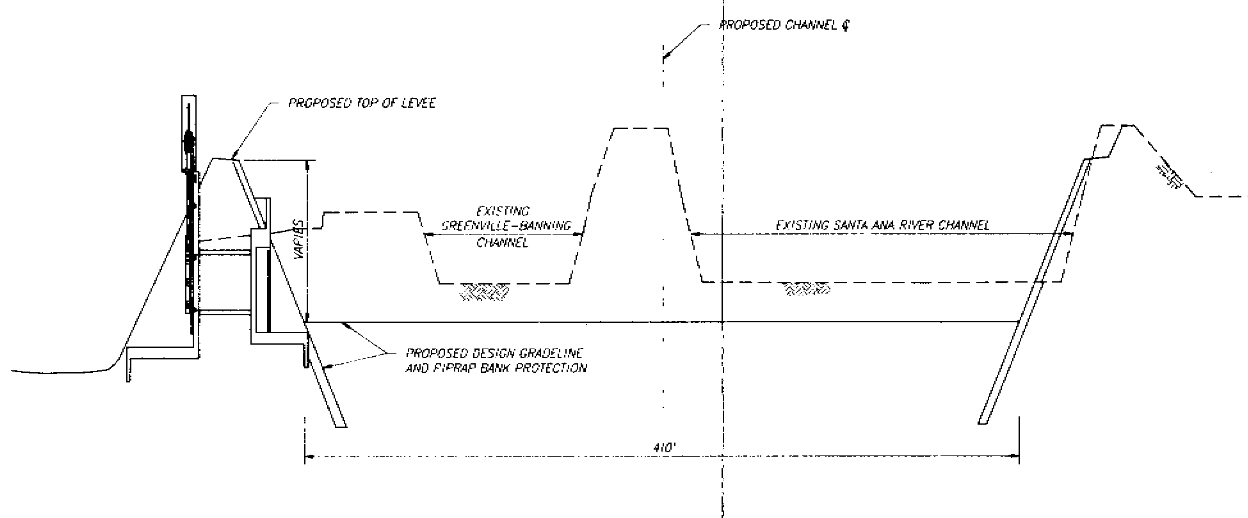
	Gate 1	Gate 2
Station	17+80	32+87
Intake Elevation	-4.0' MSL	-1.0' MSL
Maximum marsh design water level	6.0' MSL	6.0' MSL
Gate remains completely open until marsh water level rises above	3.0' MSL	3.0' MSL
Gate completely closed when marsh water level reaches	3.5' MSL	3.5' MSL
Gates begin to open when marsh water level falls below	3.5' MSL	3.5' MSL
Top of SAR levee Elevation	10.4'	13.6'
Design water surface w/sediment	8'±	9.5'±
Design water surface wo/sed	5.5'±	7.5'±



SIDE VIEW OF GATES
NOT TO SCALE



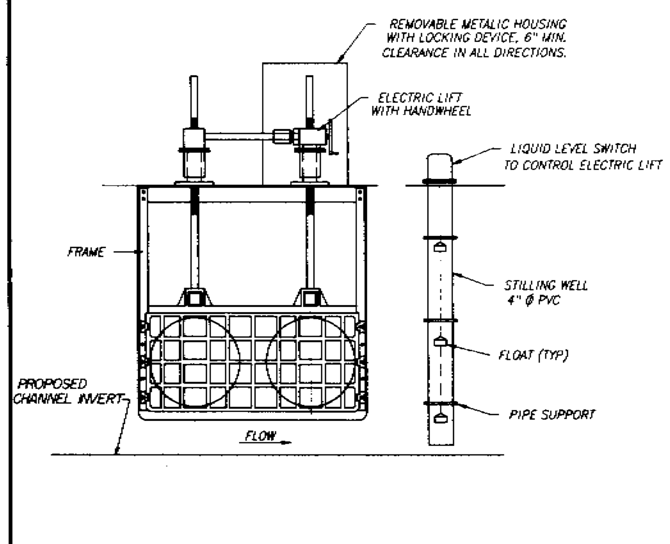
PLAN
NOT TO SCALE



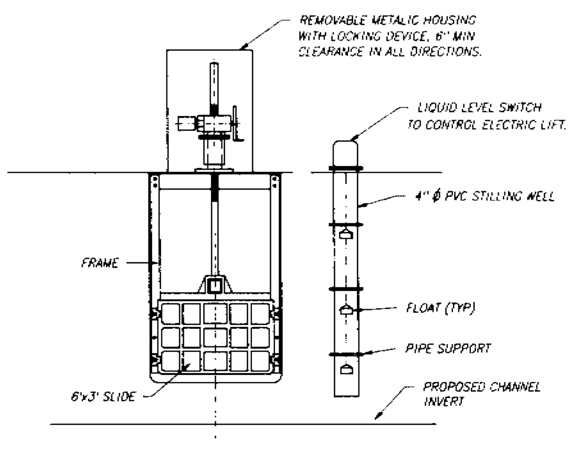
TYPICAL SECTION
NOT TO SCALE

	TIDAL GATES	
	NO. 1	NO. 2
STATION	10+50	29+00
GATE SIZE	60" O	6'x3'
NO. OF GATE(S)	1	1
MATERIAL	AUSTENITIC GRAY IRON (NI-RESIST)	
ELEV. A*(MSL)	12.3'	13.9'
ELEV. B (MSL)	1.0'	2.0'
ELEV. C (MSL)	-4.0'	-1.0'

* APPROXIMATE TOP OF LEVEE



FRONT VIEW OF GATE NO. 1
NOT TO SCALE



FRONT VIEW OF GATE NO. 2
NOT TO SCALE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY:
DRAWN BY:
CHECKED BY:

SANTA ANA RIVER MAINSTEM, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

LOWER SANTA ANA RIVER CHANNEL

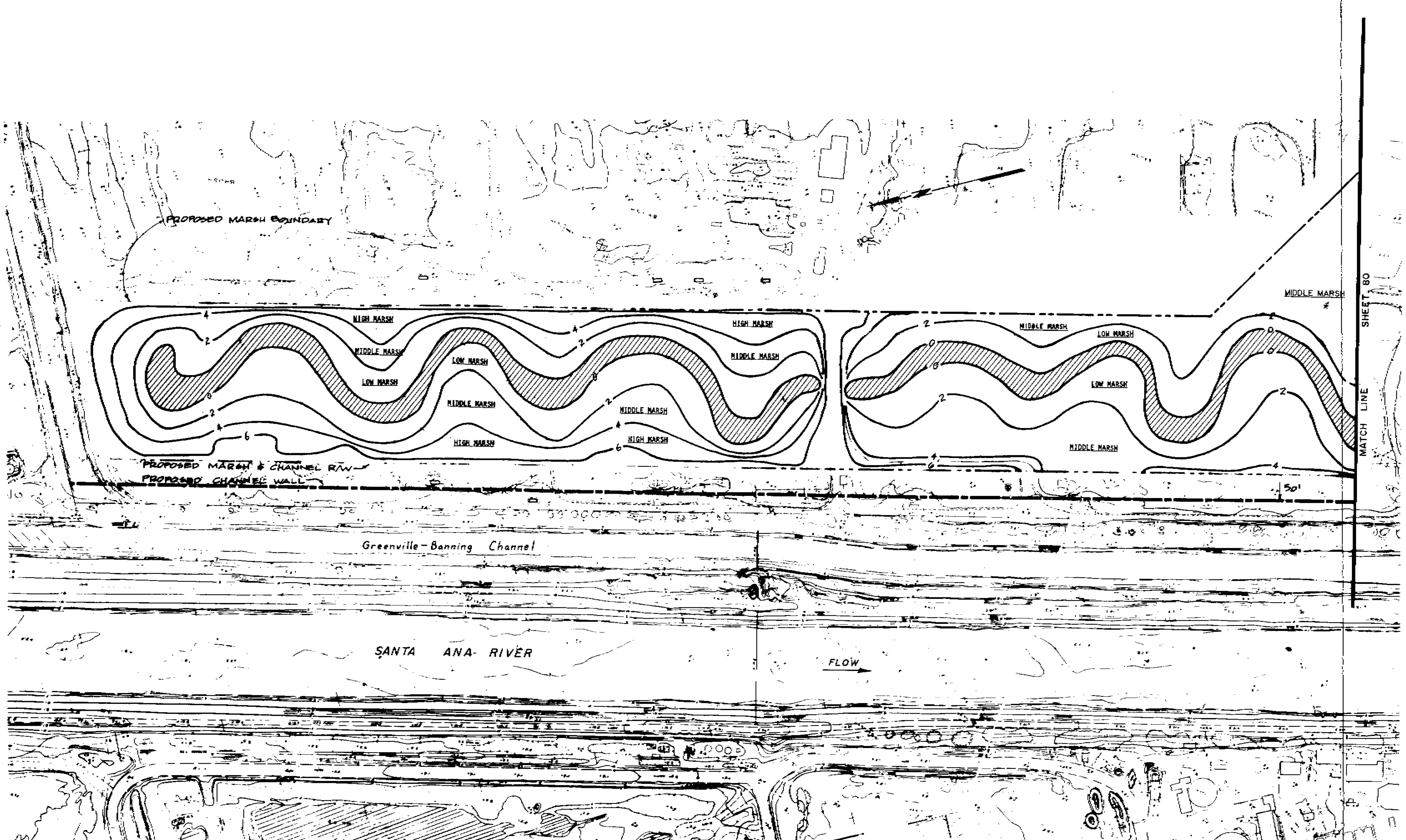
TIDE GATES

SUBMITTED BY: DATE APPROVED: DISTRICT FILE NO.
CHIEF, BRANCH

SHEET 82 OF 105 SHEETS

PLATE 65

ENVIRONMENTAL ENHANCEMENT THRU ENGINEERING



Legend

LOW MARSH (0.5-2 feet MSL)
Plant 4x4 inch plugs of Pacific cordgrass on 4-foot centers.

MIDDLE MARSH (2-4 feet MSL)
Plant 6x6 inch plugs of perennial pickleweed on 8-foot centers; broadcast seed at 4-6 seeds/square foot.

HIGH MARSH (4-6 feet MSL)
Plant high marsh plant species on 6-foot centers.

0 50 100 200 300
SCALE IN FEET

DATUM IS NATIONAL GEODETIC VERTICAL DATUM OF 1929

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY:
DRAWN BY:
CHECKED BY:

SANTA ANA RIVER MAINSTEM, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

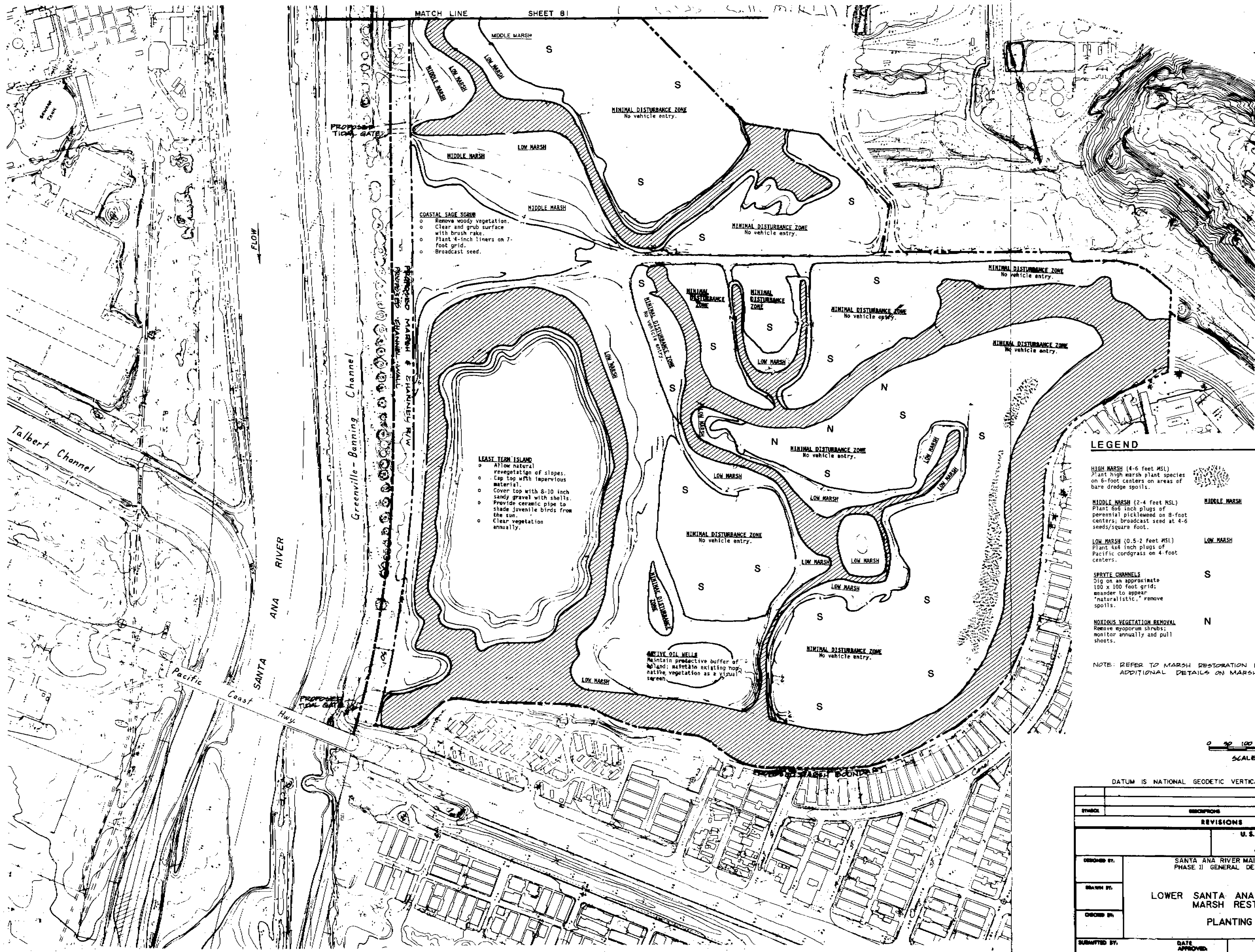
LOWER SANTA ANA RIVER CHANNEL
MARSH RESTORATION

PLANTING PLAN

SUBMITTED BY:
DATE APPROVED:
DISTRICT FILE NO.

SHEET 81 OF 105 SHEETS

ENVIRONMENTAL ENHANCEMENT THRU ENGINEERING



LEGEND

HIGH MARSH (4-6 feet MSL)
Plant high marsh plant species on 6-foot centers on areas of bare dredge spoils.

MIDDLE MARSH (2-4 feet MSL) — MIDDLE MARSH
Plant 6x6 inch plugs of perennial pickleweed on 8-foot centers; broadcast seed at 4-6 seeds/square foot.

LOW MARSH (0.5-2 feet MSL) — LOW MARSH
Plant 4x4 inch plugs of Pacific cordgrass on 4-foot centers.

SPRYTE CHANNELS — S
Dig on an approximate 100 x 100 foot grid; meander to appear "naturalistic," remove spoils.

NOXIOUS VEGETATION REMOVAL — N
Remove myoporum shrubs; monitor annually and pull shoots.

NOTE: REFER TO MARSH RESTORATION REPORT FOR ADDITIONAL DETAILS ON MARSH PLANTING.

0 50 100 200 300
SCALE IN FEET

DATUM IS NATIONAL GEODETIC VERTICAL DATUM OF 1929

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY.
DRAWN BY.
CHECKED BY.

SANTA ANA RIVER MAINSTEM, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

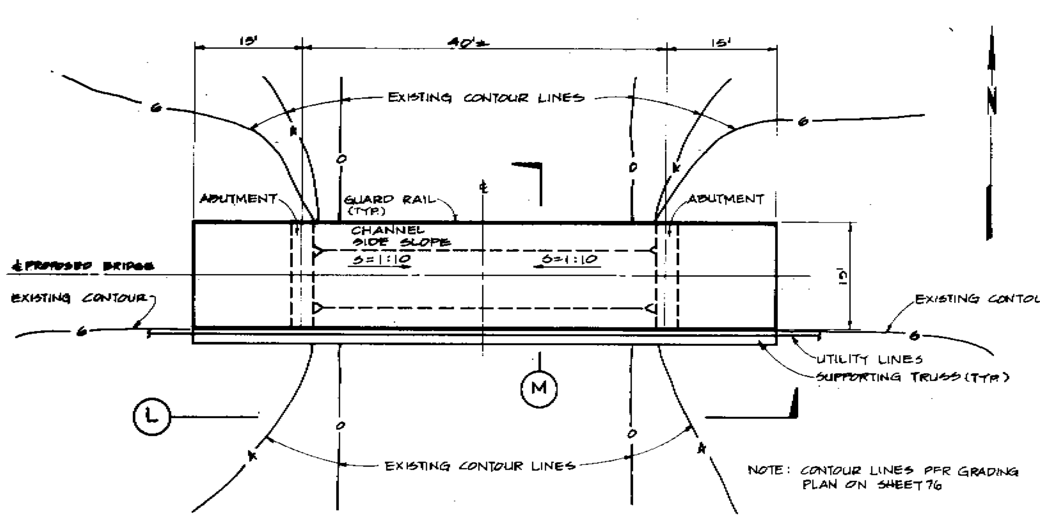
LOWER SANTA ANA RIVER CHANNEL MARSH RESTORATION

PLANTING PLAN

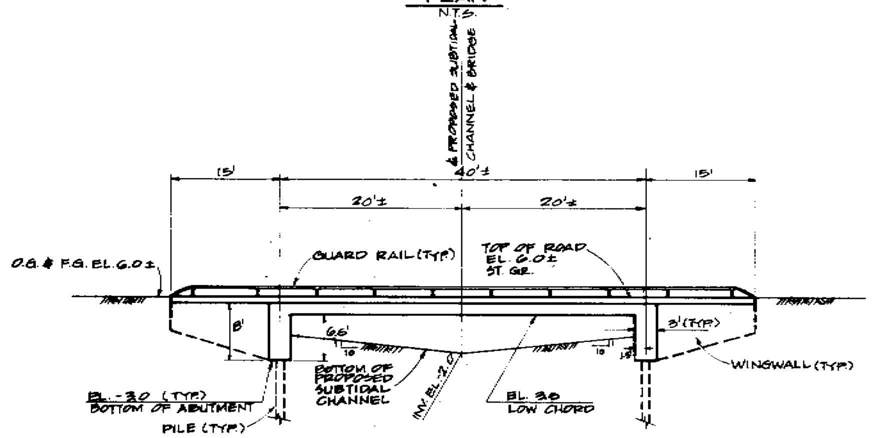
SUBMITTED BY.
DATE APPROVED.
DISTRICT FILE NO.

SHEET 80 OF 105 SHEETS

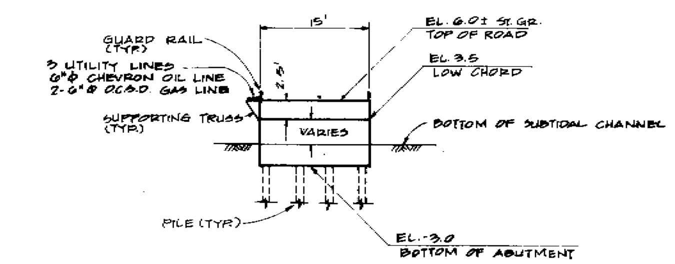
VALUE ENGINEERING PAYS



PLAN
N.T.S.

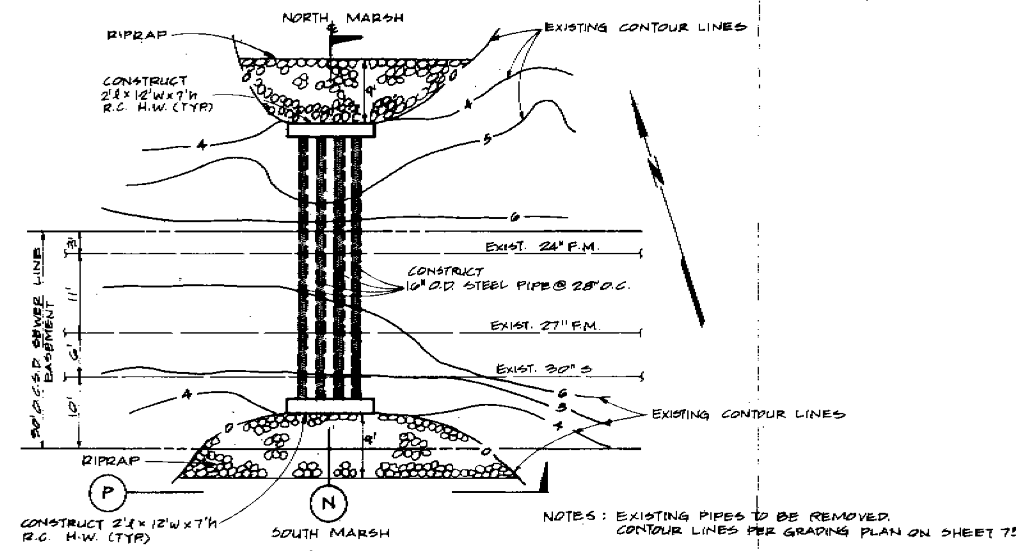


SECTION L
N.T.S.

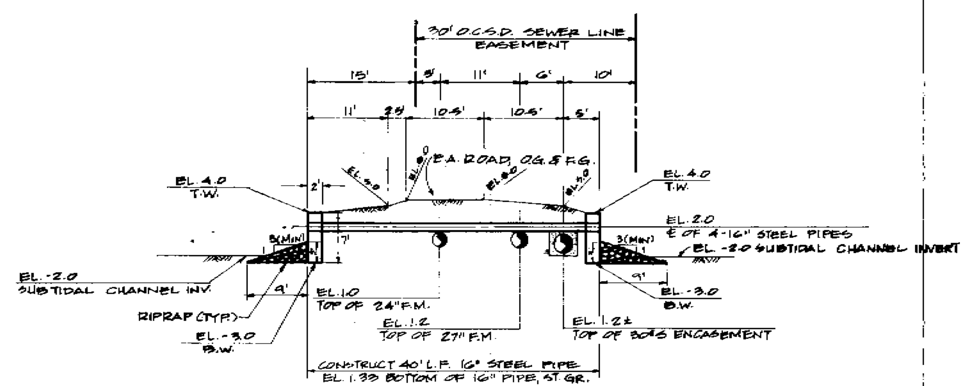


SECTION M
N.T.S.

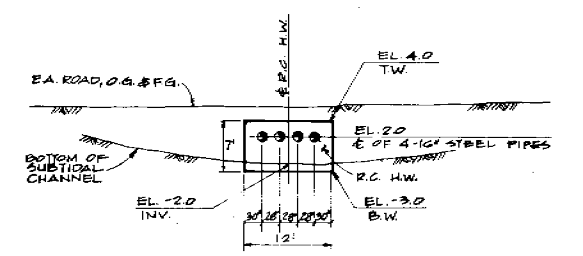
CHEVRON OIL LINE ACCESS RD CROSSING



PLAN
SCALE: 1"=10'



SECTION N
SCALE 1"=10'



SECTION P
SCALE 1"=10'

STEEL PIPES CONNECTING NORTH & SOUTH MARSHES

ENVIRONMENTAL ENHANCEMENT THRU ENGINEERING

DATUM IS NATIONAL GEODETIC VERTICAL DATUM OF 1929

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY: J.T.Y./L.Y.L.
DRAWN BY: B.C.
CHECKED BY: L.Y.L.

SANTA ANA RIVER MAINSTEM, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

LOWER SANTA ANA RIVER CHANNEL
MARSH RESTORATION
MISCELLANEOUS DETAILS

SUBMITTED BY:
DATE APPROVED:
DISTRICT FILE NO.
SHEET 79 OF 105 SHEETS

PLATE 82

SAFETY PAYS

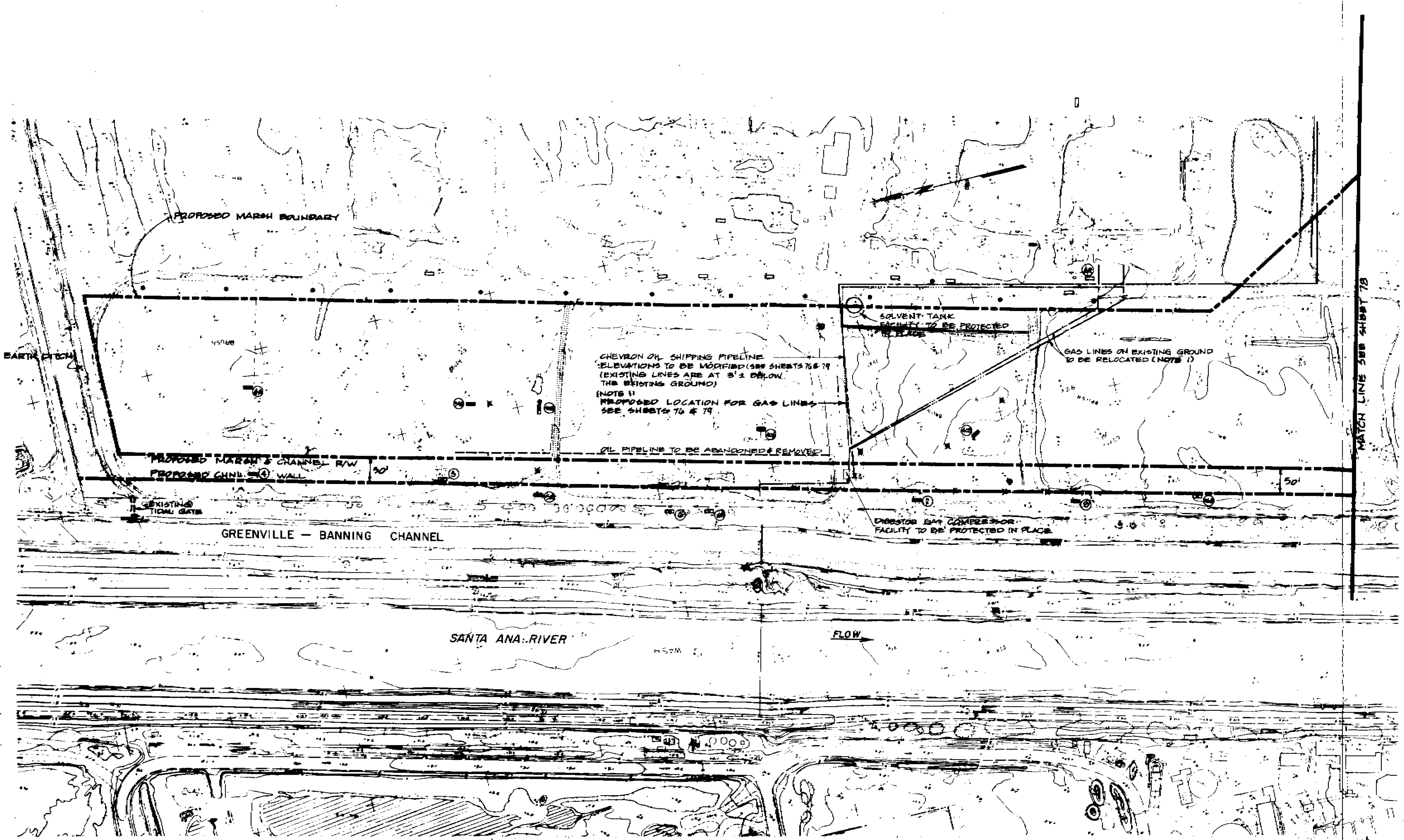
ENVIRONMENTAL ENHANCEMENT THRU ENGINEERING

ENVIRONMENTAL ENHANCEMENT THRU ENGINEERING

GENERAL NOTES

1. CONTRACTOR TO VERIFY THE ELEVATION OF CHEVRON OIL LINE PRIOR TO EXCAVATION.
2. CONTRACTOR TO CONTACT SOUTHERN CALIFORNIA EDISON COMPANY FOR POWER POLE REMOVAL.
3. CONTRACTOR TO VERIFY THE LOCATION AND ELEVATION OF THE CITY OF NEWPORT BEACH OIL LINE PRIOR TO EXCAVATION.
4. CONTRACTOR TO OBTAIN APPLICABLE REGULATIONS AND PERMITS PRIOR TO ABANDON AND/OR RELOCATION OF OIL WELLS.
5. CONTRACTOR TO MODIFY THE OIL WELLS PER PROPOSED FINISHED ELEVATIONS ON SHEETS 75 AND 76
6. CONTRACTOR TO CONTACT WEST NEWPORT OIL COMPANY FOR OIL WELL RELOCATION.
7. CONTACT PERSONS:

UTILITY	TELEPHONE	PERSON
WEST NEWPORT OIL COMPANY	(714) 650-4000	LEONARD W. ANDERSON
WEST NEWPORT OIL COMPANY FIELD OFFICE	(714) 631-1100	JAY R. STAIR
ORANGE COUNTY SANITATION DISTRICT	(714) 962-2411 (714) 540-2910	RUSS WOLD
SOUTHERN CALIFORNIA EDISON	(714) 895-0205	R. JOHN MCMANN
CHEVRON OIL PIPELINE	(213) 694-7659 (213) 694-2818	JOE KENZALAS MARGO BART
CITY OF NEWPORT BEACH	(714) 644-3011	JOSEPH T. DEVLIN



LEGEND

- OIL WELL NUMBER, BANNING-6R
- ABANDONED OIL WELL
- OIL WELL TO BE ABANDONED AND REPLACED
- OIL WELL TO BE PROTECTED IN PLACE
- OIL WELL TO BE ABANDONED
- POWER POLE TO BE PROTECTED IN PLACE
- POWER POLE TO BE ABANDONED
- ACCESS ROAD TO BE ABANDONED
- ACCESS ROAD TO BE MAINTAINED
- FM FORCED MAIN
- S SEWER LINE
- MH MANHOLE

0 50 100 200 300
SCALE IN FEET

DATUM IS NATIONAL GEODETIC VERTICAL DATUM OF 1929

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY: J.T.Y./L.Y.L.

DRAWN BY: E.C.

CHECKED BY: L.Y.L.

SANTA ANA RIVER MAINSTEM, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

LOWER SANTA ANA RIVER CHANNEL MARSH RESTORATION

OIL WELL, UTILITY AND ACCESS RD

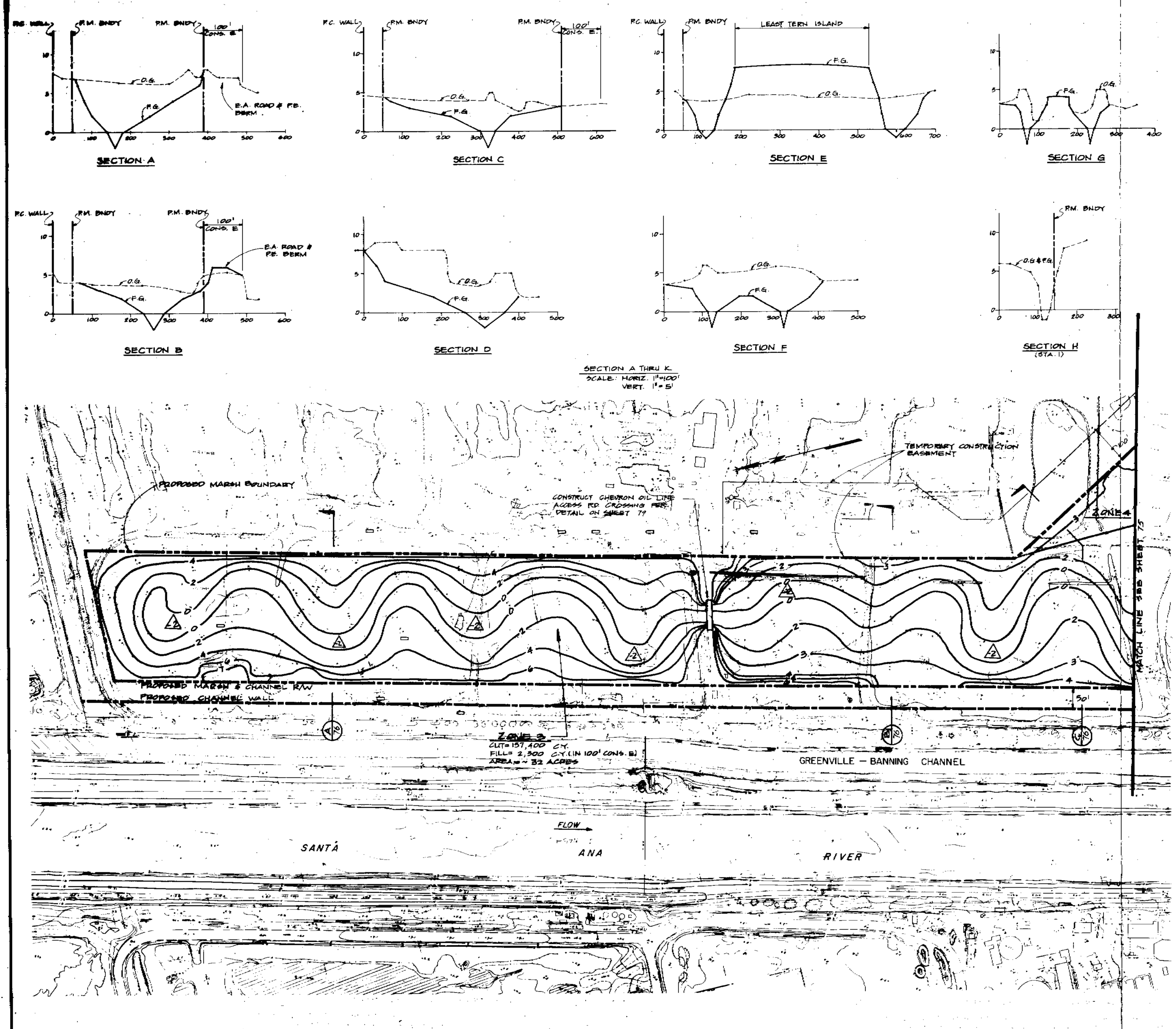
SUBMITTED BY:

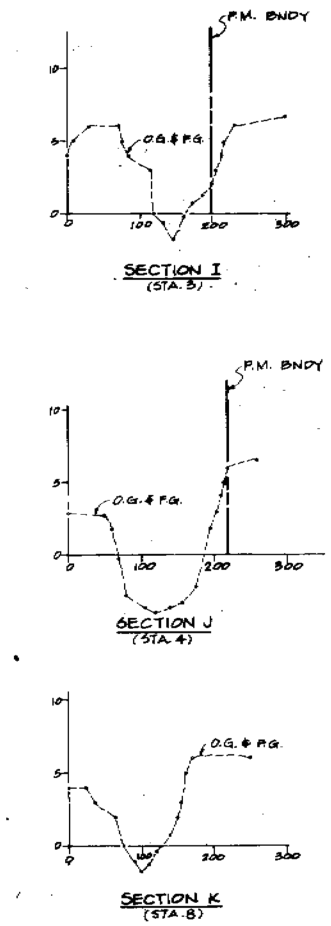
DATE APPROVED:

DISTRICT FILE NO.

SHEET 77 OF 105 SHEETS

PLATE 80





ABBREVIATIONS

O.G.	ORIGINAL GRADE
F.G.	FINISHED GRADE
P.M. BNDY	PROPOSED MARSH BOUNDARY
P.C. WALL	PROPOSED CHANNEL WALL
P.E. BERM	PROPOSED EARTH BERM
E.A. ROAD	EXISTING ACCESS ROAD
S.R.C.	SURFACE RUNOFF CONTROL
CONS. E	CONSTRUCTION EASEMENT
R.C. H.W.	REINFORCED CONCRETE HEADWALL
T.W.	TOP OF WALL
B.W.	BOTTOM OF WALL
ST. GR	STRAIGHT GRADE
H.P.	HIGH POINT
F.M.	FORCED MAIN
S	SEWER LINE
M.H.	MANHOLE
△2	MINIMUM DEPTH

TOTAL (ZONE 1 THRU 4)
CUT = 262,800 C.Y.
FILL = 69,800 C.Y. (15,200 C.Y. FOR P.E. BERM IN CONS. E)
AREA ~ 92 ACRES

0 50 100 200 300
SCALE IN FEET

DATUM IS NATIONAL GEODETIC VERTICAL DATUM OF 1929

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

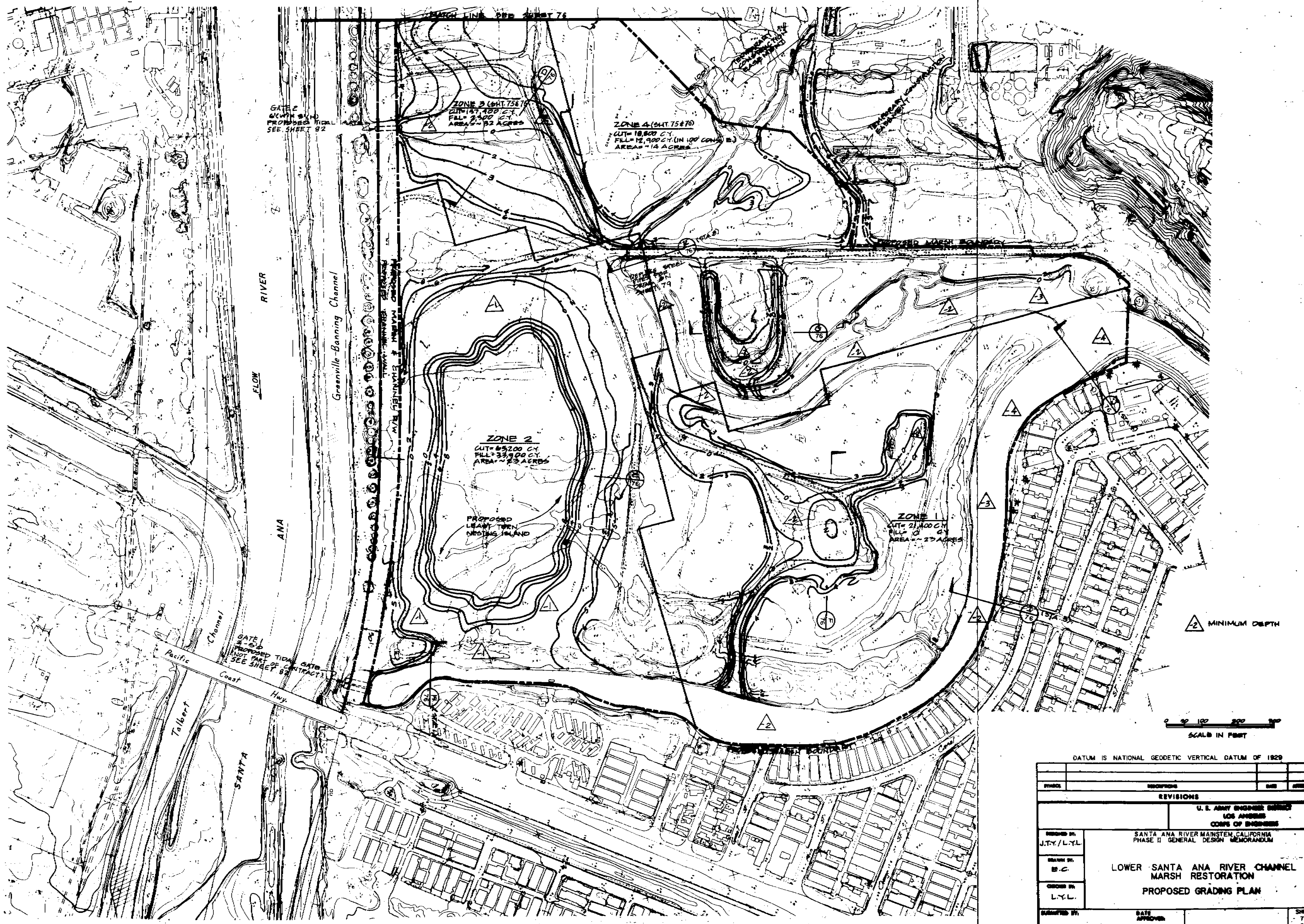
SANTA ANA RIVER MAINSTEM, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

LOWER SANTA ANA RIVER CHANNEL MARSH RESTORATION

PROPOSED GRADING PLAN

DESIGNED BY: J.T.Y./L.Y.L
DRAWN BY: E.C.
CHECKED BY: L.Y.L.
SUBMITTED BY:
DATE APPROVED:
DISTRICT FILE NO.
SHEET 76 OF 105 SHEETS

PLATE 79



DATUM IS NATIONAL GEODETIC VERTICAL DATUM OF 1929

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY: J.T.Y. / L.Y.L.
DRAWN BY: B.C.
CHECKED BY: L.Y.L.

SANTA ANA RIVER MAINSTEM, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

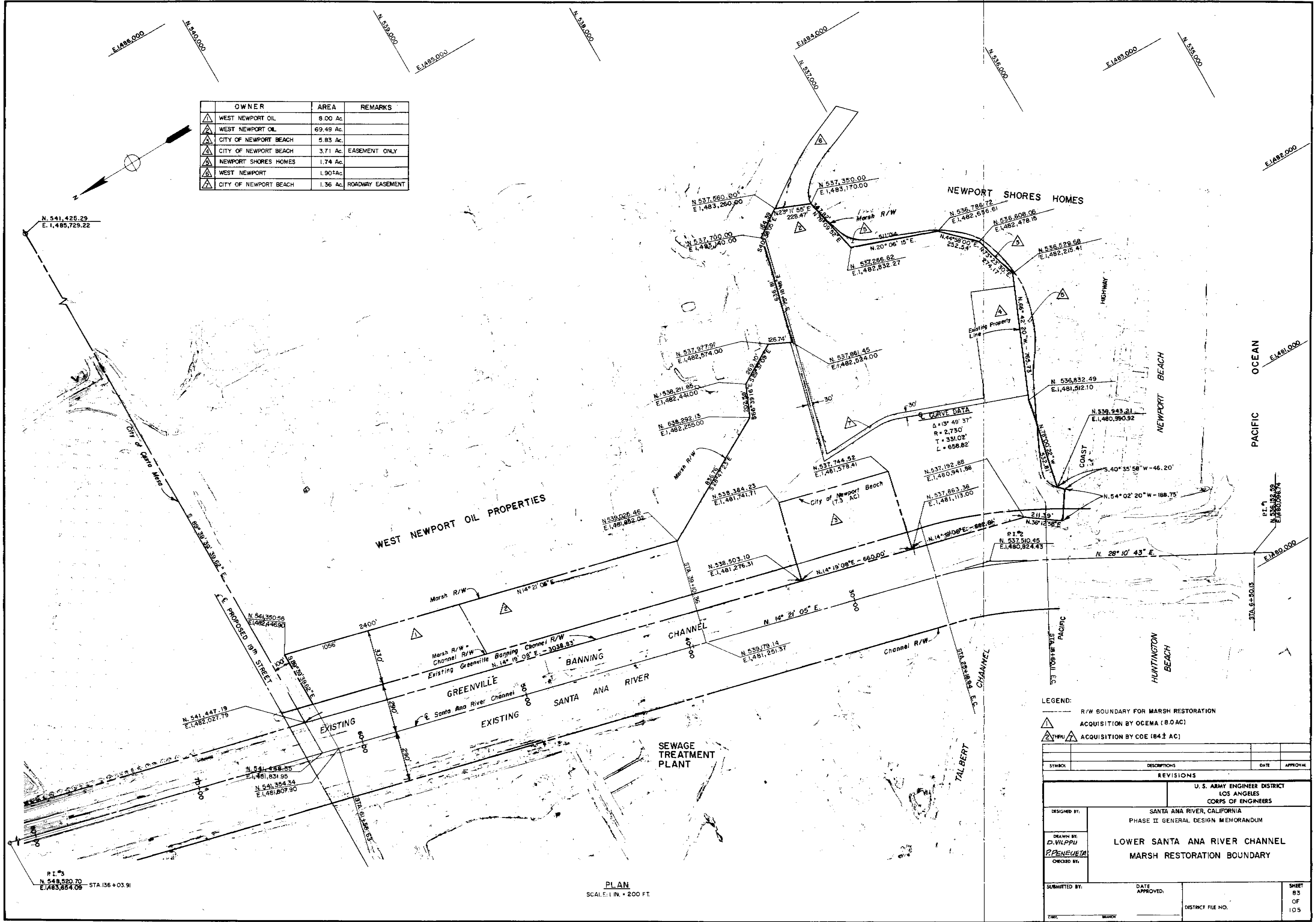
LOWER SANTA ANA RIVER CHANNEL
MARSH RESTORATION

PROPOSED GRADING PLAN

SUBMITTED BY:
DATE APPROVED
DISTRICT FILE NO.

SHEET 75 OF 105 SHEETS

PLATE 7



PLAN
SCALE: 1 IN. = 200 FT.

	OWNER	AREA	REMARKS
1	WEST NEWPORT OIL	8.00 Ac.	
2	WEST NEWPORT OIL	69.49 Ac.	
3	CITY OF NEWPORT BEACH	5.83 Ac.	
4	CITY OF NEWPORT BEACH	3.71 Ac.	EASEMENT ONLY
5	NEWPORT SHORES HOMES	1.74 Ac.	
6	WEST NEWPORT	1.90±Ac.	
7	CITY OF NEWPORT BEACH	1.36 Ac.	ROADWAY EASEMENT

LEGEND:

- - - - R/W BOUNDARY FOR MARSH RESTORATION

1 ACQUISITION BY OCEMA (8.0 AC)

2 THRU 7 ACQUISITION BY COE (84± AC)

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY:

DRAWN BY: D.VILPPU
P.PENEUETA

CHECKED BY:

SANTA ANA RIVER, CALIFORNIA
PHASE II GENERAL DESIGN MEMORANDUM

LOWER SANTA ANA RIVER CHANNEL
MARSH RESTORATION BOUNDARY

SUBMITTED BY: CHIEF, BRANCH

DATE APPROVED:

DISTRICT FILE NO.

SHEET 83 OF 105

ENVIRONMENTAL ENHANCEMENT THRU ENGINEERING

A2 FEMA Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevation** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevation (BFEs) shown on this map apply only landward of 0.0′ North American Vertical Datum (NAVD). Users of this FIRM should be aware that coastal flood elevations may also be provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map is Universal Tranverse Mercator (UTM) zone 11. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Orange County GIS Department.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

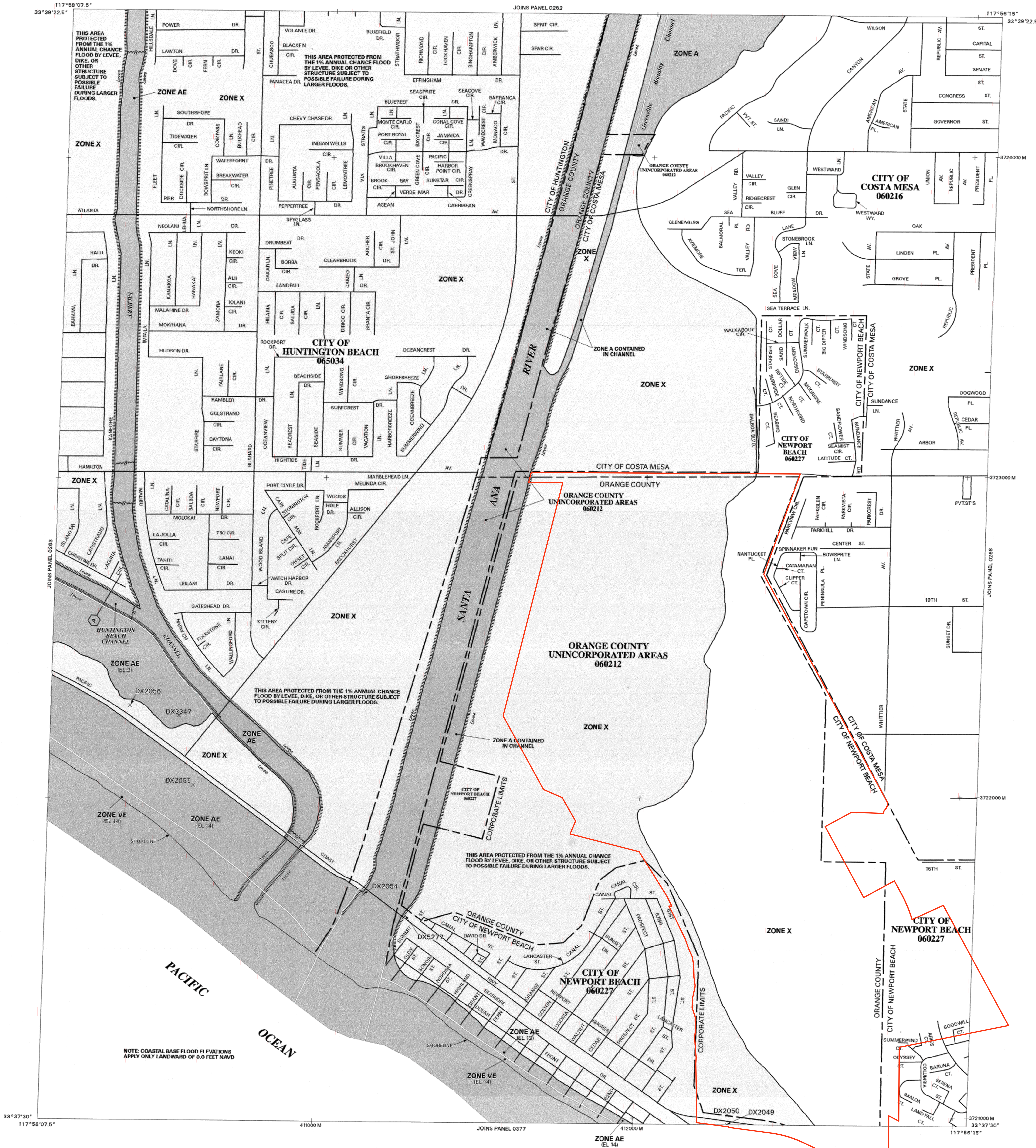
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for infomation on all related products available from FEMA;

Phone: 800-358-9616
FAX: 800-358-9620
www.fema.gov/msc

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at www.fema.gov.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.
ZONE A99	Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.

~~513~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross Section Line
(23)- - - -(23)	Transect Line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000M	1000-meter Universal Transverse Mercator grid values, zone 11
600000 FT	5000-foot grid ticks
DX5510×	Bench mark (see explanation in Notes to Users section of this FIRM panel).
• M1.5	River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
SEPTEMBER 15, 1989

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

February 5, 1992 November 3, 1993 January 3, 1997
February 18, 2004: to update corporate limits, to add special flood hazard areas, to change zone designations, to update map format, to incorporate previously issued letters of map revision, to update roads and road names.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0264H

FIRM
FLOOD INSURANCE RATE MAP
ORANGE COUNTY,
CALIFORNIA
AND INCORPORATED AREAS

PANEL 264 OF 550

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HUNTINGTON BEACH, CITY OF	065034	0264	H
ORANGE COUNTY, UNINCORPORATED AREAS	060212	0264	H
COSTA MESA, CITY OF	060216	0264	H
NEWPORT BEACH, CITY OF	060227	0264	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0264H

MAP REVISED:
FEBRUARY 18, 2004

Federal Emergency Management Agency

B HYDROLOGY CALCULATIONS

B1 Existing Condition Rational Method Calculations

a) High Confidence Events

i. HC 100-Year Storm Event

Drainage A

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             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X100_A.DAT
  TIME/DATE OF STUDY: 16:12 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                  --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.605
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    91    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.79

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   2.98   Tc(MIN.) =   11.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.869
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.89
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.16
  FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.10   Tc(MIN.) =   13.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.510
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =   10.59
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      16.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.65
  FLOW VELOCITY(FEET/SEC.) =  2.23   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.46
  STREET FLOW TRAVEL TIME(MIN.) =   2.06   Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.234
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   18.71
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      33.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  26.13
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      44.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.69
    HALFSTREET FLOOD WIDTH(FEET) =   30.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.57   Tc(MIN.) =   18.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.962
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   22.22
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      53.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.71   HALFSTREET FLOOD WIDTH(FEET) =  32.41
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
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  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      76.14
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.78
    HALFSTREET FLOOD WIDTH(FEET) =   35.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =   19.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      18.43      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   46.26
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      96.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.84   HALFSTREET FLOOD WIDTH(FEET) =  38.57
  FLOW VELOCITY(FEET/SEC.) =  3.67   DEPTH*VELOCITY(FT*FT/SEC.) =   3.07
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   71.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.04
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.49
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   20.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.760
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.81      0.20     0.100    91
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.99      0.20     1.000    96
  COMMERCIAL                 D        6.24      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA AREA(ACRES) =   12.04      SUBAREA RUNOFF(CFS) =   28.89
  EFFECTIVE AREA(ACRES) =     50.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       50.6       PEAK FLOW RATE(CFS) =     123.70

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
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  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.54
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     123.70
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   20.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1180.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.550
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       25.52      0.20     1.000    96
  NATURAL POOR COVER
  "BARREN"                   D        6.51      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     157.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.66
  AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   2.95
  Tc(MIN.) =   23.48
  SUBAREA AREA(ACRES) =    32.03       SUBAREA RUNOFF(CFS) =   67.75
  EFFECTIVE AREA(ACRES) =     82.60     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.52
  TOTAL AREA(ACRES) =       82.6         PEAK FLOW RATE(CFS) =     181.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   7.02
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.445
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       29.92      0.20     1.000    96
  NATURAL POOR COVER
  "BARREN"                   D       14.41      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     226.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.13
  AVERAGE FLOW DEPTH(FEET) =   1.40   TRAVEL TIME(MIN.) =   1.79
  Tc(MIN.) =   25.28
  SUBAREA AREA(ACRES) =    44.33       SUBAREA RUNOFF(CFS) =   89.56
  EFFECTIVE AREA(ACRES) =    126.93     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =      126.9         PEAK FLOW RATE(CFS) =     263.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.54   FLOW VELOCITY(FEET/SEC.) =   6.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.367
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       14.64      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     277.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.60
  AVERAGE FLOW DEPTH(FEET) =   1.58   TRAVEL TIME(MIN.) =   1.46
  Tc(MIN.) =   26.74
  SUBAREA AREA(ACRES) =    14.64       SUBAREA RUNOFF(CFS) =   28.56
  EFFECTIVE AREA(ACRES) =    141.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.72
  TOTAL AREA(ACRES) =      141.6         PEAK FLOW RATE(CFS) =     283.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.61   FLOW VELOCITY(FEET/SEC.) =   6.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    5020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     284.89
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.94
    HALFSTREET FLOOD WIDTH(FEET) =   43.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    7.72
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =   27.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.323
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        1.83      0.40     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    3.17
  EFFECTIVE AREA(ACRES) =    143.40    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =      143.4        PEAK FLOW RATE(CFS) =     283.31
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.94   HALFSTREET FLOOD WIDTH(FEET) =  43.58
  FLOW VELOCITY(FEET/SEC.) =  8.20   DEPTH*VELOCITY(FT*FT/SEC.) =   7.70
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.316
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       3.17      0.20     0.200    91    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     12.20
  TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =     12.20

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.62
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.20
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   11.56
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.827
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B      31.84      0.30     0.200    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   31.84      SUBAREA RUNOFF(CFS) =  107.94
  EFFECTIVE AREA(ACRES) =     35.01   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       35.0       PEAK FLOW RATE(CFS) =     118.74

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.702
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D      11.64      0.20     0.200    91
  NATURAL FAIR COVER
  "OPEN BRUSH"               A      13.96      0.40     1.000    66
  COMMERCIAL                 D       2.65      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     163.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  18.88
  AVERAGE FLOW DEPTH(FEET) =   2.08   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =   12.25
  SUBAREA AREA(ACRES) =    28.25       SUBAREA RUNOFF(CFS) =   88.63
  EFFECTIVE AREA(ACRES) =     63.26     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =       63.3         PEAK FLOW RATE(CFS) =     203.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.26   FLOW VELOCITY(FEET/SEC.) =  19.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  49.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.74
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     203.44
  PIPE TRAVEL TIME(MIN.) =   2.34    Tc(MIN.) =   14.60
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4320.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.349
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       44.48      0.20     1.000    96
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    52
  COMMERCIAL                 A        4.75      0.40     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.834
  SUBAREA AREA(ACRES) =   55.34      SUBAREA RUNOFF(CFS) =  158.17
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     341.49

******************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  53.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.72
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     341.49
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   14.88
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4590.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.312
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    52
  COMMERCIAL                 A        2.82      0.40     0.100    52
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.64      0.40     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =   24.05      SUBAREA RUNOFF(CFS) =   67.95
  EFFECTIVE AREA(ACRES) =    142.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      142.7       PEAK FLOW RATE(CFS) =     405.49

******************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
```

```
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"               A        2.68      0.40     1.000    66
RESIDENTIAL
"11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     422.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.16
AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   1.00
Tc(MIN.) =   15.88
SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   33.97
EFFECTIVE AREA(ACRES) =    155.06     AREA-AVERAGED Fm(INCH/HR) =   0.15
AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.55
TOTAL AREA(ACRES) =      155.1         PEAK FLOW RATE(CFS) =     423.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.12   FLOW VELOCITY(FEET/SEC.) =  10.18
LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5200.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
REPRESENTATIVE CHANNEL SLOPE =  0.0050
CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.981
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        1.58      0.40     0.100    52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     425.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
AVERAGE FLOW DEPTH(FEET) =   1.05   TRAVEL TIME(MIN.) =   2.00
Tc(MIN.) =   17.88
SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    4.18
EFFECTIVE AREA(ACRES) =    156.64     AREA-AVERAGED Fm(INCH/HR) =   0.15
AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.54
TOTAL AREA(ACRES) =      156.6         PEAK FLOW RATE(CFS) =     423.90
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.04   FLOW VELOCITY(FEET/SEC.) =   3.01
LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

** MAIN STREAM CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1      423.90   17.88    2.981  0.28( 0.15) 0.54     156.6      13.00
LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1      283.31   27.63    2.323  0.20( 0.15) 0.72     143.4       1.00
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1      662.66   17.88    2.981  0.25( 0.15) 0.61     249.4      13.00
    2      608.62   27.63    2.323  0.24( 0.15) 0.63     300.0       1.00
  TOTAL AREA(ACRES) =       300.0

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      662.66  Tc(MIN.) =   17.881
EFFECTIVE AREA(ACRES) =    249.43  AREA-AVERAGED Fm(INCH/HR) =  0.15
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.61
TOTAL AREA(ACRES) =      300.0
```

```
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =   5560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.757
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    52
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.10      0.20     1.000    96
  COMMERCIAL                 A        1.56      0.40     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     697.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.63
  AVERAGE FLOW DEPTH(FEET) =   1.40   TRAVEL TIME(MIN.) =   2.61
  Tc(MIN.) =   20.50
  SUBAREA AREA(ACRES) =    29.53       SUBAREA RUNOFF(CFS) =   69.46
  EFFECTIVE AREA(ACRES) =    278.96     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.61
  TOTAL AREA(ACRES) =      329.6         PEAK FLOW RATE(CFS) =     662.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   3.56
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =   6130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.563
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    52
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.52      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.848
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     673.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.59
  AVERAGE FLOW DEPTH(FEET) =   1.37   TRAVEL TIME(MIN.) =   2.78
  Tc(MIN.) =   23.28
  SUBAREA AREA(ACRES) =    10.25       SUBAREA RUNOFF(CFS) =   22.05
  EFFECTIVE AREA(ACRES) =    289.21     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
  TOTAL AREA(ACRES) =      339.8         PEAK FLOW RATE(CFS) =     662.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   3.56
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =   6730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
```

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 REPRESENTATIVE CHANNEL SLOPE =  0.0050
 CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.440
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    52
 NATURAL FAIR COVER
 "OPEN BRUSH"               D        4.47      0.20     1.000    96
 COMMERCIAL                 A        1.68      0.40     0.100    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.549
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     672.83
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.59
 AVERAGE FLOW DEPTH(FEET) =   1.37   TRAVEL TIME(MIN.) =   2.09
 Tc(MIN.) =   25.37
 SUBAREA AREA(ACRES) =     9.77       SUBAREA RUNOFF(CFS) =   20.33
 EFFECTIVE AREA(ACRES) =    298.98     AREA-AVERAGED Fm(INCH/HR) =   0.15
 AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
 TOTAL AREA(ACRES) =      349.6         PEAK FLOW RATE(CFS) =     662.66
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   3.56
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7180.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      349.6  TC(MIN.) =     25.37
 EFFECTIVE AREA(ACRES) =    298.98  AREA-AVERAGED Fm(INCH/HR)=  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap = 0.617
 PEAK FLOW RATE(CFS)   =     662.66

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      662.66   25.37    2.440  0.24( 0.15) 0.62     299.0      13.00
     2      609.02   35.37    2.017  0.24( 0.15) 0.63     349.6       1.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X100_B.DAT
  TIME/DATE OF STUDY: 16:13 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================= ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.913
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    91    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.38
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   2.82   Tc(MIN.) =   10.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.091
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.63      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    2.31
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.47
  FLOW VELOCITY(FEET/SEC.) =  2.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
  STREET FLOW TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =   13.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.543
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.72      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.28
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.13
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
  STREET FLOW TRAVEL TIME(MIN.) =   2.89   Tc(MIN.) =   16.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.164
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   19.13
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      24.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.12
  FLOW VELOCITY(FEET/SEC.) =  3.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.99
  STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =   18.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.880
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   19.20
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      41.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  24.80
  FLOW VELOCITY(FEET/SEC.) =  3.65   DEPTH*VELOCITY(FT*FT/SEC.) =   2.21
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   25.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.26   Tc(MIN.) =   21.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.701
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    3.55
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      42.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  25.04
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   2.23
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      56.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.66
    HALFSTREET FLOOD WIDTH(FEET) =   27.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.60
  STREET FLOW TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =   23.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.536
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   27.81
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      67.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.51
  FLOW VELOCITY(FEET/SEC.) =  4.11   DEPTH*VELOCITY(FT*FT/SEC.) =   2.86
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     109.80
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.79
    HALFSTREET FLOOD WIDTH(FEET) =   36.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.82
  STREET FLOW TRAVEL TIME(MIN.) =   2.34   Tc(MIN.) =   26.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.403
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    91
  SCHOOL                     D        9.91      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   84.30
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =     148.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.86   HALFSTREET FLOOD WIDTH(FEET) =  39.55
  FLOW VELOCITY(FEET/SEC.) =  5.33   DEPTH*VELOCITY(FT*FT/SEC.) =   4.57
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS  144.0 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.82
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     148.35
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   27.03
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.353
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   24.02
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     169.19

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.29
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.19
```

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  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   27.76
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.317
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       15.82      0.20     0.100    91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.45      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.122
  SUBAREA AREA(ACRES) =   20.27      SUBAREA RUNOFF(CFS) =   41.82
  EFFECTIVE AREA(ACRES) =    101.29   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =      101.3       PEAK FLOW RATE(CFS) =     208.42

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.242
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       20.98      0.20     1.000    96
  NATURAL POOR COVER
  "BARREN"                   D       12.82      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     239.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.66
  AVERAGE FLOW DEPTH(FEET) =   1.31   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =   29.40
  SUBAREA AREA(ACRES) =    33.80       SUBAREA RUNOFF(CFS) =   62.12
  EFFECTIVE AREA(ACRES) =    135.09     AREA-AVERAGED Fm(INCH/HR) =   0.07
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =      135.1         PEAK FLOW RATE(CFS) =     263.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.38   FLOW VELOCITY(FEET/SEC.) =   9.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6200.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      135.1  TC(MIN.) =     29.40
  EFFECTIVE AREA(ACRES) =    135.09  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.365
  PEAK FLOW RATE(CFS)   =     263.72
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

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****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2007 Advanced Engineering Software (aes)
              Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X100_C.DAT
  TIME/DATE OF STUDY: 16:13 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =    104.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.593
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.27      0.20     1.000    98   12.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.93
  TOTAL AREA(ACRES) =      2.27   PEAK FLOW RATE(CFS) =      6.93

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
  STREET FLOW TRAVEL TIME(MIN.) =   2.10   Tc(MIN.) =   15.01
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.295
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.61      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.61      SUBAREA RUNOFF(CFS) =   12.84
  EFFECTIVE AREA(ACRES) =      6.88    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      19.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.24
  FLOW VELOCITY(FEET/SEC.) =  3.03   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =   16.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.111
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.74      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =   12.42
  EFFECTIVE AREA(ACRES) =     11.62    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      30.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.10
  FLOW VELOCITY(FEET/SEC.) =  4.41   DEPTH*VELOCITY(FT*FT/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1200
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.99
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =   17.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        7.90      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   20.11
  EFFECTIVE AREA(ACRES) =     19.52    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       19.5        PEAK FLOW RATE(CFS) =      49.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.21
  FLOW VELOCITY(FEET/SEC.) =  9.78   DEPTH*VELOCITY(FT*FT/SEC.) =   4.42
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0900
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     104.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   10.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    6.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =   17.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.971
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       34.33      0.20     1.000    96
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   44.09      SUBAREA RUNOFF(CFS) =  109.95
  EFFECTIVE AREA(ACRES) =     63.61    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       63.6        PEAK FLOW RATE(CFS) =     158.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.65   HALFSTREET FLOOD WIDTH(FEET) =  27.23
  FLOW VELOCITY(FEET/SEC.) = 11.64   DEPTH*VELOCITY(FT*FT/SEC.) =   7.55
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1870.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       63.6  TC(MIN.) =     17.99
  EFFECTIVE AREA(ACRES) =     63.61  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     158.62
============================================================================
```

==
END OF RATIONAL METHOD ANALYSIS

Drainage D

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****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X100_D.DAT
  TIME/DATE OF STUDY: 10:01 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                  --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =     95.00  DOWNSTREAM(FEET) =     83.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.794
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.686
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.10      0.20     0.200    91    5.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.59
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      5.59

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =    8.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.644
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.58      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.58      SUBAREA RUNOFF(CFS) =   18.98
  EFFECTIVE AREA(ACRES) =      5.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.7        PEAK FLOW RATE(CFS) =      23.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  19.80
  FLOW VELOCITY(FEET/SEC.) =  3.18   DEPTH*VELOCITY(FT*FT/SEC.) =   1.64
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   740.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.096
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.61      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.10
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   2.02
  Tc(MIN.) =   10.27
  SUBAREA AREA(ACRES) =     8.61       SUBAREA RUNOFF(CFS) =   30.19
  EFFECTIVE AREA(ACRES) =     14.29     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =       14.3         PEAK FLOW RATE(CFS) =      50.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   6.75
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     10.27
  EFFECTIVE AREA(ACRES) =     14.29  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.682
  PEAK FLOW RATE(CFS)   =      50.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage E

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                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X100_E.DAT
  TIME/DATE OF STUDY: 16:35 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================= ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    103.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.376
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.39      0.20     0.200    91    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.33
  TOTAL AREA(ACRES) =      2.39   PEAK FLOW RATE(CFS) =      9.33

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   2.89   Tc(MIN.) =   12.04
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.739
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.83      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.83      SUBAREA RUNOFF(CFS) =   12.75
  EFFECTIVE AREA(ACRES) =      6.22    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.2        PEAK FLOW RATE(CFS) =      20.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.87
  FLOW VELOCITY(FEET/SEC.) =  3.07   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
  STREET FLOW TRAVEL TIME(MIN.) =   2.29   Tc(MIN.) =   14.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.384
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.65      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.65      SUBAREA RUNOFF(CFS) =   10.98
  EFFECTIVE AREA(ACRES) =      9.87    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        9.9        PEAK FLOW RATE(CFS) =      29.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.76
  FLOW VELOCITY(FEET/SEC.) =  3.36   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      52.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.65
    HALFSTREET FLOOD WIDTH(FEET) =   27.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.49
  STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =   15.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.189
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       6.18      0.20     0.100    91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       9.62      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.161
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   44.90
  EFFECTIVE AREA(ACRES) =     25.67    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       25.7        PEAK FLOW RATE(CFS) =      72.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.71   HALFSTREET FLOOD WIDTH(FEET) =  32.16
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   3.00
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   3.6 FT, IS   66.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    104.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =  1090.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      96.36
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.76
    HALFSTREET FLOOD WIDTH(FEET) =   34.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.54
  STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =   19.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.811
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      16.93      0.20     0.100    91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       1.76      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.109
  SUBAREA AREA(ACRES) =   18.69      SUBAREA RUNOFF(CFS) =   46.92
  EFFECTIVE AREA(ACRES) =     44.36    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       44.4        PEAK FLOW RATE(CFS) =     111.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.79   HALFSTREET FLOOD WIDTH(FEET) =  36.25
  FLOW VELOCITY(FEET/SEC.) =  4.86   DEPTH*VELOCITY(FT*FT/SEC.) =   3.85
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1090.0 FT WITH ELEVATION-DROP =  10.9 FT, IS   61.1 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    105.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2730.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     123.37
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.81
    HALFSTREET FLOOD WIDTH(FEET) =   37.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    4.10
  STREET FLOW TRAVEL TIME(MIN.) =   2.31   Tc(MIN.) =   22.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.639
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.36      0.20     0.200    91
  COMMERCIAL                 D        8.10      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.123
  SUBAREA AREA(ACRES) =   10.46      SUBAREA RUNOFF(CFS) =   24.61
  EFFECTIVE AREA(ACRES) =     54.82    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       54.8        PEAK FLOW RATE(CFS) =     128.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.82   HALFSTREET FLOOD WIDTH(FEET) =  37.84
  FLOW VELOCITY(FEET/SEC.) =  5.11   DEPTH*VELOCITY(FT*FT/SEC.) =   4.21
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   630.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     135.56
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.84
    HALFSTREET FLOOD WIDTH(FEET) =   38.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    4.34
  STREET FLOW TRAVEL TIME(MIN.) =   2.02   Tc(MIN.) =   24.14
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.510
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.09      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.09      SUBAREA RUNOFF(CFS) =   13.54
```

```
  EFFECTIVE AREA(ACRES) =     60.91    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       60.9        PEAK FLOW RATE(CFS) =     135.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.84   HALFSTREET FLOOD WIDTH(FEET) =  38.51
  FLOW VELOCITY(FEET/SEC.) =  5.18   DEPTH*VELOCITY(FT*FT/SEC.) =   4.34
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.130
  DEPTH OF FLOW IN 114.0 INCH PIPE IS  92.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.20
  ESTIMATED PIPE DIAMETER(INCH) = 114.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     135.96
  PIPE TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   26.04
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    4310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.04
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.404
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        4.84      0.20     0.100    91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       14.79      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =   19.63      SUBAREA RUNOFF(CFS) =   41.85
  EFFECTIVE AREA(ACRES) =     80.54   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       80.5       PEAK FLOW RATE(CFS) =     171.98

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   470.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.31
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     171.98
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   26.63
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    109.00 =    4780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.373
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.62      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.62      SUBAREA RUNOFF(CFS) =   32.50
  EFFECTIVE AREA(ACRES) =     97.16   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       97.2       PEAK FLOW RATE(CFS) =     202.26
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       97.2  TC(MIN.) =     26.63
  EFFECTIVE AREA(ACRES) =     97.16  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.300
  PEAK FLOW RATE(CFS)   =     202.26
```

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==
END OF RATIONAL METHOD ANALYSIS

Drainage F

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****************************************************************************
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                            Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: X100_F.DAT
  TIME/DATE OF STUDY: 16:35 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)     (FT)     SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.80      0.40     0.200    52    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     24.31
  TOTAL AREA(ACRES) =      5.80   PEAK FLOW RATE(CFS) =     24.31
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.8  TC(MIN.) =      7.97
  EFFECTIVE AREA(ACRES) =      5.80  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      24.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage G

```
****************************************************************************
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                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X100_G.DAT
  TIME/DATE OF STUDY: 16:35 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.110
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.690
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.75      0.40     0.200    52    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      7.26
  TOTAL AREA(ACRES) =      1.75   PEAK FLOW RATE(CFS) =      7.26
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.8  TC(MIN.) =      8.11
  EFFECTIVE AREA(ACRES) =      1.75  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       7.26
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage H

```
****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X100_H.DAT
  TIME/DATE OF STUDY: 16:35 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =     10.00  DOWNSTREAM(FEET) =      9.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.63      0.40     0.200    52    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.46
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      3.46

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   680.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.46
  PIPE TRAVEL TIME(MIN.) =   2.20    Tc(MIN.) =    7.20
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.019
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.53      0.40     0.200    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.53      SUBAREA RUNOFF(CFS) =   15.69
  EFFECTIVE AREA(ACRES) =      4.16   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      18.49

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.49
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.702
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        2.82      0.40     0.200    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    2.82      SUBAREA RUNOFF(CFS) =   11.73
  EFFECTIVE AREA(ACRES) =      6.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        7.0       PEAK FLOW RATE(CFS) =      29.04
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.0  TC(MIN.) =      8.07
  EFFECTIVE AREA(ACRES) =      6.98  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      29.04
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage I

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____________________________________________________________________________
****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X100_I.DAT
  TIME/DATE OF STUDY: 16:36 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.746
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.815
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.47      0.40     0.200    52    7.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    6.53
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
 STREET FLOW TRAVEL TIME(MIN.) =   1.79   Tc(MIN.) =    9.54
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.273
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       A        0.58      0.40     0.200    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    2.19
 EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.96

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.59
 FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
 LONGEST FLOWPATH FROM NODE    215.00 TO NODE    217.00 =     540.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      9.54
 EFFECTIVE AREA(ACRES) =      1.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
 PEAK FLOW RATE(CFS)   =       3.96
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
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Drainage J

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****************************************************************************
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                          Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X100_J.DAT
  TIME/DATE OF STUDY: 16:36 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.642
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.522
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.55      0.40     0.200    52    8.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.20
  TOTAL AREA(ACRES) =      1.55   PEAK FLOW RATE(CFS) =      6.20

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.73
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   2.44   Tc(MIN.) =   11.09
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.921
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.46      0.40     0.200    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.46      SUBAREA RUNOFF(CFS) =   11.96
  EFFECTIVE AREA(ACRES) =      5.01    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      17.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.54
  FLOW VELOCITY(FEET/SEC.) =  2.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.29   Tc(MIN.) =   13.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.520
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.98      0.40     0.200    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.98      SUBAREA RUNOFF(CFS) =   18.51
  EFFECTIVE AREA(ACRES) =     10.99    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      34.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.93
  FLOW VELOCITY(FEET/SEC.) =  3.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.99
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =    1150.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.0  TC(MIN.) =     13.38
  EFFECTIVE AREA(ACRES) =     10.99  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      34.03
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage K

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****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X100_K.DAT
  TIME/DATE OF STUDY: 16:36 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =      7.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.376
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.53      0.40     0.200    52    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.92
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      5.92

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =  14.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   1.67   Tc(MIN.) =   10.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.975
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        4.77      0.40     0.200    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.77      SUBAREA RUNOFF(CFS) =   16.72
  EFFECTIVE AREA(ACRES) =      6.30    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      22.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.77
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.76
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.11
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.08
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.17
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    228.00 =     830.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.3  TC(MIN.) =     11.17
  EFFECTIVE AREA(ACRES) =      6.30  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      22.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

ii. HC 25-Year Storm Event

Drainage A

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****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2007 Advanced Engineering Software (aes)
              Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                            Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X025_A.DAT
  TIME/DATE OF STUDY: 16:13 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.603
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    75    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   3.16   Tc(MIN.) =   11.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.02
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    8.18
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      12.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.70
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   15.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   14.42
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      25.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.63
  FLOW VELOCITY(FEET/SEC.) =  2.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.63
    HALFSTREET FLOOD WIDTH(FEET) =   26.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   17.11
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      40.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.67   HALFSTREET FLOOD WIDTH(FEET) =  28.16
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      58.57
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.73
    HALFSTREET FLOOD WIDTH(FEET) =   33.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =   20.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.163
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      18.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   35.55
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      74.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.78   HALFSTREET FLOOD WIDTH(FEET) =  35.58
  FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   2.64
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   56.2 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.11
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   21.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.27
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.126
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       0.81      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       4.99      0.20     1.000    83
  COMMERCIAL                 D       6.24      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA AREA(ACRES) =   12.04      SUBAREA RUNOFF(CFS) =   22.01
  EFFECTIVE AREA(ACRES) =     50.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       50.6       PEAK FLOW RATE(CFS) =      94.81

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.66
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.81
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   21.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1180.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.956
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       25.52      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        6.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     120.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.01
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   3.27
  Tc(MIN.) =   24.63
  SUBAREA AREA(ACRES) =    32.03       SUBAREA RUNOFF(CFS) =   50.63
  EFFECTIVE AREA(ACRES) =     82.60     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.52
  TOTAL AREA(ACRES) =       82.6         PEAK FLOW RATE(CFS) =     137.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   6.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       29.92      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       14.41      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     171.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.51
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   2.00
  Tc(MIN.) =   26.62
  SUBAREA AREA(ACRES) =    44.33       SUBAREA RUNOFF(CFS) =   66.71
  EFFECTIVE AREA(ACRES) =    126.93     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =      126.9         PEAK FLOW RATE(CFS) =     198.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.29   FLOW VELOCITY(FEET/SEC.) =   5.82
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.810
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       14.64      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     208.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.95
  AVERAGE FLOW DEPTH(FEET) =   1.33   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =   28.25
  SUBAREA AREA(ACRES) =    14.64       SUBAREA RUNOFF(CFS) =   21.22
  EFFECTIVE AREA(ACRES) =    141.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.72
  TOTAL AREA(ACRES) =      141.6         PEAK FLOW RATE(CFS) =     212.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.35   FLOW VELOCITY(FEET/SEC.) =   5.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    5020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     213.48
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.86
    HALFSTREET FLOOD WIDTH(FEET) =   39.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    6.52
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   29.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        1.83      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    2.27
  EFFECTIVE AREA(ACRES) =    143.40    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =      143.4        PEAK FLOW RATE(CFS) =     212.35
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.86   HALFSTREET FLOOD WIDTH(FEET) =  39.73
  FLOW VELOCITY(FEET/SEC.) =  7.55   DEPTH*VELOCITY(FT*FT/SEC.) =   6.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    75    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.53
  TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      9.53

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.07
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.53
  PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.986
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   31.84      SUBAREA RUNOFF(CFS) =   83.86
  EFFECTIVE AREA(ACRES) =     35.01   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       35.0       PEAK FLOW RATE(CFS) =      92.26

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       13.96      0.40     1.000    46
  COMMERCIAL                 D        2.65      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     126.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.71
  AVERAGE FLOW DEPTH(FEET) =   1.89   TRAVEL TIME(MIN.) =   0.73
  Tc(MIN.) =   12.40
  SUBAREA AREA(ACRES) =    28.25       SUBAREA RUNOFF(CFS) =   67.86
  EFFECTIVE AREA(ACRES) =     63.26     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =       63.3         PEAK FLOW RATE(CFS) =     156.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.05   FLOW VELOCITY(FEET/SEC.) =  18.68
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.07
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     156.93
  PIPE TRAVEL TIME(MIN.) =   2.50    Tc(MIN.) =   14.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4320.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.90
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.600
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              D       44.48      0.20     1.000    83
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      A        6.11      0.40     0.200    32
  COMMERCIAL                A        4.75      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.834
  SUBAREA AREA(ACRES) =   55.34      SUBAREA RUNOFF(CFS) =  120.88
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     261.59

******************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     261.59
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   15.20
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4590.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.20
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                  A        4.65      0.40     1.000    78
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      A       13.94      0.40     0.200    32
  COMMERCIAL                A        2.82      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"              A        2.64      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =   24.05      SUBAREA RUNOFF(CFS) =   51.91
  EFFECTIVE AREA(ACRES) =    142.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      142.7       PEAK FLOW RATE(CFS) =     310.34

******************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.471
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.68      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     323.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.21
  AVERAGE FLOW DEPTH(FEET) =   0.95   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =   16.31
  SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   25.93
  EFFECTIVE AREA(ACRES) =    155.06     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.55
  TOTAL AREA(ACRES) =      155.1         PEAK FLOW RATE(CFS) =     323.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.95   FLOW VELOCITY(FEET/SEC.) =   9.22
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.299
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     325.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.72
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   2.21
  Tc(MIN.) =   18.52
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =    156.64     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.54
  TOTAL AREA(ACRES) =      156.6         PEAK FLOW RATE(CFS) =     323.44
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =   2.71
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      323.44   18.52    2.299  0.28( 0.15) 0.54     156.6      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      212.35   29.22    1.776  0.20( 0.15) 0.72     143.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      501.23   18.52    2.299  0.25( 0.15) 0.61     247.5      13.00
      2      457.00   29.22    1.776  0.24( 0.15) 0.63     300.0       1.00
    TOTAL AREA(ACRES) =       300.0

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      501.23  Tc(MIN.) =   18.515
  EFFECTIVE AREA(ACRES) =    247.52  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =      300.0
```

```
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.10      0.20     1.000    83
  COMMERCIAL                 A        1.56      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     527.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.27
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   2.91
  Tc(MIN.) =   21.42
  SUBAREA AREA(ACRES) =    29.53       SUBAREA RUNOFF(CFS) =   52.46
  EFFECTIVE AREA(ACRES) =    277.05     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.61
  TOTAL AREA(ACRES) =      329.6         PEAK FLOW RATE(CFS) =     501.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.961
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.52      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.848
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     509.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.23
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   3.10
  Tc(MIN.) =   24.52
  SUBAREA AREA(ACRES) =    10.25       SUBAREA RUNOFF(CFS) =   16.50
  EFFECTIVE AREA(ACRES) =    287.30     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
  TOTAL AREA(ACRES) =      339.8         PEAK FLOW RATE(CFS) =     501.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
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REPRESENTATIVE CHANNEL SLOPE =  0.0050
CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.863
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    32
NATURAL FAIR COVER
"OPEN BRUSH"               D        4.47      0.20     1.000    83
COMMERCIAL                 A        1.68      0.40     0.100    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.549
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     508.86
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.22
AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.33
Tc(MIN.) =   26.85
SUBAREA AREA(ACRES) =     9.77       SUBAREA RUNOFF(CFS) =   15.26
EFFECTIVE AREA(ACRES) =    297.07     AREA-AVERAGED Fm(INCH/HR) =   0.15
AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
TOTAL AREA(ACRES) =      349.6         PEAK FLOW RATE(CFS) =     501.23
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7180.00 FEET.
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =      349.6  TC(MIN.) =     26.85
EFFECTIVE AREA(ACRES) =    297.07  AREA-AVERAGED Fm(INCH/HR)=  0.15
AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap = 0.617
PEAK FLOW RATE(CFS)   =     501.23

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1      501.23   26.85    1.863  0.24( 0.15) 0.62     297.1      13.00
    2      457.00   37.87    1.533  0.24( 0.15) 0.63     349.6       1.00
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_B.DAT
  TIME/DATE OF STUDY: 16:14 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.841
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.86
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.86

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   10.44
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.180
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.12   Tc(MIN.) =   13.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.743
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.76
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.84
  FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   16.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.443
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   14.74
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      18.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.16
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   19.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   14.77
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      31.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   22.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      32.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.54
  FLOW VELOCITY(FEET/SEC.) =  3.44   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   25.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.62   Tc(MIN.) =   24.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.951
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   21.34
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      51.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.65   HALFSTREET FLOOD WIDTH(FEET) =  27.07
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   2.49
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.11
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.74
    HALFSTREET FLOOD WIDTH(FEET) =   33.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   27.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.846
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    75
  SCHOOL                     D        9.91      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   64.38
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =     113.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.80   HALFSTREET FLOOD WIDTH(FEET) =  36.44
  FLOW VELOCITY(FEET/SEC.) =  4.91   DEPTH*VELOCITY(FT*FT/SEC.) =   3.90
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
        AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS  112.5 CFS,
        WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.45
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   28.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   28.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.806
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   18.39
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     129.35

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.34
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.35
```

```
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   29.15
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   29.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       15.82      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.45      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.122
  SUBAREA AREA(ACRES) =   20.27      SUBAREA RUNOFF(CFS) =   32.00
  EFFECTIVE AREA(ACRES) =    101.29   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =      101.3       PEAK FLOW RATE(CFS) =     159.33

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.719
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       20.98      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       12.82      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     182.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.83
  AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   1.79
  Tc(MIN.) =   30.94
  SUBAREA AREA(ACRES) =    33.80       SUBAREA RUNOFF(CFS) =   46.22
  EFFECTIVE AREA(ACRES) =    135.09     AREA-AVERAGED Fm(INCH/HR) =   0.07
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =      135.1         PEAK FLOW RATE(CFS) =     200.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   9.10
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6200.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      135.1  TC(MIN.) =     30.94
  EFFECTIVE AREA(ACRES) =    135.09  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.365
  PEAK FLOW RATE(CFS)   =     200.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X025_C.DAT
  TIME/DATE OF STUDY: 16:14 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =    104.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.819
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.27      0.20     1.000    93   12.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.35
  TOTAL AREA(ACRES) =      2.27   PEAK FLOW RATE(CFS) =      5.35

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   14.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   15.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.576
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.61      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.61      SUBAREA RUNOFF(CFS) =    9.86
  EFFECTIVE AREA(ACRES) =      6.88    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      14.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.37
  FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   16.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.427
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.74      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =    9.50
  EFFECTIVE AREA(ACRES) =     11.62    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      23.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.15
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1200
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =   17.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.360
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        7.90      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   15.36
  EFFECTIVE AREA(ACRES) =     19.52    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       19.5        PEAK FLOW RATE(CFS) =      37.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.49
  FLOW VELOCITY(FEET/SEC.) =  9.17   DEPTH*VELOCITY(FT*FT/SEC.) =   3.86
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0900
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      79.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    5.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =   18.31
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.314
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       34.33      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   44.09      SUBAREA RUNOFF(CFS) =   83.89
  EFFECTIVE AREA(ACRES) =     63.61    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       63.6        PEAK FLOW RATE(CFS) =     121.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.60   HALFSTREET FLOOD WIDTH(FEET) =  24.57
  FLOW VELOCITY(FEET/SEC.) = 10.84   DEPTH*VELOCITY(FT*FT/SEC.) =   6.52
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1870.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       63.6  TC(MIN.) =     18.31
  EFFECTIVE AREA(ACRES) =     63.61  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     121.03
============================================================================
```

==
END OF RATIONAL METHOD ANALYSIS

Drainage D

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****************************************************************************
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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X025_D.DAT
  TIME/DATE OF STUDY: 10:05 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =     95.00  DOWNSTREAM(FEET) =     83.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.794
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.438
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.10      0.20     0.200    75    5.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =    8.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.600
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.58      SUBAREA RUNOFF(CFS) =   14.67
  EFFECTIVE AREA(ACRES) =      5.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.7        PEAK FLOW RATE(CFS) =      18.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.85
  FLOW VELOCITY(FEET/SEC.) =  2.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   740.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.153
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.61      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.57
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   2.21
  Tc(MIN.) =   10.60
  SUBAREA AREA(ACRES) =     8.61       SUBAREA RUNOFF(CFS) =   22.88
  EFFECTIVE AREA(ACRES) =     14.29     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =       14.3         PEAK FLOW RATE(CFS) =      38.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   6.12
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     10.60
  EFFECTIVE AREA(ACRES) =     14.29  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.682
  PEAK FLOW RATE(CFS)   =      38.79
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X025_E.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    103.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.39      0.20     0.200    75    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      7.28
  TOTAL AREA(ACRES) =      2.39   PEAK FLOW RATE(CFS) =      7.28

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =  15.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   12.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.83      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.83      SUBAREA RUNOFF(CFS) =    9.89
  EFFECTIVE AREA(ACRES) =      6.22    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.2        PEAK FLOW RATE(CFS) =      16.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  16.99
  FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.35
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =  18.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.52
  STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =   14.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.623
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.65      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.65      SUBAREA RUNOFF(CFS) =    8.48
  EFFECTIVE AREA(ACRES) =      9.87    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        9.9        PEAK FLOW RATE(CFS) =      22.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.65
  FLOW VELOCITY(FEET/SEC.) =  3.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.62
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.60
    HALFSTREET FLOOD WIDTH(FEET) =   24.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =   16.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.469
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       6.18      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       9.62      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.161
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   34.65
  EFFECTIVE AREA(ACRES) =     25.67    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       25.7        PEAK FLOW RATE(CFS) =      56.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.66   HALFSTREET FLOOD WIDTH(FEET) =  27.93
  FLOW VELOCITY(FEET/SEC.) =  3.93   DEPTH*VELOCITY(FT*FT/SEC.) =   2.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =  1090.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      74.26
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.71
    HALFSTREET FLOOD WIDTH(FEET) =   32.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.03
  STREET FLOW TRAVEL TIME(MIN.) =   4.28   Tc(MIN.) =   20.61
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.164
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      16.93      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       1.76      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.109
  SUBAREA AREA(ACRES) =   18.69      SUBAREA RUNOFF(CFS) =   36.03
  EFFECTIVE AREA(ACRES) =     44.36    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       44.4        PEAK FLOW RATE(CFS) =      85.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.74   HALFSTREET FLOOD WIDTH(FEET) =  33.57
  FLOW VELOCITY(FEET/SEC.) =  4.46   DEPTH*VELOCITY(FT*FT/SEC.) =   3.29
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      94.65
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.76
    HALFSTREET FLOOD WIDTH(FEET) =   34.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.50
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =   23.13
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.027
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.36      0.20     0.200    75
  COMMERCIAL                 D        8.10      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.123
  SUBAREA AREA(ACRES) =   10.46      SUBAREA RUNOFF(CFS) =   18.85
  EFFECTIVE AREA(ACRES) =     54.82    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       54.8        PEAK FLOW RATE(CFS) =      98.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.77   HALFSTREET FLOOD WIDTH(FEET) =  34.97
  FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   3.59
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   630.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     103.76
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.78
    HALFSTREET FLOOD WIDTH(FEET) =   35.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.21   Tc(MIN.) =   25.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.925
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.09      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.09      SUBAREA RUNOFF(CFS) =   10.33
  EFFECTIVE AREA(ACRES) =     60.91    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       60.9        PEAK FLOW RATE(CFS) =     103.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.78   HALFSTREET FLOOD WIDTH(FEET) =  35.52
```

```
  FLOW VELOCITY(FEET/SEC.) =  4.77   DEPTH*VELOCITY(FT*FT/SEC.) =   3.70
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.130
  DEPTH OF FLOW IN 108.0 INCH PIPE IS  78.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.10
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     103.90
  PIPE TRAVEL TIME(MIN.) =   1.98    Tc(MIN.) =   27.32
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    4310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.32
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.845
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        4.84      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       14.79      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =   19.63      SUBAREA RUNOFF(CFS) =   31.97
  EFFECTIVE AREA(ACRES) =     80.54   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       80.5       PEAK FLOW RATE(CFS) =     131.46

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   470.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.46
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   27.96
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    109.00 =    4780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.821
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.62      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.62      SUBAREA RUNOFF(CFS) =   24.24
  EFFECTIVE AREA(ACRES) =     97.16   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       97.2       PEAK FLOW RATE(CFS) =     153.98
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       97.2  TC(MIN.) =     27.96
  EFFECTIVE AREA(ACRES) =     97.16  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.300
  PEAK FLOW RATE(CFS)   =     153.98
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage F

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_F.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.705
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.80      0.40     0.200    32    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     18.92
  TOTAL AREA(ACRES) =      5.80   PEAK FLOW RATE(CFS) =     18.92
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.8  TC(MIN.) =      7.97
  EFFECTIVE AREA(ACRES) =      5.80  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      18.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage G

```
****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_G.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.110
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.669
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.75      0.40     0.200    32    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.65
  TOTAL AREA(ACRES) =      1.75   PEAK FLOW RATE(CFS) =      5.65
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.8  TC(MIN.) =      8.11
  EFFECTIVE AREA(ACRES) =      1.75  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       5.65
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage H

```
****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X025_H.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =     10.00  DOWNSTREAM(FEET) =      9.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.63      0.40     0.200    32    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.69
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.69

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   680.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.69
  PIPE TRAVEL TIME(MIN.) =   2.37    Tc(MIN.) =    7.37
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.37
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.53      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.53      SUBAREA RUNOFF(CFS) =   12.05
  EFFECTIVE AREA(ACRES) =      4.16   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      14.20

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.20
  PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =    8.31
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.31
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.618
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        2.82      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    2.82      SUBAREA RUNOFF(CFS) =    8.98
  EFFECTIVE AREA(ACRES) =      6.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        7.0       PEAK FLOW RATE(CFS) =      22.23
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.0  TC(MIN.) =      8.31
  EFFECTIVE AREA(ACRES) =      6.98  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      22.23
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage I

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****************************************************************************
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                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: X025_I.DAT
  TIME/DATE OF STUDY: 16:39 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.746
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.765
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.47      0.40     0.200    32    7.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    9.60
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.335
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.58      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.53
  FLOW VELOCITY(FEET/SEC.) =  2.68   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    217.00 =     540.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      9.60
  EFFECTIVE AREA(ACRES) =      1.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       3.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage J

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_J.DAT
  TIME/DATE OF STUDY: 16:39 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.642
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.539
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.55      0.40     0.200    32    8.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.83
  TOTAL AREA(ACRES) =      1.55   PEAK FLOW RATE(CFS) =      4.83

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   2.61   Tc(MIN.) =   11.25
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.048
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.46      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.46      SUBAREA RUNOFF(CFS) =    9.24
  EFFECTIVE AREA(ACRES) =      5.01    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      13.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =   13.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.726
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.98      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.98      SUBAREA RUNOFF(CFS) =   14.24
  EFFECTIVE AREA(ACRES) =     10.99    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      26.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.66
  FLOW VELOCITY(FEET/SEC.) =  3.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =    1150.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.0  TC(MIN.) =     13.70
  EFFECTIVE AREA(ACRES) =     10.99  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      26.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage K

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_K.DAT
  TIME/DATE OF STUDY: 16:39 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =      7.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.53      0.40     0.200    32    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.61
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      4.61

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.25
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =   10.91
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        4.77      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.77      SUBAREA RUNOFF(CFS) =   12.97
  EFFECTIVE AREA(ACRES) =      6.30    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      17.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.05
  FLOW VELOCITY(FEET/SEC.) =  3.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.13
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    228.00 =     830.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.3  TC(MIN.) =     11.29
  EFFECTIVE AREA(ACRES) =      6.30  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      17.13
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

iii. HC 10-Year Storm Event

Drainage A

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X010_A.DAT
  TIME/DATE OF STUDY: 16:24 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    75    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.82
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.82

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   3.27   Tc(MIN.) =   11.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.82
  FLOW VELOCITY(FEET/SEC.) =  1.62   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   2.33   Tc(MIN.) =   13.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    6.75
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      10.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.37
  FLOW VELOCITY(FEET/SEC.) =  2.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   2.31   Tc(MIN.) =   16.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.064
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   11.86
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      21.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.91
  FLOW VELOCITY(FEET/SEC.) =  2.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.60
    HALFSTREET FLOOD WIDTH(FEET) =   24.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =   19.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.881
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   14.05
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      33.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  26.13
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      47.99
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   21.22
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.773
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       18.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   29.08
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      60.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.74   HALFSTREET FLOOD WIDTH(FEET) =  33.63
  FLOW VELOCITY(FEET/SEC.) =  3.16   DEPTH*VELOCITY(FT*FT/SEC.) =   2.34
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   47.0 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.59
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   21.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.90
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.741
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.81      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.99      0.20     1.000    83
  COMMERCIAL                 D        6.24      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA AREA(ACRES) =   12.04      SUBAREA RUNOFF(CFS) =   17.84
  EFFECTIVE AREA(ACRES) =     50.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       50.6       PEAK FLOW RATE(CFS) =      77.32

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.14
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.32
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   21.99
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1180.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.595
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       25.52      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        6.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      97.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.55
  AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   3.54
  Tc(MIN.) =   25.54
  SUBAREA AREA(ACRES) =    32.03       SUBAREA RUNOFF(CFS) =   40.21
  EFFECTIVE AREA(ACRES) =     82.60     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.52
  TOTAL AREA(ACRES) =       82.6         PEAK FLOW RATE(CFS) =     110.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   5.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.522
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       29.92      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       14.41      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     137.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.09
  AVERAGE FLOW DEPTH(FEET) =   1.03   TRAVEL TIME(MIN.) =   2.16
  Tc(MIN.) =   27.70
  SUBAREA AREA(ACRES) =    44.33       SUBAREA RUNOFF(CFS) =   52.75
  EFFECTIVE AREA(ACRES) =    126.93     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =      126.9         PEAK FLOW RATE(CFS) =     158.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =   5.35
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.469
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       14.64      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     166.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.47
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   1.77
  Tc(MIN.) =   29.46
  SUBAREA AREA(ACRES) =    14.64       SUBAREA RUNOFF(CFS) =   16.72
  EFFECTIVE AREA(ACRES) =    141.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.72
  TOTAL AREA(ACRES) =      141.6         PEAK FLOW RATE(CFS) =     168.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.17   FLOW VELOCITY(FEET/SEC.) =   5.51
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    5020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     169.75
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.81
    HALFSTREET FLOOD WIDTH(FEET) =   37.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    5.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =   30.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.440
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        1.83      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     1.83      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =    143.40    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =      143.4        PEAK FLOW RATE(CFS) =     168.89
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.81   HALFSTREET FLOOD WIDTH(FEET) =  36.98
  FLOW VELOCITY(FEET/SEC.) =  7.06   DEPTH*VELOCITY(FT*FT/SEC.) =   5.69
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.832
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    75    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      7.97
  TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      7.97

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.58
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.97
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   11.76
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.76
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   31.84      SUBAREA RUNOFF(CFS) =   69.53
  EFFECTIVE AREA(ACRES) =     35.01   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       35.0       PEAK FLOW RATE(CFS) =      76.51

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.398
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       13.96      0.40     1.000    46
  COMMERCIAL                 D        2.65      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     104.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  16.87
  AVERAGE FLOW DEPTH(FEET) =   1.76   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =   12.53
  SUBAREA AREA(ACRES) =    28.25       SUBAREA RUNOFF(CFS) =   55.47
  EFFECTIVE AREA(ACRES) =     63.26     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =       63.3         PEAK FLOW RATE(CFS) =     129.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.90   FLOW VELOCITY(FEET/SEC.) =  17.81
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.45
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.19
  PIPE TRAVEL TIME(MIN.) =   2.66    Tc(MIN.) =   15.19
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.147
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       44.48      0.20     1.000    83
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    32
  COMMERCIAL                 A        4.75      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.834
  SUBAREA AREA(ACRES) =   55.34      SUBAREA RUNOFF(CFS) =   98.33
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     213.25

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  46.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.86
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     213.25
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   15.52
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4590.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.52
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.121
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    78
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    32
  COMMERCIAL                 A        2.82      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.64      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =   24.05      SUBAREA RUNOFF(CFS) =   42.19
  EFFECTIVE AREA(ACRES) =    142.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      142.7       PEAK FLOW RATE(CFS) =     252.68

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.033
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.68      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     263.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.52
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   1.19
  Tc(MIN.) =   16.71
  SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   21.04
  EFFECTIVE AREA(ACRES) =    155.06     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.55
  TOTAL AREA(ACRES) =      155.1         PEAK FLOW RATE(CFS) =     262.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   8.49
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.884
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     263.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.52
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   2.39
  Tc(MIN.) =   19.10
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    2.62
  EFFECTIVE AREA(ACRES) =    156.64     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.54
  TOTAL AREA(ACRES) =      156.6         PEAK FLOW RATE(CFS) =     262.40
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   2.50
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      262.40   19.10    1.884  0.28( 0.15) 0.54     156.6      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      168.89   30.50    1.440  0.20( 0.15) 0.72     143.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      404.39   19.10    1.884  0.25( 0.15) 0.61     246.4      13.00
      2      364.14   30.50    1.440  0.24( 0.15) 0.63     300.0       1.00
    TOTAL AREA(ACRES) =       300.0

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      404.39  Tc(MIN.) =   19.098
  EFFECTIVE AREA(ACRES) =    246.43  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =      300.0
```

```
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.726
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.10      0.20     1.000    83
  COMMERCIAL                 A        1.56      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     425.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.02
  AVERAGE FLOW DEPTH(FEET) =   1.04   TRAVEL TIME(MIN.) =   3.15
  Tc(MIN.) =   22.25
  SUBAREA AREA(ACRES) =    29.53       SUBAREA RUNOFF(CFS) =   42.06
  EFFECTIVE AREA(ACRES) =    275.96     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.61
  TOTAL AREA(ACRES) =      329.6         PEAK FLOW RATE(CFS) =     404.39
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.01   FLOW VELOCITY(FEET/SEC.) =   2.96
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.592
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.52      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.848
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     410.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.97
  AVERAGE FLOW DEPTH(FEET) =   1.03   TRAVEL TIME(MIN.) =   3.37
  Tc(MIN.) =   25.62
  SUBAREA AREA(ACRES) =    10.25       SUBAREA RUNOFF(CFS) =   13.09
  EFFECTIVE AREA(ACRES) =    286.21     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
  TOTAL AREA(ACRES) =      339.8         PEAK FLOW RATE(CFS) =     404.39
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.01   FLOW VELOCITY(FEET/SEC.) =   2.96
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
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  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.508
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.47      0.20     1.000    83
  COMMERCIAL                 A        1.68      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.549
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     410.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.96
  AVERAGE FLOW DEPTH(FEET) =   1.03   TRAVEL TIME(MIN.) =   2.53
  Tc(MIN.) =   28.15
  SUBAREA AREA(ACRES) =     9.77       SUBAREA RUNOFF(CFS) =   12.14
  EFFECTIVE AREA(ACRES) =    295.98     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
  TOTAL AREA(ACRES) =      349.6         PEAK FLOW RATE(CFS) =     404.39
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.01   FLOW VELOCITY(FEET/SEC.) =   2.96
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7180.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      349.6  TC(MIN.) =     28.15
  EFFECTIVE AREA(ACRES) =    295.98  AREA-AVERAGED Fm(INCH/HR)=  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap = 0.616
  PEAK FLOW RATE(CFS)   =     404.39

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      404.39   28.15    1.508  0.24( 0.15) 0.62     296.0      13.00
      2      364.14   39.93    1.234  0.24( 0.15) 0.63     349.6       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage B

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****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2007 Advanced Engineering Software (aes)
              Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                            Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X010_B.DAT
  TIME/DATE OF STUDY: 16:26 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.224
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   3.06   Tc(MIN.) =   10.54
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.648
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.49
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.53
  FLOW VELOCITY(FEET/SEC.) =  1.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   3.22   Tc(MIN.) =   13.75
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.273
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.46
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.97
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   3.21   Tc(MIN.) =   16.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.016
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   12.14
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      15.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.76
  FLOW VELOCITY(FEET/SEC.) =  2.88   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.57
  STREET FLOW TRAVEL TIME(MIN.) =   3.22   Tc(MIN.) =   20.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.825
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   12.12
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      26.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.66
  FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      27.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =   22.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.705
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    2.23
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      26.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.82
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.76   Tc(MIN.) =   25.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.597
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   17.42
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      42.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  25.04
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   2.23
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      68.49
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.88
  STREET FLOW TRAVEL TIME(MIN.) =   2.75   Tc(MIN.) =   28.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.505
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    75
  SCHOOL                     D        9.91      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   52.21
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =      92.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.75   HALFSTREET FLOOD WIDTH(FEET) =  34.30
  FLOW VELOCITY(FEET/SEC.) =  4.59   DEPTH*VELOCITY(FT*FT/SEC.) =   3.45
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS   93.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.30
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.13
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   29.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   29.36
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.472
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   14.95
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     105.00

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.78
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     105.00
```

```
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   30.18
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   30.18
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.449
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       15.82      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.45      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.122
  SUBAREA AREA(ACRES) =   20.27      SUBAREA RUNOFF(CFS) =   25.99
  EFFECTIVE AREA(ACRES) =    101.29   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =      101.3       PEAK FLOW RATE(CFS) =     129.31

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.399
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       20.98      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       12.82      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     147.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.25
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   1.92
  Tc(MIN.) =   32.10
  SUBAREA AREA(ACRES) =    33.80       SUBAREA RUNOFF(CFS) =   36.47
  EFFECTIVE AREA(ACRES) =    135.09     AREA-AVERAGED Fm(INCH/HR) =   0.07
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =      135.1         PEAK FLOW RATE(CFS) =     161.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.05   FLOW VELOCITY(FEET/SEC.) =   8.48
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6200.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      135.1  TC(MIN.) =     32.10
  EFFECTIVE AREA(ACRES) =    135.09  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.365
  PEAK FLOW RATE(CFS)   =     161.20
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X010_C.DAT
  TIME/DATE OF STUDY: 16:15 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =    104.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.357
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.27      0.20     1.000    93   12.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.41
  TOTAL AREA(ACRES) =      2.27   PEAK FLOW RATE(CFS) =      4.41

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   2.33   Tc(MIN.) =   15.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.143
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.61      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.61      SUBAREA RUNOFF(CFS) =    8.06
  EFFECTIVE AREA(ACRES) =      6.88    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      12.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.04
  FLOW VELOCITY(FEET/SEC.) =  2.72   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   17.01
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.74      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =    7.73
  EFFECTIVE AREA(ACRES) =     11.62    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      18.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  3.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1200
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.16
  STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =   17.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.954
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        7.90      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   12.47
  EFFECTIVE AREA(ACRES) =     19.52    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       19.5        PEAK FLOW RATE(CFS) =      30.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.24
  FLOW VELOCITY(FEET/SEC.) =  8.76   DEPTH*VELOCITY(FT*FT/SEC.) =   3.49
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0900
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      64.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    4.71
  STREET FLOW TRAVEL TIME(MIN.) =   0.66   Tc(MIN.) =   18.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.914
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       34.33      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   44.09      SUBAREA RUNOFF(CFS) =   68.00
  EFFECTIVE AREA(ACRES) =     63.61    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       63.6        PEAK FLOW RATE(CFS) =      98.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.62
  FLOW VELOCITY(FEET/SEC.) = 10.30   DEPTH*VELOCITY(FT*FT/SEC.) =   5.84
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1870.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       63.6  TC(MIN.) =     18.57
  EFFECTIVE AREA(ACRES) =     63.61  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      98.11
============================================================================
```

==
END OF RATIONAL METHOD ANALYSIS

Drainage D

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X010_D.DAT
  TIME/DATE OF STUDY: 10:05 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =     95.00  DOWNSTREAM(FEET) =     83.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.794
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.731
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.10      0.20     0.200    75    5.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.65
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.65

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   2.71   Tc(MIN.) =    8.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.995
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.58      SUBAREA RUNOFF(CFS) =   12.18
  EFFECTIVE AREA(ACRES) =      5.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.7        PEAK FLOW RATE(CFS) =      15.10

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.52
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   740.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.602
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.61      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.22
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   2.36
  Tc(MIN.) =   10.86
  SUBAREA AREA(ACRES) =     8.61       SUBAREA RUNOFF(CFS) =   18.62
  EFFECTIVE AREA(ACRES) =     14.29     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =       14.3         PEAK FLOW RATE(CFS) =      31.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   5.71
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     10.86
  EFFECTIVE AREA(ACRES) =     14.29  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.682
  PEAK FLOW RATE(CFS)   =      31.71
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage E

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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X010_E.DAT
  TIME/DATE OF STUDY: 16:40 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    103.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.871
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.39      0.20     0.200    75    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.09
  TOTAL AREA(ACRES) =      2.39   PEAK FLOW RATE(CFS) =      6.09

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =  14.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
  STREET FLOW TRAVEL TIME(MIN.) =   3.19   Tc(MIN.) =   12.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.419
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       3.83      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.83      SUBAREA RUNOFF(CFS) =    8.20
  EFFECTIVE AREA(ACRES) =      6.22    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.2        PEAK FLOW RATE(CFS) =      13.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  2.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =  17.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.38
  STREET FLOW TRAVEL TIME(MIN.) =   2.56   Tc(MIN.) =   14.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.172
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       3.65      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.65      SUBAREA RUNOFF(CFS) =    7.00
  EFFECTIVE AREA(ACRES) =      9.87    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        9.9        PEAK FLOW RATE(CFS) =      18.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.16
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.97
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   16.63
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.039
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       6.18      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       9.62      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.161
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   28.54
  EFFECTIVE AREA(ACRES) =     25.67    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       25.7        PEAK FLOW RATE(CFS) =      46.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  25.90
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   2.34
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =  1090.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      61.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.68
    HALFSTREET FLOOD WIDTH(FEET) =   29.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.72
  STREET FLOW TRAVEL TIME(MIN.) =   4.52   Tc(MIN.) =   21.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.777
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      16.93      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       1.76      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.109
  SUBAREA AREA(ACRES) =   18.69      SUBAREA RUNOFF(CFS) =   29.52
  EFFECTIVE AREA(ACRES) =     44.36    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       44.4        PEAK FLOW RATE(CFS) =      69.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.80
  FLOW VELOCITY(FEET/SEC.) =  4.16   DEPTH*VELOCITY(FT*FT/SEC.) =   2.92
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      77.45
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.72
    HALFSTREET FLOOD WIDTH(FEET) =   32.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.11
  STREET FLOW TRAVEL TIME(MIN.) =   2.71   Tc(MIN.) =   23.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.658
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.36      0.20     0.200    75
  COMMERCIAL                 D        8.10      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.123
  SUBAREA AREA(ACRES) =   10.46      SUBAREA RUNOFF(CFS) =   15.38
  EFFECTIVE AREA(ACRES) =     54.82    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       54.8        PEAK FLOW RATE(CFS) =      80.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.73   HALFSTREET FLOOD WIDTH(FEET) =  33.02
  FLOW VELOCITY(FEET/SEC.) =  4.38   DEPTH*VELOCITY(FT*FT/SEC.) =   3.18
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   630.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.60
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.74
    HALFSTREET FLOOD WIDTH(FEET) =   33.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.28
  STREET FLOW TRAVEL TIME(MIN.) =   2.36   Tc(MIN.) =   26.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.571
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.09      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.09      SUBAREA RUNOFF(CFS) =    8.39
  EFFECTIVE AREA(ACRES) =     60.91    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       60.9        PEAK FLOW RATE(CFS) =      84.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.74   HALFSTREET FLOOD WIDTH(FEET) =  33.51
  FLOW VELOCITY(FEET/SEC.) =  4.44   DEPTH*VELOCITY(FT*FT/SEC.) =   3.27
```

```
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.130
  DEPTH OF FLOW IN  96.0 INCH PIPE IS  76.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.96
  ESTIMATED PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.49
  PIPE TRAVEL TIME(MIN.) =   2.12    Tc(MIN.) =   28.34
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    4310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   28.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        4.84      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       14.79      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =   19.63      SUBAREA RUNOFF(CFS) =   25.92
  EFFECTIVE AREA(ACRES) =     80.54   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       80.5       PEAK FLOW RATE(CFS) =     106.66

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   470.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.80
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.66
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   29.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    109.00 =    4780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   29.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.483
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.62      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.62      SUBAREA RUNOFF(CFS) =   19.19
  EFFECTIVE AREA(ACRES) =     97.16   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       97.2       PEAK FLOW RATE(CFS) =     124.41
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       97.2  TC(MIN.) =     29.00
  EFFECTIVE AREA(ACRES) =     97.16  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.300
  PEAK FLOW RATE(CFS)   =     124.41
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage F

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X010_F.DAT
  TIME/DATE OF STUDY: 16:41 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.80      0.40     0.200    32    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     15.81
  TOTAL AREA(ACRES) =      5.80   PEAK FLOW RATE(CFS) =     15.81
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.8  TC(MIN.) =      7.97
  EFFECTIVE AREA(ACRES) =      5.80  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      15.81
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage G

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****************************************************************************
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                            Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X010_G.DAT
  TIME/DATE OF STUDY: 16:41 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.110
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.077
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.75      0.40     0.200    32    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.72
  TOTAL AREA(ACRES) =      1.75   PEAK FLOW RATE(CFS) =      4.72
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.8  TC(MIN.) =      8.11
  EFFECTIVE AREA(ACRES) =      1.75  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       4.72
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage H

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____________________________________________________________________________
****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X010_H.DAT
  TIME/DATE OF STUDY: 16:41 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =     10.00  DOWNSTREAM(FEET) =      9.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.63      0.40     0.200    32    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.26

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   680.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.26
  PIPE TRAVEL TIME(MIN.) =   2.46    Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.228
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.53      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.53      SUBAREA RUNOFF(CFS) =   10.00
  EFFECTIVE AREA(ACRES) =      4.16   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      11.79

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.79
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =    8.42
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.011
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        2.82      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    2.82      SUBAREA RUNOFF(CFS) =    7.44
  EFFECTIVE AREA(ACRES) =      6.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        7.0       PEAK FLOW RATE(CFS) =      18.41
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.0  TC(MIN.) =      8.42
  EFFECTIVE AREA(ACRES) =      6.98  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      18.41
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage I

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X010_I.DAT
  TIME/DATE OF STUDY: 16:42 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.746
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.159
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.47      0.40     0.200    32    7.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.30
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.30

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    4.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    9.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.788
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.58      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   5.72
  FLOW VELOCITY(FEET/SEC.) =  2.63   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    217.00 =     540.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      9.64
  EFFECTIVE AREA(ACRES) =      1.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       2.56
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage J

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****************************************************************************
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                         Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X010_J.DAT
  TIME/DATE OF STUDY: 16:42 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.642
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.967
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.55      0.40     0.200    32    8.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.03
  TOTAL AREA(ACRES) =      1.55   PEAK FLOW RATE(CFS) =      4.03

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.71   Tc(MIN.) =   11.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.538
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.46      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.46      SUBAREA RUNOFF(CFS) =    7.65
  EFFECTIVE AREA(ACRES) =      5.01    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      11.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.57
  FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   2.56   Tc(MIN.) =   13.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.259
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.98      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.98      SUBAREA RUNOFF(CFS) =   11.73
  EFFECTIVE AREA(ACRES) =     10.99    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      21.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.10
  FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.57
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =    1150.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.0  TC(MIN.) =     13.91
  EFFECTIVE AREA(ACRES) =     10.99  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      21.55
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage K

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****************************************************************************
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                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: X010_K.DAT
  TIME/DATE OF STUDY: 16:42 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =      7.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.871
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.53      0.40     0.200    32    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.84
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      3.84

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
  STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =   10.99
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        4.77      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.77      SUBAREA RUNOFF(CFS) =   10.75
  EFFECTIVE AREA(ACRES) =      6.30    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      14.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.80
  FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.20
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    228.00 =     830.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.3  TC(MIN.) =     11.39
  EFFECTIVE AREA(ACRES) =      6.30  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      14.20
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

b) Expected Value (50% Confidence) Events

i. EV 100-Year Storm Event

Drainage A

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: X025_A.DAT
  TIME/DATE OF STUDY: 16:13 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.603
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    75    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   3.16   Tc(MIN.) =   11.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.02
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    8.18
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      12.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.70
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   15.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   14.42
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      25.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.63
  FLOW VELOCITY(FEET/SEC.) =  2.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.63
    HALFSTREET FLOOD WIDTH(FEET) =   26.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   17.11
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      40.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.67   HALFSTREET FLOOD WIDTH(FEET) =  28.16
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      58.57
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.73
    HALFSTREET FLOOD WIDTH(FEET) =   33.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =   20.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.163
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       18.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   35.55
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      74.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.78   HALFSTREET FLOOD WIDTH(FEET) =  35.58
  FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   2.64
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   56.2 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.11
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   21.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.27
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.126
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.81      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.99      0.20     1.000    83
  COMMERCIAL                 D        6.24      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA AREA(ACRES) =   12.04      SUBAREA RUNOFF(CFS) =   22.01
  EFFECTIVE AREA(ACRES) =     50.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       50.6       PEAK FLOW RATE(CFS) =      94.81

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.66
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.81
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   21.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1180.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.956
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       25.52      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        6.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     120.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.01
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   3.27
  Tc(MIN.) =   24.63
  SUBAREA AREA(ACRES) =    32.03       SUBAREA RUNOFF(CFS) =   50.63
  EFFECTIVE AREA(ACRES) =     82.60     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.52
  TOTAL AREA(ACRES) =       82.6         PEAK FLOW RATE(CFS) =     137.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   6.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       29.92      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       14.41      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     171.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.51
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   2.00
  Tc(MIN.) =   26.62
  SUBAREA AREA(ACRES) =    44.33       SUBAREA RUNOFF(CFS) =   66.71
  EFFECTIVE AREA(ACRES) =    126.93     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =      126.9         PEAK FLOW RATE(CFS) =     198.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.29   FLOW VELOCITY(FEET/SEC.) =   5.82
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.810
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       14.64      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     208.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.95
  AVERAGE FLOW DEPTH(FEET) =   1.33   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =   28.25
  SUBAREA AREA(ACRES) =    14.64       SUBAREA RUNOFF(CFS) =   21.22
  EFFECTIVE AREA(ACRES) =    141.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.72
  TOTAL AREA(ACRES) =      141.6         PEAK FLOW RATE(CFS) =     212.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.35   FLOW VELOCITY(FEET/SEC.) =   5.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    5020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     213.48
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.86
    HALFSTREET FLOOD WIDTH(FEET) =   39.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    6.52
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   29.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        1.83      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     1.83      SUBAREA RUNOFF(CFS) =    2.27
  EFFECTIVE AREA(ACRES) =    143.40    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =      143.4        PEAK FLOW RATE(CFS) =     212.35
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.86   HALFSTREET FLOOD WIDTH(FEET) =  39.73
  FLOW VELOCITY(FEET/SEC.) =  7.55   DEPTH*VELOCITY(FT*FT/SEC.) =   6.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    75    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.53
  TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      9.53

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.07
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.53
  PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.986
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   31.84      SUBAREA RUNOFF(CFS) =   83.86
  EFFECTIVE AREA(ACRES) =     35.01   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       35.0       PEAK FLOW RATE(CFS) =      92.26

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       13.96      0.40     1.000    46
  COMMERCIAL                 D        2.65      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     126.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.71
  AVERAGE FLOW DEPTH(FEET) =   1.89   TRAVEL TIME(MIN.) =   0.73
  Tc(MIN.) =   12.40
  SUBAREA AREA(ACRES) =    28.25       SUBAREA RUNOFF(CFS) =   67.86
  EFFECTIVE AREA(ACRES) =     63.26     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =       63.3         PEAK FLOW RATE(CFS) =     156.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.05   FLOW VELOCITY(FEET/SEC.) =  18.68
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.07
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     156.93
  PIPE TRAVEL TIME(MIN.) =   2.50    Tc(MIN.) =   14.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.90
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.600
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       44.48      0.20     1.000    83
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    32
  COMMERCIAL                 A        4.75      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.834
  SUBAREA AREA(ACRES) =   55.34      SUBAREA RUNOFF(CFS) =  120.88
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     261.59

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     261.59
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   15.20
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4590.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.20
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    78
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    32
  COMMERCIAL                 A        2.82      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.64      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =   24.05      SUBAREA RUNOFF(CFS) =   51.91
  EFFECTIVE AREA(ACRES) =    142.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      142.7       PEAK FLOW RATE(CFS) =     310.34

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.471
```

```
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               A        2.68      0.40     1.000    46
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     323.30
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.21
 AVERAGE FLOW DEPTH(FEET) =   0.95   TRAVEL TIME(MIN.) =   1.10
 Tc(MIN.) =   16.31
 SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   25.93
 EFFECTIVE AREA(ACRES) =    155.06     AREA-AVERAGED Fm(INCH/HR) =   0.15
 AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.55
 TOTAL AREA(ACRES) =      155.1         PEAK FLOW RATE(CFS) =     323.44

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.95   FLOW VELOCITY(FEET/SEC.) =   9.22
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0050
 CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.299
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        1.58      0.40     0.100    32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     325.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.72
 AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   2.21
 Tc(MIN.) =   18.52
 SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    3.21
 EFFECTIVE AREA(ACRES) =    156.64     AREA-AVERAGED Fm(INCH/HR) =   0.15
 AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.54
 TOTAL AREA(ACRES) =      156.6         PEAK FLOW RATE(CFS) =     323.44
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =   2.71
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      323.44   18.52    2.299  0.28( 0.15) 0.54     156.6      13.00
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      212.35   29.22    1.776  0.20( 0.15) 0.72     143.4       1.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      501.23   18.52    2.299  0.25( 0.15) 0.61     247.5      13.00
     2      457.00   29.22    1.776  0.24( 0.15) 0.63     300.0       1.00
   TOTAL AREA(ACRES) =       300.0

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      501.23  Tc(MIN.) =   18.515
 EFFECTIVE AREA(ACRES) =    247.52  AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.61
 TOTAL AREA(ACRES) =      300.0
```

```
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =   5560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.10      0.20     1.000    83
  COMMERCIAL                 A        1.56      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     527.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.27
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   2.91
  Tc(MIN.) =   21.42
  SUBAREA AREA(ACRES) =    29.53       SUBAREA RUNOFF(CFS) =   52.46
  EFFECTIVE AREA(ACRES) =    277.05     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.61
  TOTAL AREA(ACRES) =      329.6         PEAK FLOW RATE(CFS) =     501.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =   6130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.961
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.52      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.848
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     509.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.23
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   3.10
  Tc(MIN.) =   24.52
  SUBAREA AREA(ACRES) =    10.25       SUBAREA RUNOFF(CFS) =   16.50
  EFFECTIVE AREA(ACRES) =    287.30     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
  TOTAL AREA(ACRES) =      339.8         PEAK FLOW RATE(CFS) =     501.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =   6730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
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  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.863
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.47      0.20     1.000    83
  COMMERCIAL                 A        1.68      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.549
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     508.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.22
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.33
  Tc(MIN.) =   26.85
  SUBAREA AREA(ACRES) =     9.77       SUBAREA RUNOFF(CFS) =   15.26
  EFFECTIVE AREA(ACRES) =    297.07     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
  TOTAL AREA(ACRES) =      349.6         PEAK FLOW RATE(CFS) =     501.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7180.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      349.6  TC(MIN.) =     26.85
  EFFECTIVE AREA(ACRES) =    297.07  AREA-AVERAGED Fm(INCH/HR)=  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap = 0.617
  PEAK FLOW RATE(CFS)   =     501.23

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      501.23   26.85    1.863  0.24( 0.15) 0.62     297.1      13.00
      2      457.00   37.87    1.533  0.24( 0.15) 0.63     349.6       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_B.DAT
  TIME/DATE OF STUDY: 16:14 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.841
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.86
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.86

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   10.44
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.180
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.12   Tc(MIN.) =   13.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.743
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.76
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.84
  FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   16.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.443
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   14.74
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      18.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.16
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   19.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   14.77
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      31.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   22.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      32.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.54
  FLOW VELOCITY(FEET/SEC.) =  3.44   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   25.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.62   Tc(MIN.) =   24.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.951
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   21.34
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      51.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.65   HALFSTREET FLOOD WIDTH(FEET) =  27.07
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   2.49
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.11
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.74
    HALFSTREET FLOOD WIDTH(FEET) =   33.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   27.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.846
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    75
  SCHOOL                     D        9.91      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   64.38
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =     113.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.80   HALFSTREET FLOOD WIDTH(FEET) =  36.44
  FLOW VELOCITY(FEET/SEC.) =  4.91   DEPTH*VELOCITY(FT*FT/SEC.) =   3.90
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS  112.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.45
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   28.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   28.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.806
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   18.39
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     129.35

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.34
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.35
```

```
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   29.15
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   29.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       15.82      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.45      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.122
  SUBAREA AREA(ACRES) =   20.27      SUBAREA RUNOFF(CFS) =   32.00
  EFFECTIVE AREA(ACRES) =    101.29   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =      101.3       PEAK FLOW RATE(CFS) =     159.33

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.719
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       20.98      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       12.82      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     182.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.83
  AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   1.79
  Tc(MIN.) =   30.94
  SUBAREA AREA(ACRES) =    33.80       SUBAREA RUNOFF(CFS) =   46.22
  EFFECTIVE AREA(ACRES) =    135.09     AREA-AVERAGED Fm(INCH/HR) =   0.07
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =      135.1         PEAK FLOW RATE(CFS) =     200.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   9.10
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6200.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      135.1  TC(MIN.) =     30.94
  EFFECTIVE AREA(ACRES) =    135.09  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.365
  PEAK FLOW RATE(CFS)   =     200.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

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******************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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              Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                             Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X025_C.DAT
  TIME/DATE OF STUDY: 16:14 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =    104.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.819
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.27      0.20     1.000    93   12.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.35
  TOTAL AREA(ACRES) =      2.27   PEAK FLOW RATE(CFS) =      5.35

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   14.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   15.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.576
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.61      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.61      SUBAREA RUNOFF(CFS) =    9.86
  EFFECTIVE AREA(ACRES) =      6.88    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      14.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.37
  FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   16.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.427
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.74      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =    9.50
  EFFECTIVE AREA(ACRES) =     11.62    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      23.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.15
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1200
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =   17.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.360
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        7.90      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   15.36
  EFFECTIVE AREA(ACRES) =     19.52    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       19.5        PEAK FLOW RATE(CFS) =      37.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.49
  FLOW VELOCITY(FEET/SEC.) =  9.17   DEPTH*VELOCITY(FT*FT/SEC.) =   3.86
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0900
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      79.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    5.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =   18.31
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.314
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       34.33      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   44.09      SUBAREA RUNOFF(CFS) =   83.89
  EFFECTIVE AREA(ACRES) =     63.61    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       63.6        PEAK FLOW RATE(CFS) =     121.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.60   HALFSTREET FLOOD WIDTH(FEET) =  24.57
  FLOW VELOCITY(FEET/SEC.) = 10.84   DEPTH*VELOCITY(FT*FT/SEC.) =   6.52
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1870.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       63.6  TC(MIN.) =     18.31
  EFFECTIVE AREA(ACRES) =     63.61  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     121.03
============================================================================
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END OF RATIONAL METHOD ANALYSIS

Drainage D

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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X025_D.DAT
  TIME/DATE OF STUDY: 10:05 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =     95.00  DOWNSTREAM(FEET) =     83.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.794
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.438
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.10      0.20     0.200    75    5.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =  14.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =    8.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.600
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.58      SUBAREA RUNOFF(CFS) =   14.67
  EFFECTIVE AREA(ACRES) =      5.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.7        PEAK FLOW RATE(CFS) =      18.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.85
  FLOW VELOCITY(FEET/SEC.) =  2.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   740.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.153
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.61      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.57
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   2.21
  Tc(MIN.) =   10.60
  SUBAREA AREA(ACRES) =     8.61       SUBAREA RUNOFF(CFS) =   22.88
  EFFECTIVE AREA(ACRES) =     14.29     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =       14.3         PEAK FLOW RATE(CFS) =      38.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   6.12
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     10.60
  EFFECTIVE AREA(ACRES) =     14.29  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.682
  PEAK FLOW RATE(CFS)   =      38.79
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage E

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                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X025_E.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    103.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.39      0.20     0.200    75    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      7.28
  TOTAL AREA(ACRES) =      2.39   PEAK FLOW RATE(CFS) =      7.28

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   12.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.83      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.83      SUBAREA RUNOFF(CFS) =    9.89
  EFFECTIVE AREA(ACRES) =      6.22    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.2        PEAK FLOW RATE(CFS) =      16.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  16.99
  FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.35
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.52
  STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =   14.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.623
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.65      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.65      SUBAREA RUNOFF(CFS) =    8.48
  EFFECTIVE AREA(ACRES) =      9.87    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        9.9        PEAK FLOW RATE(CFS) =      22.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.65
  FLOW VELOCITY(FEET/SEC.) =  3.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.62
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.60
    HALFSTREET FLOOD WIDTH(FEET) =   24.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =   16.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.469
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.18      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.62      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.161
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   34.65
  EFFECTIVE AREA(ACRES) =     25.67    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       25.7        PEAK FLOW RATE(CFS) =      56.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.66   HALFSTREET FLOOD WIDTH(FEET) =  27.93
  FLOW VELOCITY(FEET/SEC.) =  3.93   DEPTH*VELOCITY(FT*FT/SEC.) =   2.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =  1090.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      74.26
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.71
    HALFSTREET FLOOD WIDTH(FEET) =   32.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.03
  STREET FLOW TRAVEL TIME(MIN.) =   4.28   Tc(MIN.) =   20.61
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.164
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       16.93      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.76      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.109
  SUBAREA AREA(ACRES) =   18.69      SUBAREA RUNOFF(CFS) =   36.03
  EFFECTIVE AREA(ACRES) =     44.36    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       44.4        PEAK FLOW RATE(CFS) =      85.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.74   HALFSTREET FLOOD WIDTH(FEET) =  33.57
  FLOW VELOCITY(FEET/SEC.) =  4.46   DEPTH*VELOCITY(FT*FT/SEC.) =   3.29
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      94.65
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.76
    HALFSTREET FLOOD WIDTH(FEET) =   34.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.50
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =   23.13
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.027
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.36      0.20     0.200    75
  COMMERCIAL                 D        8.10      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.123
  SUBAREA AREA(ACRES) =   10.46      SUBAREA RUNOFF(CFS) =   18.85
  EFFECTIVE AREA(ACRES) =     54.82    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       54.8        PEAK FLOW RATE(CFS) =      98.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.77   HALFSTREET FLOOD WIDTH(FEET) =  34.97
  FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   3.59
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   630.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     103.76
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.78
    HALFSTREET FLOOD WIDTH(FEET) =   35.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.21   Tc(MIN.) =   25.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.925
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.09      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.09      SUBAREA RUNOFF(CFS) =   10.33
  EFFECTIVE AREA(ACRES) =     60.91    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       60.9        PEAK FLOW RATE(CFS) =     103.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.78   HALFSTREET FLOOD WIDTH(FEET) =  35.52
```

```
  FLOW VELOCITY(FEET/SEC.) =  4.77   DEPTH*VELOCITY(FT*FT/SEC.) =   3.70
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.130
  DEPTH OF FLOW IN 108.0 INCH PIPE IS  78.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.10
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     103.90
  PIPE TRAVEL TIME(MIN.) =   1.98    Tc(MIN.) =   27.32
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    4310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.32
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.845
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        4.84      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       14.79      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =   19.63      SUBAREA RUNOFF(CFS) =   31.97
  EFFECTIVE AREA(ACRES) =     80.54   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       80.5       PEAK FLOW RATE(CFS) =     131.46

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   470.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.46
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   27.96
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    109.00 =    4780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.821
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.62      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.62      SUBAREA RUNOFF(CFS) =   24.24
  EFFECTIVE AREA(ACRES) =     97.16   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       97.2       PEAK FLOW RATE(CFS) =     153.98
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       97.2  TC(MIN.) =     27.96
  EFFECTIVE AREA(ACRES) =     97.16  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.300
  PEAK FLOW RATE(CFS)   =     153.98
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage F

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____________________________________________________________________________
****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X025_F.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.705
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.80      0.40     0.200    32    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     18.92
  TOTAL AREA(ACRES) =      5.80   PEAK FLOW RATE(CFS) =     18.92
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.8  TC(MIN.) =      7.97
  EFFECTIVE AREA(ACRES) =      5.80  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      18.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage G

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****************************************************************************
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----------------------------------------------------------------------------
  FILE NAME: X025_G.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.110
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.669
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.75      0.40     0.200    32    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.65
  TOTAL AREA(ACRES) =      1.75   PEAK FLOW RATE(CFS) =      5.65
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.8  TC(MIN.) =      8.11
  EFFECTIVE AREA(ACRES) =      1.75  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       5.65
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage H

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_H.DAT
  TIME/DATE OF STUDY: 16:37 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =     10.00  DOWNSTREAM(FEET) =      9.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.63      0.40     0.200    32    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.69
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.69

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   680.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.69
  PIPE TRAVEL TIME(MIN.) =   2.37    Tc(MIN.) =    7.37
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.37
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.53      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.53      SUBAREA RUNOFF(CFS) =   12.05
  EFFECTIVE AREA(ACRES) =      4.16   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      14.20

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.20
  PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =    8.31
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.31
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.618
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        2.82      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    2.82      SUBAREA RUNOFF(CFS) =    8.98
  EFFECTIVE AREA(ACRES) =      6.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        7.0       PEAK FLOW RATE(CFS) =      22.23
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.0  TC(MIN.) =      8.31
  EFFECTIVE AREA(ACRES) =      6.98  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      22.23
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage I

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****************************************************************************
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                           Analysis prepared by:



----------------------------------------------------------------------------
  FILE NAME: X025_I.DAT
  TIME/DATE OF STUDY: 16:39 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.746
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.765
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.47      0.40     0.200    32    7.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    9.60
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.335
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.58      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.53
  FLOW VELOCITY(FEET/SEC.) =  2.68   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    217.00 =     540.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      9.60
  EFFECTIVE AREA(ACRES) =      1.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       3.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage J

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****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X025_J.DAT
  TIME/DATE OF STUDY: 16:39 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.642
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.539
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.55      0.40     0.200    32    8.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.83
  TOTAL AREA(ACRES) =      1.55   PEAK FLOW RATE(CFS) =      4.83

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   2.61   Tc(MIN.) =   11.25
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.048
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.46      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.46      SUBAREA RUNOFF(CFS) =    9.24
  EFFECTIVE AREA(ACRES) =      5.01    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      13.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =   13.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.726
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.98      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.98      SUBAREA RUNOFF(CFS) =   14.24
  EFFECTIVE AREA(ACRES) =     10.99    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      26.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.66
  FLOW VELOCITY(FEET/SEC.) =  3.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =    1150.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.0  TC(MIN.) =     13.70
  EFFECTIVE AREA(ACRES) =     10.99  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      26.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage K

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****************************************************************************
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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X025_K.DAT
  TIME/DATE OF STUDY: 16:39 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =      7.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.53      0.40     0.200    32    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.61
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      4.61

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.25
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =   10.91
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        4.77      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.77      SUBAREA RUNOFF(CFS) =   12.97
  EFFECTIVE AREA(ACRES) =      6.30    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      17.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.05
  FLOW VELOCITY(FEET/SEC.) =  3.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.13
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    228.00 =     830.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.3  TC(MIN.) =     11.29
  EFFECTIVE AREA(ACRES) =      6.30  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      17.13
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

ii. EV 2-Year Storm Event

Drainage A

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X002_A.DAT
  TIME/DATE OF STUDY: 16:16 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.180
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    75    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.33
  STREET FLOW TRAVEL TIME(MIN.) =   3.86   Tc(MIN.) =   12.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.949
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    0.92
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       1.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.34
  FLOW VELOCITY(FEET/SEC.) =  1.34   DEPTH*VELOCITY(FT*FT/SEC.) =   0.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =   15.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.839
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    2.44
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =       3.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.51
  FLOW VELOCITY(FEET/SEC.) =  1.58   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
  STREET FLOW TRAVEL TIME(MIN.) =   2.95   Tc(MIN.) =   18.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.758
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =    4.21
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =       7.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.34
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   21.78
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.682
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =    5.00
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      11.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.23
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
================================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   2.67   Tc(MIN.) =   24.45
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.638
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       18.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   10.25
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      21.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.84
  FLOW VELOCITY(FEET/SEC.) =  2.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.21
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   25.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   25.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.625
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.81      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.99      0.20     1.000    83
  COMMERCIAL                 D        6.24      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA AREA(ACRES) =   12.04      SUBAREA RUNOFF(CFS) =    5.74
  EFFECTIVE AREA(ACRES) =     50.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       50.6       PEAK FLOW RATE(CFS) =      26.50

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.98
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.50
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   25.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1180.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.557
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       25.52      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        6.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      31.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.59
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   5.48
  Tc(MIN.) =   30.95
  SUBAREA AREA(ACRES) =    32.03       SUBAREA RUNOFF(CFS) =   10.29
  EFFECTIVE AREA(ACRES) =     82.60     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.52
  TOTAL AREA(ACRES) =       82.6         PEAK FLOW RATE(CFS) =      33.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   3.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.524
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       29.92      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       14.41      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   3.44
  Tc(MIN.) =   34.39
  SUBAREA AREA(ACRES) =    44.33       SUBAREA RUNOFF(CFS) =   12.94
  EFFECTIVE AREA(ACRES) =    126.93     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =      126.9         PEAK FLOW RATE(CFS) =      44.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   3.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.501
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       14.64      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      46.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.36
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   2.88
  Tc(MIN.) =   37.27
  SUBAREA AREA(ACRES) =    14.64       SUBAREA RUNOFF(CFS) =    3.96
  EFFECTIVE AREA(ACRES) =    141.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.72
  TOTAL AREA(ACRES) =      141.6         PEAK FLOW RATE(CFS) =      45.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.53   FLOW VELOCITY(FEET/SEC.) =   3.35
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    5020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      45.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.56
    HALFSTREET FLOOD WIDTH(FEET) =   22.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.73
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =   38.79
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.489
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        1.83      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    0.15
  EFFECTIVE AREA(ACRES) =    143.40    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =      143.4        PEAK FLOW RATE(CFS) =      45.49
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.46
  FLOW VELOCITY(FEET/SEC.) =  4.84   DEPTH*VELOCITY(FT*FT/SEC.) =   2.73
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.106
```

```
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    75    9.37
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      3.04
 TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      3.04

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0500
 FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.04
 PIPE TRAVEL TIME(MIN.) =   3.10    Tc(MIN.) =   12.47
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.47
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.939
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =   31.84      SUBAREA RUNOFF(CFS) =   25.18
 EFFECTIVE AREA(ACRES) =     35.01   AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       35.0       PEAK FLOW RATE(CFS) =      27.75

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0400
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    75
 NATURAL FAIR COVER
 "OPEN BRUSH"               A       13.96      0.40     1.000    46
 COMMERCIAL                 D        2.65      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.42
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.96
 AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   1.00
 Tc(MIN.) =   13.47
 SUBAREA AREA(ACRES) =    28.25       SUBAREA RUNOFF(CFS) =   17.34
 EFFECTIVE AREA(ACRES) =     63.26     AREA-AVERAGED Fm(INCH/HR) =   0.13
 AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.37
 TOTAL AREA(ACRES) =       63.3         PEAK FLOW RATE(CFS) =      43.80

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.27   FLOW VELOCITY(FEET/SEC.) =  13.59
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.21
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.80
  PIPE TRAVEL TIME(MIN.) =   3.49    Tc(MIN.) =   16.96
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.96
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.787
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"             D       44.48      0.20     1.000    83
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    32
  COMMERCIAL               A        4.75      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.834
  SUBAREA AREA(ACRES) =   55.34      SUBAREA RUNOFF(CFS) =   30.57
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =      68.04

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.63
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.04
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   17.38
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4590.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.38
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                 A        4.65      0.40     1.000    78
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    32
  COMMERCIAL               A        2.82      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"             A        2.64      0.40     1.000    46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =   24.05      SUBAREA RUNOFF(CFS) =   13.06
  EFFECTIVE AREA(ACRES) =    142.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      142.7       PEAK FLOW RATE(CFS) =      79.93

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.732
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"               A        2.68      0.40     1.000    46
RESIDENTIAL
"11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      83.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.47
AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   1.86
Tc(MIN.) =   19.24
SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =    6.51
EFFECTIVE AREA(ACRES) =    155.06     AREA-AVERAGED Fm(INCH/HR) =   0.15
AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.55
TOTAL AREA(ACRES) =      155.1         PEAK FLOW RATE(CFS) =      80.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   5.41
LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.661
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      81.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.59
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   3.76
  Tc(MIN.) =   23.01
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    0.88
  EFFECTIVE AREA(ACRES) =    156.64     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.54
  TOTAL AREA(ACRES) =      156.6         PEAK FLOW RATE(CFS) =      80.79
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       80.79   23.01    0.661  0.28( 0.15) 0.54     156.6      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       45.49   38.79    0.489  0.20( 0.15) 0.72     143.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5460.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      121.26   23.01    0.661  0.25( 0.15) 0.61     241.7      13.00
      2       99.11   38.79    0.489  0.24( 0.15) 0.63     300.0       1.00
    TOTAL AREA(ACRES) =       300.0

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      121.26  Tc(MIN.) =   23.007
  EFFECTIVE AREA(ACRES) =    241.70  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =      300.0
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5560.00 FEET.
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  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.590
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.10      0.20     1.000    83
  COMMERCIAL                 A        1.56      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     127.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.89
  AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   5.03
  Tc(MIN.) =   28.04
  SUBAREA AREA(ACRES) =    29.53       SUBAREA RUNOFF(CFS) =   11.86
  EFFECTIVE AREA(ACRES) =    271.23     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.61
  TOTAL AREA(ACRES) =      329.6         PEAK FLOW RATE(CFS) =     121.26
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.533
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.52      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.848
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     122.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.86
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   5.38
  Tc(MIN.) =   33.42
  SUBAREA AREA(ACRES) =    10.25       SUBAREA RUNOFF(CFS) =    3.32
  EFFECTIVE AREA(ACRES) =    281.48     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.62
  TOTAL AREA(ACRES) =      339.8         PEAK FLOW RATE(CFS) =     121.26
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
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  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.499
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.47      0.20     1.000    83
  COMMERCIAL                 A        1.68      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.549
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     122.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.86
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   4.03
  Tc(MIN.) =   37.45
  SUBAREA AREA(ACRES) =     9.77       SUBAREA RUNOFF(CFS) =    3.27
  EFFECTIVE AREA(ACRES) =    291.25     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   0.61
  TOTAL AREA(ACRES) =      349.6         PEAK FLOW RATE(CFS) =     121.26
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7180.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      349.6  TC(MIN.) =     37.45
  EFFECTIVE AREA(ACRES) =    291.25  AREA-AVERAGED Fm(INCH/HR)=  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap = 0.615
  PEAK FLOW RATE(CFS)   =     121.26

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      121.26   37.45    0.499  0.24( 0.15) 0.61     291.3      13.00
      2       99.11   54.37    0.403  0.24( 0.15) 0.63     349.6       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:



----------------------------------------------------------------------------
  FILE NAME: X002_B.DAT
  TIME/DATE OF STUDY: 16:17 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.259
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20      0.100    75    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
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  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
  STREET FLOW TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   10.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.056
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       1.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   3.34
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.41
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    4.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   13.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.885
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       1.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   4.84
  FLOW VELOCITY(FEET/SEC.) =  1.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.45
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
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  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =   17.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.765
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        6.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =    4.53
  EFFECTIVE AREA(ACRES) =       8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =       5.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  2.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   4.07   Tc(MIN.) =   21.88
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.680
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        7.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =    4.43
  EFFECTIVE AREA(ACRES) =      16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =       9.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
  FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   3.23   Tc(MIN.) =   25.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.628
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =       9.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.74
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   3.52   Tc(MIN.) =   28.63
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.583
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =    6.22
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      15.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.60
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.66
  STREET FLOW TRAVEL TIME(MIN.) =   3.53   Tc(MIN.) =   32.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.545
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    75
  SCHOOL                     D        9.91      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   17.87
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =      31.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  3.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.85
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.98
  PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =   33.59
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   33.59
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.532
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =      36.41

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.01
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.41
```

```
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   34.67
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   34.67
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.522
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       15.82      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.45      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.122
  SUBAREA AREA(ACRES) =   20.27      SUBAREA RUNOFF(CFS) =    9.08
  EFFECTIVE AREA(ACRES) =    101.29   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =      101.3       PEAK FLOW RATE(CFS) =      44.79

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.499
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       20.98      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D       12.82      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      49.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.62
  AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   2.82
  Tc(MIN.) =   37.48
  SUBAREA AREA(ACRES) =    33.80       SUBAREA RUNOFF(CFS) =    9.10
  EFFECTIVE AREA(ACRES) =    135.09     AREA-AVERAGED Fm(INCH/HR) =   0.07
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.37
  TOTAL AREA(ACRES) =      135.1         PEAK FLOW RATE(CFS) =      51.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =   5.72
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6200.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      135.1  TC(MIN.) =     37.48
  EFFECTIVE AREA(ACRES) =    135.09  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.365
  PEAK FLOW RATE(CFS)   =      51.80
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X002_C.DAT
  TIME/DATE OF STUDY: 16:17 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =    104.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.920
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.27      0.20     1.000    93   12.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.47
  TOTAL AREA(ACRES) =      2.27   PEAK FLOW RATE(CFS) =      1.47

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   15.88
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.817
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                  D        4.61      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.61      SUBAREA RUNOFF(CFS) =    2.56
  EFFECTIVE AREA(ACRES) =      6.88    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =       3.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.97
  FLOW VELOCITY(FEET/SEC.) =  2.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   2.27   Tc(MIN.) =   18.15
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.757
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              D        4.74      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =    2.38
  EFFECTIVE AREA(ACRES) =     11.62    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =       5.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.28
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1200
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.13   Tc(MIN.) =   19.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.731
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        7.90      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =    3.78
  EFFECTIVE AREA(ACRES) =     19.52    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       19.5        PEAK FLOW RATE(CFS) =       9.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.41
  FLOW VELOCITY(FEET/SEC.) =  6.82   DEPTH*VELOCITY(FT*FT/SEC.) =   2.01
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0900
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.60
  STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =   20.15
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.713
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       34.33      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   44.09      SUBAREA RUNOFF(CFS) =   20.34
  EFFECTIVE AREA(ACRES) =     63.61    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       63.6        PEAK FLOW RATE(CFS) =      29.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.79
  FLOW VELOCITY(FEET/SEC.) =  7.76   DEPTH*VELOCITY(FT*FT/SEC.) =   3.17
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1870.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       63.6  TC(MIN.) =     20.15
```

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  EFFECTIVE AREA(ACRES) =     63.61  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      29.35
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage D

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****************************************************************************
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                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: X002_D.DAT
  TIME/DATE OF STUDY: 11:25 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =     95.00  DOWNSTREAM(FEET) =     83.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.794
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.458
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.10      0.20     0.200    75    5.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   3.35   Tc(MIN.) =    9.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.122
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.58      SUBAREA RUNOFF(CFS) =    4.46
  EFFECTIVE AREA(ACRES) =      5.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.7        PEAK FLOW RATE(CFS) =       5.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.74
  FLOW VELOCITY(FEET/SEC.) =  2.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   740.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.928
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        8.61      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.44
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   3.58
  Tc(MIN.) =   12.72
  SUBAREA AREA(ACRES) =     8.61       SUBAREA RUNOFF(CFS) =    5.64
  EFFECTIVE AREA(ACRES) =     14.29     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =       14.3         PEAK FLOW RATE(CFS) =      10.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.67
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     12.72
  EFFECTIVE AREA(ACRES) =     14.29  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.682
  PEAK FLOW RATE(CFS)   =      10.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage E

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****************************************************************************
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                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X002_E.DAT
  TIME/DATE OF STUDY: 16:43 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    103.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.121
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.39      0.20     0.200    75    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      2.39   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =   13.12
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.912
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.83      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.83      SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =      6.22    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.2        PEAK FLOW RATE(CFS) =       4.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.12
  FLOW VELOCITY(FEET/SEC.) =  2.20   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   3.22   Tc(MIN.) =   16.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.804
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.65      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.65      SUBAREA RUNOFF(CFS) =    2.51
  EFFECTIVE AREA(ACRES) =      9.87    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        9.9        PEAK FLOW RATE(CFS) =       6.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.76
  FLOW VELOCITY(FEET/SEC.) =  2.38   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   18.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.747
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.18      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.62      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.161
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   10.17
  EFFECTIVE AREA(ACRES) =     25.67    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       25.7        PEAK FLOW RATE(CFS) =      16.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.15
  FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =  1090.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.57
  STREET FLOW TRAVEL TIME(MIN.) =   5.84   Tc(MIN.) =   24.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.639
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       16.93      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.76      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.109
  SUBAREA AREA(ACRES) =   18.69      SUBAREA RUNOFF(CFS) =   10.38
  EFFECTIVE AREA(ACRES) =     44.36    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       44.4        PEAK FLOW RATE(CFS) =      24.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.12
  FLOW VELOCITY(FEET/SEC.) =  3.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   20.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   3.54   Tc(MIN.) =   27.93
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.591
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.36      0.20     0.200    75
  COMMERCIAL                 D        8.10      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.123
  SUBAREA AREA(ACRES) =   10.46      SUBAREA RUNOFF(CFS) =    5.33
  EFFECTIVE AREA(ACRES) =     54.82    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       54.8        PEAK FLOW RATE(CFS) =      27.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.13
  FLOW VELOCITY(FEET/SEC.) =  3.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   630.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.55
    HALFSTREET FLOOD WIDTH(FEET) =   21.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.83
  STREET FLOW TRAVEL TIME(MIN.) =   3.14   Tc(MIN.) =   31.07
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.556
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.09      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.09      SUBAREA RUNOFF(CFS) =    2.83
  EFFECTIVE AREA(ACRES) =     60.91    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       60.9        PEAK FLOW RATE(CFS) =      28.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.52
  FLOW VELOCITY(FEET/SEC.) =  3.33   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.130
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  49.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.52
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.84
  PIPE TRAVEL TIME(MIN.) =   2.74    Tc(MIN.) =   33.81
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    4310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   33.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.530
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        4.84      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       14.79      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =   19.63      SUBAREA RUNOFF(CFS) =    8.74
  EFFECTIVE AREA(ACRES) =     80.54   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       80.5       PEAK FLOW RATE(CFS) =      36.13

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   470.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.00
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.13
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   34.68
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    109.00 =    4780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   34.68
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.522
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       16.62      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.62      SUBAREA RUNOFF(CFS) =    4.81
  EFFECTIVE AREA(ACRES) =     97.16   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       97.2       PEAK FLOW RATE(CFS) =      40.39
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       97.2  TC(MIN.) =     34.68
  EFFECTIVE AREA(ACRES) =     97.16  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.300
  PEAK FLOW RATE(CFS)   =      40.39
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage F

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****************************************************************************
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                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X002_F.DAT
  TIME/DATE OF STUDY: 16:43 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.214
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.80      0.40     0.200    32    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.92
  TOTAL AREA(ACRES) =      5.80   PEAK FLOW RATE(CFS) =      5.92
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.8  TC(MIN.) =      7.97
  EFFECTIVE AREA(ACRES) =      5.80  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      5.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage G

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X002_G.DAT
  TIME/DATE OF STUDY: 16:44 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =      9.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.110
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.202
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.75      0.40     0.200    32    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.75   PEAK FLOW RATE(CFS) =      1.77
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.8  TC(MIN.) =      8.11
  EFFECTIVE AREA(ACRES) =      1.75  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       1.77
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage H

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****************************************************************************
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                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: X002_H.DAT
  TIME/DATE OF STUDY: 16:44 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =     10.00  DOWNSTREAM(FEET) =      9.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.586
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.63      0.40     0.200    32    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   680.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.85
  PIPE TRAVEL TIME(MIN.) =   3.13    Tc(MIN.) =    8.13
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     750.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.200
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.53      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.53      SUBAREA RUNOFF(CFS) =    3.56
  EFFECTIVE AREA(ACRES) =      4.16   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =       4.19

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.38
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.19
  PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =    9.37
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.37
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.106
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        2.82      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    2.82      SUBAREA RUNOFF(CFS) =    2.61
  EFFECTIVE AREA(ACRES) =      6.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        7.0       PEAK FLOW RATE(CFS) =       6.45
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.0  TC(MIN.) =      9.37
  EFFECTIVE AREA(ACRES) =      6.98  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       6.45
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage I

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____________________________________________________________________________
****************************************************************************
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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: X002_I.DAT
  TIME/DATE OF STUDY: 16:44 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.746
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.234
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.47      0.40     0.200    32    7.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.57   Tc(MIN.) =    9.32
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.109
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        0.58      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    0.54
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       0.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   2.00
  FLOW VELOCITY(FEET/SEC.) =  3.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    217.00 =     540.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      9.32
  EFFECTIVE AREA(ACRES) =      1.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       0.97
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage J

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X002_J.DAT
  TIME/DATE OF STUDY: 16:44 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =      8.00  DOWNSTREAM(FEET) =      6.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.642
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.159
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.55      0.40     0.200    32    8.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      1.55   PEAK FLOW RATE(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =   12.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.960
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.46      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.46      SUBAREA RUNOFF(CFS) =    2.74
  EFFECTIVE AREA(ACRES) =      5.01    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =       3.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.09
  FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   3.25   Tc(MIN.) =   15.25
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.836
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        5.98      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.98      SUBAREA RUNOFF(CFS) =    4.07
  EFFECTIVE AREA(ACRES) =     10.99    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =       7.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.30
  FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =    1150.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.0  TC(MIN.) =     15.25
  EFFECTIVE AREA(ACRES) =     10.99  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       7.48
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage K

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****************************************************************************
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                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: X002_K.DAT
  TIME/DATE OF STUDY: 16:45 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =      7.00  DOWNSTREAM(FEET) =      5.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.151
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.121
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        1.53      0.40     0.200    32    9.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.43
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      1.43

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =   11.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.987
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        4.77      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.77      SUBAREA RUNOFF(CFS) =    3.89
  EFFECTIVE AREA(ACRES) =      6.30    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =       5.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.41
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.59
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.14
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    228.00 =     830.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.3  TC(MIN.) =     11.93
  EFFECTIVE AREA(ACRES) =      6.30  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       5.14
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B2 Proposed Condition Rational Method Calculations

a) High Confidence Events

i. HC 100-Year Storm Event

Drainage A

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: P100_A.DAT
  TIME/DATE OF STUDY: 10:26 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.605
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    91    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.79

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   2.98   Tc(MIN.) =   11.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.869
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.89
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.16
  FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.10   Tc(MIN.) =   13.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.510
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =   10.59
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      16.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.65
  FLOW VELOCITY(FEET/SEC.) =  2.23   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.46
  STREET FLOW TRAVEL TIME(MIN.) =   2.06   Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.234
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   18.71
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      33.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  26.13
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      44.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.69
    HALFSTREET FLOOD WIDTH(FEET) =   30.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.57   Tc(MIN.) =   18.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.962
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   22.22
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      53.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.71   HALFSTREET FLOOD WIDTH(FEET) =  32.41
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      76.14
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.78
    HALFSTREET FLOOD WIDTH(FEET) =   35.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =   19.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      18.43      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   46.26
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      96.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.84   HALFSTREET FLOOD WIDTH(FEET) =  38.57
  FLOW VELOCITY(FEET/SEC.) =  3.67   DEPTH*VELOCITY(FT*FT/SEC.) =   3.07
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   71.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.04
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.49
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   20.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.760
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       6.24      0.20     0.100    91
  PUBLIC PARK                D       6.35      0.20     0.850    91
  COMMERCIAL                 D       2.47      0.20     0.100    91
  NATURAL POOR COVER
  "BARREN"                   D       3.55      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.528
  SUBAREA AREA(ACRES) =   18.61      SUBAREA RUNOFF(CFS) =   44.47
  EFFECTIVE AREA(ACRES) =     57.14   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       57.1       PEAK FLOW RATE(CFS) =     139.28

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     139.28
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   20.69
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.587
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       13.41      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     153.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.57
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   2.21
  Tc(MIN.) =   22.90
  SUBAREA AREA(ACRES) =    13.41       SUBAREA RUNOFF(CFS) =   28.81
  EFFECTIVE AREA(ACRES) =     70.55     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.40
  TOTAL AREA(ACRES) =       70.6         PEAK FLOW RATE(CFS) =     159.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.92   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.466
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        9.71      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     169.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.48
  AVERAGE FLOW DEPTH(FEET) =   1.18   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =   24.90
  SUBAREA AREA(ACRES) =     9.71       SUBAREA RUNOFF(CFS) =   19.80
  EFFECTIVE AREA(ACRES) =     80.26     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.47
  TOTAL AREA(ACRES) =       80.3         PEAK FLOW RATE(CFS) =     171.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   5.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.383
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"              D       3.89      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     175.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.57
  AVERAGE FLOW DEPTH(FEET) =   1.20   TRAVEL TIME(MIN.) =   1.53
  Tc(MIN.) =   26.43
  SUBAREA AREA(ACRES) =     3.89       SUBAREA RUNOFF(CFS) =    7.64
  EFFECTIVE AREA(ACRES) =     84.15     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.50
  TOTAL AREA(ACRES) =       84.2         PEAK FLOW RATE(CFS) =     172.96

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   5.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.01 TO NODE     11.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     99.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.375
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.936
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D       0.19      0.20     0.100    91    5.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.01
  TOTAL AREA(ACRES) =      0.19   PEAK FLOW RATE(CFS) =      1.01

****************************************************************************
  FLOW PROCESS FROM NODE     11.02 TO NODE     11.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   2.31   Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.836
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               D       1.84      0.20     0.850    91
  COMMERCIAL                D       0.25      0.20     0.100    91
  NATURAL FAIR COVER
  "OPEN BRUSH"              D       0.64      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.816
  SUBAREA AREA(ACRES) =    2.73      SUBAREA RUNOFF(CFS) =   11.48
  EFFECTIVE AREA(ACRES) =      2.92    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.77
```

```
  TOTAL AREA(ACRES) =       2.9       PEAK FLOW RATE(CFS) =     12.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.20
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.03 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.03 TO NODE     11.04 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.30
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =    8.86
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.04 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.86
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.458
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.18      0.20     0.100    91
  CONDOMINIUMS               D        1.15      0.20     0.350    91
  CONDOMINIUMS               D        4.75      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.308
  SUBAREA AREA(ACRES) =    7.08      SUBAREA RUNOFF(CFS) =   28.01
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      10.0       PEAK FLOW RATE(CFS) =     39.33

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.33
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.05 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     11.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.57
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.265
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        6.10      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   23.03
  EFFECTIVE AREA(ACRES) =     16.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      16.1       PEAK FLOW RATE(CFS) =     60.61

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.61
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   11.06
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       60.61   11.06    3.926  0.20( 0.08) 0.41      16.1      11.01
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      172.96   26.43    2.383  0.20( 0.10) 0.50      84.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      181.89   11.06    3.926  0.20( 0.09) 0.47      51.3      11.01
      2      209.25   26.43    2.383  0.20( 0.10) 0.48     100.2       1.00
    TOTAL AREA(ACRES) =       100.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      209.25  Tc(MIN.) =   26.428
  EFFECTIVE AREA(ACRES) =    100.25  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      100.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.06 TO NODE     11.07 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =     90.00  DOWNSTREAM(FEET) =     86.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.011
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.415
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.54      0.20     0.350    91    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      6.02
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      6.02

****************************************************************************
  FLOW PROCESS FROM NODE     11.07 TO NODE     11.08 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       6.02
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.08 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.083
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.43      0.20     0.100    91
  CONDOMINIUMS               D        1.14      0.20     0.350    91
  CONDOMINIUMS               D        4.05      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.331
  SUBAREA AREA(ACRES) =    5.62      SUBAREA RUNOFF(CFS) =   20.32
  EFFECTIVE AREA(ACRES) =      7.16   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        7.2       PEAK FLOW RATE(CFS) =      25.88

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.09 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.34
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.88
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   11.33
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.09 =    1290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.872
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  CONDOMINIUMS               D        1.13      0.20     0.350    91
  CONDOMINIUMS               D        0.62      0.20     0.350    91
  CONDOMINIUMS               D        0.48      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =    2.64      SUBAREA RUNOFF(CFS) =    9.05
  EFFECTIVE AREA(ACRES) =      9.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        9.8       PEAK FLOW RATE(CFS) =      33.58

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   730.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.58
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   12.69
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.10 =    2020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.628
  SUBAREA LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.01      0.20     0.100    91
  CONDOMINIUMS               D        2.10      0.20     0.350    91
  CONDOMINIUMS               D        1.33      0.20     0.350    91
  CONDOMINIUMS               D        7.17      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.328
  SUBAREA AREA(ACRES) =   11.61      SUBAREA RUNOFF(CFS) =   37.23
  EFFECTIVE AREA(ACRES) =     21.41   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       21.4       PEAK FLOW RATE(CFS) =      68.65

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.65
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.65
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.11 =    2530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     11.11 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.504
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.44      0.20     0.100    91
  CONDOMINIUMS               D        6.60      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  SUBAREA AREA(ACRES) =    7.04      SUBAREA RUNOFF(CFS) =   21.78
  EFFECTIVE AREA(ACRES) =     28.45   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       28.5       PEAK FLOW RATE(CFS) =      88.02

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.26
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.02
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   13.85
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       88.02   13.85    3.452  0.20( 0.07) 0.33      28.5      11.06
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      181.89   11.06    3.926  0.20( 0.09) 0.47      51.3      11.01
      2      209.25   26.43    2.383  0.20( 0.10) 0.48     100.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      262.05   11.06    3.926  0.20( 0.09) 0.43      74.0      11.01
     2      274.87   13.85    3.452  0.20( 0.09) 0.43      88.6      11.06
     3      269.49   26.43    2.383  0.20( 0.09) 0.45     128.7       1.00
   TOTAL AREA(ACRES) =       128.7

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      274.87  Tc(MIN.) =   13.845
 EFFECTIVE AREA(ACRES) =     88.63  AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      128.7
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.47
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     274.87
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   14.28
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.28
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.391
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               D        3.58      0.20     1.000    96
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    3.58      SUBAREA RUNOFF(CFS) =   10.28
 EFFECTIVE AREA(ACRES) =     92.21   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      132.3       PEAK FLOW RATE(CFS) =     274.87
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
 ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.316
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    91    9.37
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =     12.20
 TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =     12.20

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.62
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.20
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   11.56
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.827
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    76
  PUBLIC PARK                D        3.71      0.20     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.268
  SUBAREA AREA(ACRES) =   35.55      SUBAREA RUNOFF(CFS) =  120.15
  EFFECTIVE AREA(ACRES) =     38.72   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       38.7       PEAK FLOW RATE(CFS) =     130.95

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.704
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    91
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       13.96      0.40     1.000    66
  COMMERCIAL                 D        2.65      0.20     0.100    91
  PUBLIC PARK                A        1.60      0.40     0.850    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     177.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  19.28
  AVERAGE FLOW DEPTH(FEET) =   2.15   TRAVEL TIME(MIN.) =   0.67
  Tc(MIN.) =   12.24
  SUBAREA AREA(ACRES) =    29.85       SUBAREA RUNOFF(CFS) =   93.54
  EFFECTIVE AREA(ACRES) =     68.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.33  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =       68.6         PEAK FLOW RATE(CFS) =     220.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.32   FLOW VELOCITY(FEET/SEC.) =  20.39
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  52.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.81
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     220.23
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   12.69
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.60 =    3100.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.629
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.13      0.40     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.65
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.33  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =     220.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.50  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.416
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.515
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.80      0.20     0.350    91   13.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      5.58
  TOTAL AREA(ACRES) =      1.80   PEAK FLOW RATE(CFS) =      5.58

****************************************************************************
  FLOW PROCESS FROM NODE     16.20 TO NODE     16.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.365
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        2.42      0.30     0.350    76
  COMMERCIAL                 B        0.90      0.30     0.100    76
  PUBLIC PARK                B        1.92      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.490
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.31
  AVERAGE FLOW DEPTH(FEET) =   1.44   TRAVEL TIME(MIN.) =   1.06
  Tc(MIN.) =   14.47
  SUBAREA AREA(ACRES) =     5.24       SUBAREA RUNOFF(CFS) =   15.18
  EFFECTIVE AREA(ACRES) =      7.04     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.45
  TOTAL AREA(ACRES) =        7.0         PEAK FLOW RATE(CFS) =      20.52

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.


  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.50   FLOW VELOCITY(FEET/SEC.) =   9.12

  ==>FLOWDEPTH EXCEEDS MAXIMUM ALLOWABLE DEPTH

  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.30 =     730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.30 TO NODE     16.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   790.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.52
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   16.17
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.40 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.159
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.09      0.30     0.100    76
  PUBLIC PARK                B        2.54      0.30     0.850    76
  PUBLIC PARK                B        2.54      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    8.17      SUBAREA RUNOFF(CFS) =   21.98
  EFFECTIVE AREA(ACRES) =     15.21   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       15.2       PEAK FLOW RATE(CFS) =      41.18

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.43
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.18
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   16.85
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.85
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.084
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.85      0.20     0.100    91
  CONDOMINIUMS               D        2.51      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    4.36      SUBAREA RUNOFF(CFS) =   11.91
  EFFECTIVE AREA(ACRES) =     19.57   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       19.6       PEAK FLOW RATE(CFS) =      52.07

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   950.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.99
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.07
  PIPE TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =   18.44
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.60 =    2860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.44
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.929
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        2.21      0.20     0.850    91
  COMMERCIAL                 D        2.81      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.430
  SUBAREA AREA(ACRES) =    5.02      SUBAREA RUNOFF(CFS) =   12.85
  EFFECTIVE AREA(ACRES) =     24.59   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       24.6       PEAK FLOW RATE(CFS) =      62.19

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       62.19   18.44    2.929  0.27( 0.12) 0.45      24.6      16.10
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    2860.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      220.23   12.69    3.629  0.33( 0.13) 0.40      69.7      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      273.68   12.69    3.629  0.32( 0.13) 0.41      86.6      13.00
      2      238.32   18.44    2.929  0.31( 0.13) 0.42      94.3      16.10
    TOTAL AREA(ACRES) =        94.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      273.68  Tc(MIN.) =   12.686
  EFFECTIVE AREA(ACRES) =     86.62  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       94.3
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  56.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.44
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     273.68
  PIPE TRAVEL TIME(MIN.) =   1.79    Tc(MIN.) =   14.48
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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============================================================================
  MAINLINE Tc(MIN.) =   14.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.365
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        8.07      0.40     1.000    66
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    52
  COMMERCIAL                 A        3.62      0.40     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.542
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   50.43
  EFFECTIVE AREA(ACRES) =    104.42   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      112.1       PEAK FLOW RATE(CFS) =     302.48

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.26
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     302.48
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   14.77
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.77
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.326
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.09      0.40     1.000    66
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    93
  COMMERCIAL                 A        2.82      0.40     0.100    52
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.417
  SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   66.81
  EFFECTIVE AREA(ACRES) =    127.92   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      135.6       PEAK FLOW RATE(CFS) =     365.66

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.199
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.68      0.40     1.000    66
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     382.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.82
  AVERAGE FLOW DEPTH(FEET) =   1.05   TRAVEL TIME(MIN.) =   1.03
  Tc(MIN.) =   15.81
  SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   34.07
  EFFECTIVE AREA(ACRES) =    140.33     AREA-AVERAGED Fm(INCH/HR) =   0.15
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  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      148.0         PEAK FLOW RATE(CFS) =     385.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   9.83
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.982
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     387.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.91
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   2.06
  Tc(MIN.) =   17.87
  SUBAREA AREA(ACRES) =      1.58       SUBAREA RUNOFF(CFS) =    4.18
  EFFECTIVE AREA(ACRES) =    141.91     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =      149.6         PEAK FLOW RATE(CFS) =     385.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =   2.89
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      385.15   17.87    2.982  0.35( 0.15) 0.42     141.9      13.00
      2      335.83   23.86    2.527  0.35( 0.15) 0.42     149.6      16.10
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      262.05   11.51    3.837  0.20( 0.09) 0.45      77.6      11.01
      2      274.87   14.28    3.391  0.20( 0.09) 0.45      92.2      11.06
      3      270.02   26.87    2.361  0.20( 0.09) 0.46     132.3       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      584.97   11.51    3.837  0.28( 0.12) 0.44     169.0      11.01
      2      627.07   14.28    3.391  0.28( 0.12) 0.43     205.6      11.06
      3      658.64   17.87    2.982  0.28( 0.12) 0.44     245.5      13.00
      4      607.00   23.86    2.527  0.28( 0.12) 0.44     272.3      16.10
      5      582.42   26.87    2.361  0.27( 0.12) 0.44     281.9       1.00
    TOTAL AREA(ACRES) =       281.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      658.64  Tc(MIN.) =   17.871
  EFFECTIVE AREA(ACRES) =    245.55  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      281.9
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
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  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.756
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    52
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        5.63      0.20     1.000    96
  COMMERCIAL                 A        1.56      0.40     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.428
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     681.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.60
  AVERAGE FLOW DEPTH(FEET) =   1.38   TRAVEL TIME(MIN.) =   2.64
  Tc(MIN.) =   20.51
  SUBAREA AREA(ACRES) =    19.06       SUBAREA RUNOFF(CFS) =   45.35
  EFFECTIVE AREA(ACRES) =    264.61     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      300.9         PEAK FLOW RATE(CFS) =     658.64
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.561
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    52
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.03      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.730
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     664.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.57
  AVERAGE FLOW DEPTH(FEET) =   1.36   TRAVEL TIME(MIN.) =   2.80
  Tc(MIN.) =   23.32
  SUBAREA AREA(ACRES) =     5.76       SUBAREA RUNOFF(CFS) =   12.49
  EFFECTIVE AREA(ACRES) =    270.37     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      306.7         PEAK FLOW RATE(CFS) =     658.64
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.437
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    52
```

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  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.01      0.20     1.000    96
  COMMERCIAL                 A        1.68      0.40     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     668.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.57
  AVERAGE FLOW DEPTH(FEET) =   1.37   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =   25.42
  SUBAREA AREA(ACRES) =     9.31       SUBAREA RUNOFF(CFS) =   19.38
  EFFECTIVE AREA(ACRES) =    279.68     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      316.0         PEAK FLOW RATE(CFS) =     658.64
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      316.0  TC(MIN.) =     25.42
  EFFECTIVE AREA(ACRES) =    279.68  AREA-AVERAGED Fm(INCH/HR)=  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap = 0.444
  PEAK FLOW RATE(CFS)   =     658.64

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      584.97   19.38    2.847  0.27( 0.12) 0.45     203.2      11.01
      2      627.07   21.96    2.650  0.27( 0.12) 0.44     239.8      11.06
      3      658.64   25.42    2.437  0.28( 0.12) 0.44     279.7      13.00
      4      607.00   31.65    2.149  0.27( 0.12) 0.45     306.4      16.10
      5      582.42   34.77    2.037  0.27( 0.12) 0.45     316.0       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: P100_B.DAT
  TIME/DATE OF STUDY: 10:28 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.913
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    91    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.38
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   2.82   Tc(MIN.) =   10.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.091
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    2.31
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.47
  FLOW VELOCITY(FEET/SEC.) =  2.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
  STREET FLOW TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =   13.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.543
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.28
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.13
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
  STREET FLOW TRAVEL TIME(MIN.) =   2.89   Tc(MIN.) =   16.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.164
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   19.13
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      24.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.12
  FLOW VELOCITY(FEET/SEC.) =  3.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.99
  STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =   18.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.880
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   19.20
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      41.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  24.80
  FLOW VELOCITY(FEET/SEC.) =  3.65   DEPTH*VELOCITY(FT*FT/SEC.) =   2.21
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   25.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.26   Tc(MIN.) =   21.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.701
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    3.55
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      42.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  25.04
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   2.23
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      56.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.66
    HALFSTREET FLOOD WIDTH(FEET) =   27.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.60
  STREET FLOW TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =   23.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.536
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   27.81
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      67.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.51
  FLOW VELOCITY(FEET/SEC.) =  4.11   DEPTH*VELOCITY(FT*FT/SEC.) =   2.86
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
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  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     109.80
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.79
    HALFSTREET FLOOD WIDTH(FEET) =   36.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.82
  STREET FLOW TRAVEL TIME(MIN.) =   2.34   Tc(MIN.) =   26.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.403
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    91
  SCHOOL                     D        9.91      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   84.30
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =     148.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.86   HALFSTREET FLOOD WIDTH(FEET) =  39.55
  FLOW VELOCITY(FEET/SEC.) =  5.33   DEPTH*VELOCITY(FT*FT/SEC.) =   4.57
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS  144.0 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.82
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     148.35
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   27.03
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.353
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   24.02
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     169.19

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.29
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.19
```

```
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   27.76
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   27.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.317
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       13.88      0.20     0.100    91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.45      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =   18.33      SUBAREA RUNOFF(CFS) =   37.81
  EFFECTIVE AREA(ACRES) =     99.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       99.4       PEAK FLOW RATE(CFS) =     204.41

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   940.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.242
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       24.16      0.20     1.000    96
  CONDOMINIUMS               D        4.43      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     230.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.54
  AVERAGE FLOW DEPTH(FEET) =   1.28   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =   29.40
  SUBAREA AREA(ACRES) =    28.59       SUBAREA RUNOFF(CFS) =   53.06
  EFFECTIVE AREA(ACRES) =    127.94     AREA-AVERAGED Fm(INCH/HR) =   0.06
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.32
  TOTAL AREA(ACRES) =      127.9         PEAK FLOW RATE(CFS) =     250.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.35   FLOW VELOCITY(FEET/SEC.) =   9.79
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      127.9  TC(MIN.) =     29.40
  EFFECTIVE AREA(ACRES) =    127.94  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.321
  PEAK FLOW RATE(CFS)   =     250.76
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

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****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2007 Advanced Engineering Software (aes)
              Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                            Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: P100_C.DAT
  TIME/DATE OF STUDY: 10:29 04/08/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    106.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.003
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.429
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.53      0.20     1.000    98   14.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.45
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      4.45

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   16.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.154
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.73      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.73      SUBAREA RUNOFF(CFS) =   12.57
  EFFECTIVE AREA(ACRES) =      6.26    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      16.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.23
  FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.55
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.64
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   17.00
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     83.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.069
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.81      0.20     0.100    91
  CONDOMINIUMS               D        2.09      0.20     0.350    91
  CONDOMINIUMS               D        3.05      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    7.95      SUBAREA RUNOFF(CFS) =   21.58
  EFFECTIVE AREA(ACRES) =     14.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       14.2       PEAK FLOW RATE(CFS) =      37.74

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.74
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   17.46
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.022
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.73      0.20     0.100    91
  CONDOMINIUMS               D        1.21      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.256
  SUBAREA AREA(ACRES) =    1.94      SUBAREA RUNOFF(CFS) =    5.19
  EFFECTIVE AREA(ACRES) =     16.15   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      42.33

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.47
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.33
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   17.78
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.991
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.32      0.20     0.100    91
  CONDOMINIUMS               D        2.49      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.322
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    7.40
  EFFECTIVE AREA(ACRES) =     18.96   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       19.0       PEAK FLOW RATE(CFS) =      49.28

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.28
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   18.37
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     86.00 =    1780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.37
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.936
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.14      0.20     0.350    91
  COMMERCIAL                 D        0.62      0.20     0.100    91
  PUBLIC PARK                D        1.37      0.20     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.453
  SUBAREA AREA(ACRES) =    5.13      SUBAREA RUNOFF(CFS) =   13.13
  EFFECTIVE AREA(ACRES) =     24.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      61.47

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.20
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.47
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   19.40
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     87.00 =    2410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.51      0.20     0.350    91
  COMMERCIAL                 D        1.12      0.20     0.100    91
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.43      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    5.06      SUBAREA RUNOFF(CFS) =   12.64
  EFFECTIVE AREA(ACRES) =     29.15   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       29.1       PEAK FLOW RATE(CFS) =      72.16

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     88.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.71
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.16
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   19.83
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     88.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     88.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.34      0.20     0.350    91
  COMMERCIAL                 D        0.48      0.20     0.100    91
  CONDOMINIUMS               D        2.16      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    7.98      SUBAREA RUNOFF(CFS) =   19.70
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      90.91

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.29
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.91
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   20.23
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     89.00 =    2960.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.777
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        2.41      0.20     0.350    91
  COMMERCIAL                 D        2.55      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.221
  SUBAREA AREA(ACRES) =    4.96      SUBAREA RUNOFF(CFS) =   12.20
  EFFECTIVE AREA(ACRES) =     42.09   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       42.1       PEAK FLOW RATE(CFS) =     102.04

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.74
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     102.04
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   21.03
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.314
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.332
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.88      0.20     0.100    91    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.42
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      3.42

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     92.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =   11.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.891
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.06      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    3.69
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.76
  FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     92.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.76
  PIPE TRAVEL TIME(MIN.) =   1.73    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     93.00 =    1190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     93.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.584
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.84      0.20     0.350    91
  COMMERCIAL                 D        2.34      0.20     0.100    91
  CONDOMINIUMS               D        8.66      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.315
  SUBAREA AREA(ACRES) =   16.84      SUBAREA RUNOFF(CFS) =   53.36
  EFFECTIVE AREA(ACRES) =     18.78   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =      59.59

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.59
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   13.36
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     94.00 =    1430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        3.80      0.20     0.850    91
```

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  COMMERCIAL                 D        0.27      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    4.07      SUBAREA RUNOFF(CFS) =   12.32
  EFFECTIVE AREA(ACRES) =     22.85   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      70.88

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       70.88
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   13.66
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     95.00 =    1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.479
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    91
  CONDOMINIUMS               D        2.24      0.20     0.350    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    7.50
  EFFECTIVE AREA(ACRES) =     25.29   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      77.47

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       77.47
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   14.14
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     96.00 =    1930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.14
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.411
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        5.07      0.20     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    5.07      SUBAREA RUNOFF(CFS) =   14.79
  EFFECTIVE AREA(ACRES) =     30.36   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      90.70

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.29
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.70
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   14.48
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       90.70   14.48    3.365  0.20( 0.09) 0.46      30.4      90.00
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      102.04   21.03    2.717  0.20( 0.08) 0.42      42.1      80.00
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      178.24   14.48    3.365  0.20( 0.09) 0.44      59.3      90.00
      2      174.79   21.03    2.717  0.20( 0.09) 0.43      72.4      80.00
    TOTAL AREA(ACRES) =        72.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      178.24  Tc(MIN.) =   14.475
  EFFECTIVE AREA(ACRES) =     59.33  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       72.4
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.35
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.24
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   14.82
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     98.00 =    3800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     98.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.319
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       22.13      0.20     1.000    96
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   31.89      SUBAREA RUNOFF(CFS) =   89.52
  EFFECTIVE AREA(ACRES) =     91.22   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =      104.3       PEAK FLOW RATE(CFS) =     262.10
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      104.3  TC(MIN.) =     14.82
```

EFFECTIVE AREA(ACRES) =   91.22 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.635
PEAK FLOW RATE(CFS)   =   262.10

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	262.10	14.82	3.319	0.20(0.13)	0.63	91.2	90.00
2	241.31	21.38	2.691	0.20(0.12)	0.61	104.3	80.00

==
==
END OF RATIONAL METHOD ANALYSIS

ii. HC 25-Year Storm Event

Drainage A

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: P025_A.DAT
  TIME/DATE OF STUDY: 09:36 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.603
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    75    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   3.16   Tc(MIN.) =   11.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.02
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    8.18
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      12.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.70
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   15.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   14.42
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      25.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.63
  FLOW VELOCITY(FEET/SEC.) =  2.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.63
    HALFSTREET FLOOD WIDTH(FEET) =   26.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   17.11
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      40.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.67   HALFSTREET FLOOD WIDTH(FEET) =  28.16
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      58.57
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.73
    HALFSTREET FLOOD WIDTH(FEET) =   33.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =   20.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.163
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      18.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   35.55
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      74.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.78   HALFSTREET FLOOD WIDTH(FEET) =  35.58
  FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   2.64
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   56.2 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.11
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   21.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.27
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.126
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       6.24      0.20     0.100    75
  PUBLIC PARK                D       6.35      0.20     0.850    75
  COMMERCIAL                 D       2.47      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D       3.55      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.528
  SUBAREA AREA(ACRES) =   18.61      SUBAREA RUNOFF(CFS) =   33.83
  EFFECTIVE AREA(ACRES) =     57.14   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       57.1       PEAK FLOW RATE(CFS) =     106.64

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.64
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   21.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.987
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       13.41      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     117.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.95
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   2.44
  Tc(MIN.) =   23.96
  SUBAREA AREA(ACRES) =    13.41       SUBAREA RUNOFF(CFS) =   21.57
  EFFECTIVE AREA(ACRES) =     70.55     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.40
  TOTAL AREA(ACRES) =       70.6         PEAK FLOW RATE(CFS) =     121.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   6.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.890
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        9.71      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     128.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.96
  AVERAGE FLOW DEPTH(FEET) =   1.00   TRAVEL TIME(MIN.) =   2.22
  Tc(MIN.) =   26.18
  SUBAREA AREA(ACRES) =     9.71       SUBAREA RUNOFF(CFS) =   14.77
  EFFECTIVE AREA(ACRES) =     80.26     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.47
  TOTAL AREA(ACRES) =       80.3         PEAK FLOW RATE(CFS) =     129.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   4.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.824
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        3.89      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     132.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.01
  AVERAGE FLOW DEPTH(FEET) =   1.02   TRAVEL TIME(MIN.) =   1.70
  Tc(MIN.) =   27.88
  SUBAREA AREA(ACRES) =     3.89       SUBAREA RUNOFF(CFS) =    5.69
  EFFECTIVE AREA(ACRES) =     84.15     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.50
  TOTAL AREA(ACRES) =       84.2         PEAK FLOW RATE(CFS) =     130.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   5.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.01 TO NODE     11.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     99.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.375
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.630
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.19      0.20     0.100    75    5.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.79
  TOTAL AREA(ACRES) =      0.19   PEAK FLOW RATE(CFS) =      0.79

****************************************************************************
  FLOW PROCESS FROM NODE     11.02 TO NODE     11.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =    7.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.742
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        1.84      0.20     0.850    75
  COMMERCIAL                 D        0.25      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.64      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.816
  SUBAREA AREA(ACRES) =    2.73      SUBAREA RUNOFF(CFS) =    8.79
  EFFECTIVE AREA(ACRES) =      2.92    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.77
```

```
 TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       9.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.55
 FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
 LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.03 =     450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.03 TO NODE     11.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.43
 PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    9.10
 LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.04 =     940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.04 TO NODE     11.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.10
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.436
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.18      0.20     0.100    75
 CONDOMINIUMS               D        1.15      0.20     0.350    75
 CONDOMINIUMS               D        4.75      0.20     0.350    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.308
 SUBAREA AREA(ACRES) =    7.08      SUBAREA RUNOFF(CFS) =   21.50
 EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
 TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      30.13

****************************************************************************
 FLOW PROCESS FROM NODE     11.04 TO NODE     11.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.75
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      30.13
 PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    9.87
 LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.05 =    1340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.05 TO NODE     11.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.87
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.283
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               D        6.10      0.20     0.350    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   17.64
 EFFECTIVE AREA(ACRES) =     16.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      46.40

****************************************************************************
 FLOW PROCESS FROM NODE     11.05 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
```

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  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.59
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.40
  PIPE TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM      Q     Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      46.40   11.45    3.018  0.20( 0.08) 0.41      16.1      11.01
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM      Q     Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     130.59   27.88    1.824  0.20( 0.10) 0.50      84.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM      Q     Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     137.17   11.45    3.018  0.20( 0.09) 0.47      50.7      11.01
      2     158.12   27.88    1.824  0.20( 0.10) 0.48     100.2       1.00
    TOTAL AREA(ACRES) =       100.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      158.12  Tc(MIN.) =   27.878
  EFFECTIVE AREA(ACRES) =    100.25  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      100.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.06 TO NODE     11.07 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =     90.00  DOWNSTREAM(FEET) =     86.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.011
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.456
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.54      0.20     0.350    75    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      4.69
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      4.69

****************************************************************************
  FLOW PROCESS FROM NODE     11.07 TO NODE     11.08 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.50
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.69
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.08 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.38
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.191
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       0.43      0.20     0.100    75
  CONDOMINIUMS               D       1.14      0.20     0.350    75
  CONDOMINIUMS               D       4.05      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.331
  SUBAREA AREA(ACRES) =    5.62      SUBAREA RUNOFF(CFS) =   15.81
  EFFECTIVE AREA(ACRES) =      7.16   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        7.2       PEAK FLOW RATE(CFS) =      20.13

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.09 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.77
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.13
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.09 =    1290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       0.41      0.20     0.100    75
  CONDOMINIUMS               D       1.13      0.20     0.350    75
  CONDOMINIUMS               D       0.62      0.20     0.350    75
  CONDOMINIUMS               D       0.48      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =    2.64      SUBAREA RUNOFF(CFS) =    7.02
  EFFECTIVE AREA(ACRES) =      9.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        9.8       PEAK FLOW RATE(CFS) =      26.04

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   730.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.35
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.04
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   12.91
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.10 =    2020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.91
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.820
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 D        1.01      0.20     0.100    75
CONDOMINIUMS               D        2.10      0.20     0.350    75
CONDOMINIUMS               D        1.33      0.20     0.350    75
CONDOMINIUMS               D        7.17      0.20     0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.328
SUBAREA AREA(ACRES) =   11.61      SUBAREA RUNOFF(CFS) =   28.78
EFFECTIVE AREA(ACRES) =     21.41   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =       21.4       PEAK FLOW RATE(CFS) =      53.08

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.08
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   13.75
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.11 =    2530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     11.11 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.75
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.721
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.44      0.20     0.100    75
  CONDOMINIUMS               D        6.60      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  SUBAREA AREA(ACRES) =    7.04      SUBAREA RUNOFF(CFS) =   16.81
  EFFECTIVE AREA(ACRES) =     28.45   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       28.5       PEAK FLOW RATE(CFS) =      67.97

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.63
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.97
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   14.13
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       67.97   14.13    2.679  0.20( 0.07) 0.33      28.5      11.06
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      137.17   11.45    3.018  0.20( 0.09) 0.47      50.7      11.01
      2      158.12   27.88    1.824  0.20( 0.10) 0.48     100.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      199.38   11.45    3.018  0.20( 0.09) 0.43      73.7      11.01
      2      208.56   14.13    2.679  0.20( 0.09) 0.43      87.2      11.06
      3      203.84   27.88    1.824  0.20( 0.09) 0.45     128.7       1.00
    TOTAL AREA(ACRES) =       128.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      208.56  Tc(MIN.) =   14.130
  EFFECTIVE AREA(ACRES) =     87.20  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      128.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.12
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     208.56
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   14.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.60
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.630
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        3.58      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.58      SUBAREA RUNOFF(CFS) =    7.83
  EFFECTIVE AREA(ACRES) =     90.78   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      132.3       PEAK FLOW RATE(CFS) =     208.56
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    75    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.53
  TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      9.53

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0500
 FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.07
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.53
 PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   11.67
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.67
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.986
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    56
 PUBLIC PARK                D        3.71      0.20     0.850    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.268
 SUBAREA AREA(ACRES) =   35.55      SUBAREA RUNOFF(CFS) =   93.26
 EFFECTIVE AREA(ACRES) =     38.72   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.26
 TOTAL AREA(ACRES) =       38.7       PEAK FLOW RATE(CFS) =     101.67

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0400
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.887
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    75
 NATURAL FAIR COVER
 "OPEN BRUSH"               A       13.96      0.40     1.000    46
 COMMERCIAL                 D        2.65      0.20     0.100    75
 PUBLIC PARK                A        1.60      0.40     0.850    32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     137.46
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  18.07
 AVERAGE FLOW DEPTH(FEET) =   1.95   TRAVEL TIME(MIN.) =   0.72
 Tc(MIN.) =   12.38
 SUBAREA AREA(ACRES) =    29.85       SUBAREA RUNOFF(CFS) =   71.57
 EFFECTIVE AREA(ACRES) =     68.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
 AREA-AVERAGED Fp(INCH/HR) =   0.33  AREA-AVERAGED Ap =   0.41
 TOTAL AREA(ACRES) =       68.6         PEAK FLOW RATE(CFS) =     169.77

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.11   FLOW VELOCITY(FEET/SEC.) =  19.06
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.14
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     169.77
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   12.86
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.60 =    3100.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.86
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.826
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.13      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.83
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.33  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =     169.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.50  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.416
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.759
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.80      0.20     0.350    75   13.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      4.36
  TOTAL AREA(ACRES) =      1.80   PEAK FLOW RATE(CFS) =      4.36

****************************************************************************
  FLOW PROCESS FROM NODE     16.20 TO NODE     16.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.636
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        2.42      0.30     0.350    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        1.92      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.490
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.92
  AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   1.13
  Tc(MIN.) =   14.54
  SUBAREA AREA(ACRES) =     5.24       SUBAREA RUNOFF(CFS) =   11.74
  EFFECTIVE AREA(ACRES) =      7.04     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.45
  TOTAL AREA(ACRES) =        7.0         PEAK FLOW RATE(CFS) =      15.89

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.


  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.50   FLOW VELOCITY(FEET/SEC.) =   7.06

  ==>FLOWDEPTH EXCEEDS MAXIMUM ALLOWABLE DEPTH

  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.30 =     730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.30 TO NODE     16.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   790.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.89
  PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =   16.30
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.40 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.471
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.09      0.30     0.100    56
  PUBLIC PARK                B        2.54      0.30     0.850    56
  PUBLIC PARK                B        2.54      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    8.17      SUBAREA RUNOFF(CFS) =   16.92
  EFFECTIVE AREA(ACRES) =     15.21   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       15.2       PEAK FLOW RATE(CFS) =      31.77

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.84
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.77
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   17.04
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.410
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.85      0.20     0.100    75
  CONDOMINIUMS               D        2.51      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    4.36      SUBAREA RUNOFF(CFS) =    9.27
  EFFECTIVE AREA(ACRES) =     19.57   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       19.6       PEAK FLOW RATE(CFS) =      40.20

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   950.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.39
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.20
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   18.73
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.60 =    2860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.285
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        2.21      0.20     0.850    75
  COMMERCIAL                 D        2.81      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.430
  SUBAREA AREA(ACRES) =    5.02      SUBAREA RUNOFF(CFS) =    9.93
  EFFECTIVE AREA(ACRES) =     24.59   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       24.6       PEAK FLOW RATE(CFS) =      47.92

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       47.92   18.73    2.285  0.27( 0.12) 0.45      24.6      16.10
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    2860.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      169.77   12.86    2.826  0.33( 0.13) 0.40      69.7      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      210.92   12.86    2.826  0.32( 0.13) 0.41      86.6      13.00
      2      183.55   18.73    2.285  0.31( 0.13) 0.42      94.3      16.10
    TOTAL AREA(ACRES) =        94.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      210.92  Tc(MIN.) =   12.862
  EFFECTIVE AREA(ACRES) =     86.59  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       94.3
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  50.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.78
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     210.92
  PIPE TRAVEL TIME(MIN.) =   1.90    Tc(MIN.) =   14.76
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
  MAINLINE Tc(MIN.) =   14.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.614
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        8.07      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    32
  COMMERCIAL                 A        3.62      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.542
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   38.39
  EFFECTIVE AREA(ACRES) =    104.39   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      112.1       PEAK FLOW RATE(CFS) =     231.84

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  46.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.30
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     231.84
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   15.08
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.583
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.09      0.40     1.000    46
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    78
  COMMERCIAL                 A        2.82      0.40     0.100    32
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.417
  SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   51.09
  EFFECTIVE AREA(ACRES) =    127.89   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      135.6       PEAK FLOW RATE(CFS) =     280.01

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.478
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.68      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     293.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.87
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =   16.22
  SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   26.01
  EFFECTIVE AREA(ACRES) =    140.30     AREA-AVERAGED Fm(INCH/HR) =   0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      148.0         PEAK FLOW RATE(CFS) =     293.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =   8.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.299
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     295.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.62
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   2.29
  Tc(MIN.) =   18.52
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =    141.88     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =      149.6         PEAK FLOW RATE(CFS) =     293.95
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   2.62
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      293.95   18.52    2.299  0.35( 0.15) 0.42     141.9      13.00
      2      256.41   24.65    1.956  0.35( 0.15) 0.42     149.6      16.10
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      199.38   11.92    2.950  0.20( 0.09) 0.45      77.3      11.01
      2      208.56   14.60    2.630  0.20( 0.09) 0.45      90.8      11.06
      3      204.03   28.35    1.807  0.20( 0.09) 0.46     132.3       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      445.86   11.92    2.950  0.28( 0.12) 0.44     168.6      11.01
      2      475.99   14.60    2.630  0.28( 0.12) 0.43     202.6      11.06
      3      501.22   18.52    2.299  0.29( 0.12) 0.44     244.5      13.00
      4      461.66   24.65    1.956  0.28( 0.12) 0.44     270.7      16.10
      5      439.33   28.35    1.807  0.27( 0.12) 0.44     281.9       1.00
    TOTAL AREA(ACRES) =       281.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      501.22  Tc(MIN.) =   18.518
  EFFECTIVE AREA(ACRES) =    244.49  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      281.9
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

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  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.115
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        5.63      0.20     1.000    83
  COMMERCIAL                 A        1.56      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.428
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     518.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.24
  AVERAGE FLOW DEPTH(FEET) =   1.18   TRAVEL TIME(MIN.) =   2.93
  Tc(MIN.) =   21.45
  SUBAREA AREA(ACRES) =    19.06       SUBAREA RUNOFF(CFS) =   34.36
  EFFECTIVE AREA(ACRES) =    263.55     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      300.9         PEAK FLOW RATE(CFS) =     501.22
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.960
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.03      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.730
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     505.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.22
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   3.10
  Tc(MIN.) =   24.56
  SUBAREA AREA(ACRES) =     5.76       SUBAREA RUNOFF(CFS) =    9.37
  EFFECTIVE AREA(ACRES) =    269.31     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      306.7         PEAK FLOW RATE(CFS) =     501.22
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.862
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    32
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.01      0.20     1.000    83
  COMMERCIAL                 A        1.68      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     508.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.22
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.33
  Tc(MIN.) =   26.88
  SUBAREA AREA(ACRES) =     9.31       SUBAREA RUNOFF(CFS) =   14.56
  EFFECTIVE AREA(ACRES) =    278.62     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      316.0         PEAK FLOW RATE(CFS) =     501.22
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      316.0  TC(MIN.) =     26.88
  EFFECTIVE AREA(ACRES) =    278.62  AREA-AVERAGED Fm(INCH/HR)=  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap = 0.444
  PEAK FLOW RATE(CFS)   =     501.22

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      445.86   20.63    2.163  0.27( 0.12) 0.45     202.7      11.01
      2      475.99   23.11    2.028  0.27( 0.12) 0.44     236.8      11.06
      3      501.22   26.88    1.862  0.28( 0.12) 0.44     278.6      13.00
      4      461.66   33.27    1.650  0.27( 0.12) 0.45     304.8      16.10
      5      439.33   37.15    1.550  0.27( 0.12) 0.45     316.0       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: P025_B.DAT
  TIME/DATE OF STUDY: 09:36 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.841
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.86
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.86

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   10.44
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.180
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.12   Tc(MIN.) =   13.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.743
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.76
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.84
  FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   16.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.443
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   14.74
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      18.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.16
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   19.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   14.77
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      31.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   22.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      32.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.54
  FLOW VELOCITY(FEET/SEC.) =  3.44   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   25.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.62   Tc(MIN.) =   24.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.951
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   21.34
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      51.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.65   HALFSTREET FLOOD WIDTH(FEET) =  27.07
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   2.49
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
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  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.11
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.74
    HALFSTREET FLOOD WIDTH(FEET) =   33.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   27.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.846
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    75
  SCHOOL                     D        9.91      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   64.38
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =     113.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.80   HALFSTREET FLOOD WIDTH(FEET) =  36.44
  FLOW VELOCITY(FEET/SEC.) =  4.91   DEPTH*VELOCITY(FT*FT/SEC.) =   3.90
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS  112.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.45
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   28.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   28.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.806
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   18.39
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     129.35

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.34
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.35
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  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   29.15
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   29.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      13.88      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       4.45      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =   18.33      SUBAREA RUNOFF(CFS) =   28.93
  EFFECTIVE AREA(ACRES) =     99.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       99.4       PEAK FLOW RATE(CFS) =     156.26

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   940.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.719
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D      24.16      0.20     1.000    83
  CONDOMINIUMS               D       4.43      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     176.08
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.73
  AVERAGE FLOW DEPTH(FEET) =   1.10   TRAVEL TIME(MIN.) =   1.79
  Tc(MIN.) =   30.94
  SUBAREA AREA(ACRES) =    28.59       SUBAREA RUNOFF(CFS) =   39.61
  EFFECTIVE AREA(ACRES) =    127.94     AREA-AVERAGED Fm(INCH/HR) =   0.06
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.32
  TOTAL AREA(ACRES) =      127.9         PEAK FLOW RATE(CFS) =     190.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   8.99
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      127.9  TC(MIN.) =     30.94
  EFFECTIVE AREA(ACRES) =    127.94  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.321
  PEAK FLOW RATE(CFS)   =     190.59
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: P025_C.DAT
  TIME/DATE OF STUDY: 09:37 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    106.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.003
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.693
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.53      0.20     1.000    93   14.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =  12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =   0.97
  STREET FLOW TRAVEL TIME(MIN.) =   2.36   Tc(MIN.) =  16.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.466
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.73      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.73      SUBAREA RUNOFF(CFS) =    9.65
  EFFECTIVE AREA(ACRES) =      6.26    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      12.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
  FLOW VELOCITY(FEET/SEC.) =  2.75   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.77
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   17.21
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     83.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.396
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.81      0.20     0.100    75
  CONDOMINIUMS               D        2.09      0.20     0.350    75
  CONDOMINIUMS               D        3.05      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    7.95      SUBAREA RUNOFF(CFS) =   16.77
  EFFECTIVE AREA(ACRES) =     14.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       14.2       PEAK FLOW RATE(CFS) =      29.14

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.42
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.14
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   17.71
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.71
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.358
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.73      0.20     0.100    75
  CONDOMINIUMS               D        1.21      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.256
  SUBAREA AREA(ACRES) =    1.94      SUBAREA RUNOFF(CFS) =    4.03
  EFFECTIVE AREA(ACRES) =     16.15   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      32.68

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.88
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.68
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   18.05
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.05
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.32      0.20     0.100    75
  CONDOMINIUMS               D        2.49      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.322
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    5.74
  EFFECTIVE AREA(ACRES) =     18.96   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       19.0       PEAK FLOW RATE(CFS) =      38.05

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.04
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.05
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   18.67
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     86.00 =    1780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.288
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.14      0.20     0.350    75
  COMMERCIAL                 D        0.62      0.20     0.100    75
  PUBLIC PARK                D        1.37      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.453
  SUBAREA AREA(ACRES) =    5.13      SUBAREA RUNOFF(CFS) =   10.15
  EFFECTIVE AREA(ACRES) =     24.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      47.44

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.61
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.44
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   19.77
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     87.00 =    2410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.216
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.51      0.20     0.350    75
  COMMERCIAL                 D        1.12      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.43      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    5.06      SUBAREA RUNOFF(CFS) =    9.77
  EFFECTIVE AREA(ACRES) =     29.15   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       29.1       PEAK FLOW RATE(CFS) =      55.64

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     88.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.64
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   20.23
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     88.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     88.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.187
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.34      0.20     0.350    75
  COMMERCIAL                 D        0.48      0.20     0.100    75
  CONDOMINIUMS               D        2.16      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    7.98      SUBAREA RUNOFF(CFS) =   15.22
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      70.11

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.68
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.11
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   20.65
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     89.00 =    2960.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.161
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D       2.41      0.20     0.350    75
  COMMERCIAL                 D       2.55      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.221
  SUBAREA AREA(ACRES) =    4.96      SUBAREA RUNOFF(CFS) =    9.45
  EFFECTIVE AREA(ACRES) =     42.09   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       42.1       PEAK FLOW RATE(CFS) =      78.71

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.08
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.71
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   21.49
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.314
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.392
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D       0.88      0.20     0.100    75    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.67
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     92.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =   11.35
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.034
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.06      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    2.88
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.43
  FLOW VELOCITY(FEET/SEC.) =  2.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     92.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.62
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.26
  PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   13.21
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     93.00 =    1190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     93.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.84      0.20     0.350    75
  COMMERCIAL                 D        2.34      0.20     0.100    75
  CONDOMINIUMS               D        8.66      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.315
  SUBAREA AREA(ACRES) =   16.84      SUBAREA RUNOFF(CFS) =   41.22
  EFFECTIVE AREA(ACRES) =     18.78   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =      46.04

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.58
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.04
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   13.63
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     94.00 =    1430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.734
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        3.80      0.20     0.850    75
```

```
  COMMERCIAL                 D        0.27      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    4.07      SUBAREA RUNOFF(CFS) =    9.43
  EFFECTIVE AREA(ACRES) =     22.85   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      54.65

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.07
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.65
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   13.95
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     95.00 =    1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.95
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.699
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    75
  CONDOMINIUMS               D        2.24      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    5.78
  EFFECTIVE AREA(ACRES) =     25.29   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      59.71

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.71
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   14.45
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     96.00 =    1930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.645
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        5.07      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    5.07      SUBAREA RUNOFF(CFS) =   11.29
  EFFECTIVE AREA(ACRES) =     30.36   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      69.78

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.78
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   14.81
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       69.78   14.81    2.609  0.20( 0.09) 0.46      30.4      90.00
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       78.71   21.49    2.113  0.20( 0.08) 0.42      42.1      80.00
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      137.27   14.81    2.609  0.20( 0.09) 0.44      59.4      90.00
      2      134.75   21.49    2.113  0.20( 0.09) 0.43      72.4      80.00
    TOTAL AREA(ACRES) =        72.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      137.27  Tc(MIN.) =   14.813
  EFFECTIVE AREA(ACRES) =     59.37  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       72.4
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     137.27
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   15.18
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     98.00 =    3800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     98.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.573
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       22.13      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   31.89      SUBAREA RUNOFF(CFS) =   68.10
  EFFECTIVE AREA(ACRES) =     91.26   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =      104.3       PEAK FLOW RATE(CFS) =     200.88
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      104.3  TC(MIN.) =     15.18
```

```
  EFFECTIVE AREA(ACRES) =     91.26  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.634
  PEAK FLOW RATE(CFS)   =     200.88

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      200.88   15.18    2.573  0.20( 0.13) 0.63      91.3      90.00
      2      185.08   21.87    2.092  0.20( 0.12) 0.61     104.3      80.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

iii. HC 10-Year Storm Event

Drainage A

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: P010_A.DAT
  TIME/DATE OF STUDY: 09:37 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    75    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.82
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.82

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   3.27   Tc(MIN.) =   11.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.82
  FLOW VELOCITY(FEET/SEC.) =  1.62   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   2.33   Tc(MIN.) =   13.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    6.75
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      10.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.37
  FLOW VELOCITY(FEET/SEC.) =  2.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   2.31   Tc(MIN.) =   16.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.064
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   11.86
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      21.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.91
  FLOW VELOCITY(FEET/SEC.) =  2.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.60
    HALFSTREET FLOOD WIDTH(FEET) =   24.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =   19.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.881
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   14.05
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      33.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  26.13
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
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  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      47.99
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   21.22
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.773
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       18.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   29.08
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      60.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.74   HALFSTREET FLOOD WIDTH(FEET) =  33.63
  FLOW VELOCITY(FEET/SEC.) =  3.16   DEPTH*VELOCITY(FT*FT/SEC.) =   2.34
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   47.0 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.59
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   21.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.90
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.741
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.24      0.20     0.100    75
  PUBLIC PARK                D        6.35      0.20     0.850    75
  COMMERCIAL                 D        2.47      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D        3.55      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.528
  SUBAREA AREA(ACRES) =   18.61      SUBAREA RUNOFF(CFS) =   27.40
  EFFECTIVE AREA(ACRES) =     57.14   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       57.1       PEAK FLOW RATE(CFS) =      86.88

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
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  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.56
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.88
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   22.17
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.621
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       13.41      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      95.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.50
  AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   2.64
  Tc(MIN.) =   24.81
  SUBAREA AREA(ACRES) =    13.41       SUBAREA RUNOFF(CFS) =   17.15
  EFFECTIVE AREA(ACRES) =     70.55     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.40
  TOTAL AREA(ACRES) =       70.6         PEAK FLOW RATE(CFS) =      97.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   5.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.538
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        9.71      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     103.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.58
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   2.40
  Tc(MIN.) =   27.21
  SUBAREA AREA(ACRES) =     9.71       SUBAREA RUNOFF(CFS) =   11.69
  EFFECTIVE AREA(ACRES) =     80.26     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.47
  TOTAL AREA(ACRES) =       80.3         PEAK FLOW RATE(CFS) =     104.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.88   FLOW VELOCITY(FEET/SEC.) =   4.58
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.481
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        3.89      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     106.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.62
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   1.84
  Tc(MIN.) =   29.05
  SUBAREA AREA(ACRES) =     3.89       SUBAREA RUNOFF(CFS) =    4.49
  EFFECTIVE AREA(ACRES) =     84.15     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.50
  TOTAL AREA(ACRES) =       84.2         PEAK FLOW RATE(CFS) =     104.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.88   FLOW VELOCITY(FEET/SEC.) =   4.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.01 TO NODE     11.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     99.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.375
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.895
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.19      0.20     0.100    75    5.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.66
  TOTAL AREA(ACRES) =      0.19   PEAK FLOW RATE(CFS) =      0.66

****************************************************************************
  FLOW PROCESS FROM NODE     11.02 TO NODE     11.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =    7.93
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        1.84      0.20     0.850    75
  COMMERCIAL                 D        0.25      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.64      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.816
  SUBAREA AREA(ACRES) =    2.73      SUBAREA RUNOFF(CFS) =    7.26
  EFFECTIVE AREA(ACRES) =      2.92    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.77
```

```
  TOTAL AREA(ACRES) =       2.9       PEAK FLOW RATE(CFS) =      7.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.54
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =  0.94
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.03 =    450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.03 TO NODE     11.04 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.79
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =    9.24
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.04 =    940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.18      0.20     0.100    75
  CONDOMINIUMS               D        1.15      0.20     0.350    75
  CONDOMINIUMS               D        4.75      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.308
  SUBAREA AREA(ACRES) =    7.08      SUBAREA RUNOFF(CFS) =   17.80
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      10.0       PEAK FLOW RATE(CFS) =     24.90

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.29
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     24.90
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   10.04
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.05 =   1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     11.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.04
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.722
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        6.10      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   14.56
  EFFECTIVE AREA(ACRES) =     16.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      16.1       PEAK FLOW RATE(CFS) =     38.26

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.04
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.26
  PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =   11.72
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       38.26   11.72    2.492  0.20( 0.08) 0.41      16.1      11.01
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      104.65   29.05    1.481  0.20( 0.10) 0.50      84.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      111.36   11.72    2.492  0.20( 0.09) 0.47      50.1      11.01
      2      126.87   29.05    1.481  0.20( 0.10) 0.48     100.2       1.00
    TOTAL AREA(ACRES) =       100.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      126.87  Tc(MIN.) =   29.048
  EFFECTIVE AREA(ACRES) =    100.25  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      100.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.06 TO NODE     11.07 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =     90.00  DOWNSTREAM(FEET) =     86.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.011
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.897
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.54      0.20     0.350    75    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      3.92
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      3.92

****************************************************************************
  FLOW PROCESS FROM NODE     11.07 TO NODE     11.08 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.30
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       3.92
  PIPE TRAVEL TIME(MIN.) =   1.42    Tc(MIN.) =   10.43
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.08 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.664
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.43      0.20     0.100    75
  CONDOMINIUMS               D        1.14      0.20     0.350    75
  CONDOMINIUMS               D        4.05      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.331
  SUBAREA AREA(ACRES) =    5.62      SUBAREA RUNOFF(CFS) =   13.14
  EFFECTIVE AREA(ACRES) =      7.16   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        7.2       PEAK FLOW RATE(CFS) =      16.74

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.09 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.55
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.74
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =   11.53
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.09 =    1290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.53
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.515
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  CONDOMINIUMS               D        1.13      0.20     0.350    75
  CONDOMINIUMS               D        0.62      0.20     0.350    75
  CONDOMINIUMS               D        0.48      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =    2.64      SUBAREA RUNOFF(CFS) =    5.83
  EFFECTIVE AREA(ACRES) =      9.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        9.8       PEAK FLOW RATE(CFS) =      21.60

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   730.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.08
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.60
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   13.04
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.10 =    2020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.04
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.344
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.01      0.20     0.100    75
  CONDOMINIUMS               D        2.10      0.20     0.350    75
  CONDOMINIUMS               D        1.33      0.20     0.350    75
  CONDOMINIUMS               D        7.17      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.328
  SUBAREA AREA(ACRES) =   11.61      SUBAREA RUNOFF(CFS) =   23.81
  EFFECTIVE AREA(ACRES) =     21.41   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       21.4       PEAK FLOW RATE(CFS) =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.90
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   13.93
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.11 =    2530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     11.11 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.93
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.257
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.44      0.20     0.100    75
  CONDOMINIUMS               D        6.60      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  SUBAREA AREA(ACRES) =    7.04      SUBAREA RUNOFF(CFS) =   13.88
  EFFECTIVE AREA(ACRES) =     28.45   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       28.5       PEAK FLOW RATE(CFS) =      56.10

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.11
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.10
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   14.33
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       56.10   14.33    2.221  0.20( 0.07) 0.33      28.5      11.06
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      111.36   11.72    2.492  0.20( 0.09) 0.47      50.1      11.01
      2      126.87   29.05    1.481  0.20( 0.10) 0.48     100.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      163.03   11.72    2.492  0.20( 0.08) 0.42      73.3      11.01
     2      169.79   14.33    2.221  0.20( 0.08) 0.42      86.0      11.06
     3      163.71   29.05    1.481  0.20( 0.09) 0.45     128.7       1.00
   TOTAL AREA(ACRES) =       128.7

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      169.79  Tc(MIN.) =   14.325
 EFFECTIVE AREA(ACRES) =     86.05  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      128.7
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.31
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     169.79
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   14.82
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.82
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.178
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               D        3.58      0.20     1.000    83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    3.58      SUBAREA RUNOFF(CFS) =    6.37
 EFFECTIVE AREA(ACRES) =     89.63   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      132.3       PEAK FLOW RATE(CFS) =     169.79
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
 ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.832
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    75    9.37
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      7.97
 TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      7.97

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.58
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.97
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   11.76
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.76
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    56
  PUBLIC PARK                D        3.71      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.268
  SUBAREA AREA(ACRES) =   35.55      SUBAREA RUNOFF(CFS) =   77.27
  EFFECTIVE AREA(ACRES) =     38.72   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       38.7       PEAK FLOW RATE(CFS) =      84.25

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.400
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       13.96      0.40     1.000    46
  COMMERCIAL                 D        2.65      0.20     0.100    75
  PUBLIC PARK                A        1.60      0.40     0.850    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     113.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.27
  AVERAGE FLOW DEPTH(FEET) =   1.81   TRAVEL TIME(MIN.) =   0.75
  Tc(MIN.) =   12.52
  SUBAREA AREA(ACRES) =    29.85       SUBAREA RUNOFF(CFS) =   58.49
  EFFECTIVE AREA(ACRES) =     68.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.33  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =       68.6         PEAK FLOW RATE(CFS) =     139.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.96   FLOW VELOCITY(FEET/SEC.) =  18.12
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     139.71
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   13.01
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.60 =    3100.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.01
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.347
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.13      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.35
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.33  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =     139.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.50  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.416
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.306
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.80      0.20     0.350    75   13.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      3.62
  TOTAL AREA(ACRES) =      1.80   PEAK FLOW RATE(CFS) =      3.62

****************************************************************************
  FLOW PROCESS FROM NODE     16.20 TO NODE     16.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.197
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        2.42      0.30     0.350    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        1.92      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.490
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.65
  AVERAGE FLOW DEPTH(FEET) =   1.22   TRAVEL TIME(MIN.) =   1.18
  Tc(MIN.) =   14.60
  SUBAREA AREA(ACRES) =     5.24       SUBAREA RUNOFF(CFS) =    9.67
  EFFECTIVE AREA(ACRES) =      7.04     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.45
  TOTAL AREA(ACRES) =        7.0         PEAK FLOW RATE(CFS) =      13.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.44   FLOW VELOCITY(FEET/SEC.) =   6.33
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.30 =     730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.30 TO NODE     16.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   790.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.11
  PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   16.47
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.40 =    1520.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.40 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   16.47
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.09      0.30     0.100    56
  PUBLIC PARK                B        2.54      0.30     0.850    56
  PUBLIC PARK                B        2.54      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    8.17      SUBAREA RUNOFF(CFS) =   13.83
  EFFECTIVE AREA(ACRES) =     15.21   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       15.2       PEAK FLOW RATE(CFS) =      26.01

******************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.50 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.34
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.01
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   17.24
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    1910.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   17.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.997
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.85      0.20     0.100    75
  CONDOMINIUMS               D        2.51      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    4.36      SUBAREA RUNOFF(CFS) =    7.64
  EFFECTIVE AREA(ACRES) =     19.57   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       19.6       PEAK FLOW RATE(CFS) =      32.93

******************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.60 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   950.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.89
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.93
  PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   19.03
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.60 =    2860.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
------------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.03
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.888
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        2.21      0.20     0.850    75
  COMMERCIAL                 D        2.81      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.430
  SUBAREA AREA(ACRES) =    5.02      SUBAREA RUNOFF(CFS) =    8.14
  EFFECTIVE AREA(ACRES) =     24.59   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       24.6       PEAK FLOW RATE(CFS) =      39.14

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.14   19.03    1.888  0.27( 0.12) 0.45      24.6      16.10
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    2860.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      139.71   13.01    2.347  0.33( 0.13) 0.40      69.7      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      173.42   13.01    2.347  0.32( 0.13) 0.41      86.5      13.00
      2      149.85   19.03    1.888  0.31( 0.13) 0.42      94.3      16.10
    TOTAL AREA(ACRES) =        94.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      173.42  Tc(MIN.) =   13.011
  EFFECTIVE AREA(ACRES) =     86.52  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       94.3
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  48.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.14
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     173.42
  PIPE TRAVEL TIME(MIN.) =   2.02    Tc(MIN.) =   15.03
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.03
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.161
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        8.07      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    32
```

```
  COMMERCIAL                 A        3.62      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.542
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   31.14
  EFFECTIVE AREA(ACRES) =    104.32   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      112.1       PEAK FLOW RATE(CFS) =     189.14

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.72
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     189.14
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   15.36
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.36
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.134
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.09      0.40     1.000    46
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    78
  COMMERCIAL                 A        2.82      0.40     0.100    32
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.417
  SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   41.60
  EFFECTIVE AREA(ACRES) =    127.82   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      135.6       PEAK FLOW RATE(CFS) =     228.24

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.041
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.68      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     238.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.20
  AVERAGE FLOW DEPTH(FEET) =   0.80   TRAVEL TIME(MIN.) =   1.24
  Tc(MIN.) =   16.60
  SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   21.13
  EFFECTIVE AREA(ACRES) =    140.23     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      148.0         PEAK FLOW RATE(CFS) =     238.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   8.19
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
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```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.884
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     240.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.42
  AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   2.48
  Tc(MIN.) =   19.08
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    2.62
  EFFECTIVE AREA(ACRES) =    141.81     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =      149.6         PEAK FLOW RATE(CFS) =     238.69
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   2.40
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      238.69   19.08    1.884  0.35( 0.15) 0.42     141.8      13.00
      2      207.12   25.39    1.600  0.35( 0.15) 0.42     149.6      16.10
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      163.03   12.22    2.433  0.20( 0.09) 0.45      76.9      11.01
      2      169.79   14.82    2.178  0.20( 0.09) 0.45      89.6      11.06
      3      163.71   29.54    1.467  0.20( 0.09) 0.46     132.3       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      364.12   12.22    2.433  0.28( 0.12) 0.44     167.7      11.01
      2      386.50   14.82    2.178  0.28( 0.12) 0.43     199.7      11.06
      3      406.72   19.08    1.884  0.29( 0.12) 0.44     243.8      13.00
      4      372.54   25.39    1.600  0.28( 0.12) 0.44     269.8      16.10
      5      351.86   29.54    1.467  0.27( 0.12) 0.44     281.9       1.00
    TOTAL AREA(ACRES) =       281.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      406.72  Tc(MIN.) =   19.084
  EFFECTIVE AREA(ACRES) =    243.80  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      281.9
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.725
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  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        5.63      0.20     1.000    83
  COMMERCIAL                 A        1.56      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.428
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     420.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.99
  AVERAGE FLOW DEPTH(FEET) =   1.04   TRAVEL TIME(MIN.) =   3.18
  Tc(MIN.) =   22.26
  SUBAREA AREA(ACRES) =    19.06       SUBAREA RUNOFF(CFS) =   27.67
  EFFECTIVE AREA(ACRES) =    262.86     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      300.9         PEAK FLOW RATE(CFS) =     406.72
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.02   FLOW VELOCITY(FEET/SEC.) =   2.96
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.591
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.03      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.730
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     410.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.96
  AVERAGE FLOW DEPTH(FEET) =   1.03   TRAVEL TIME(MIN.) =   3.38
  Tc(MIN.) =   25.64
  SUBAREA AREA(ACRES) =     5.76       SUBAREA RUNOFF(CFS) =    7.46
  EFFECTIVE AREA(ACRES) =    268.62     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      306.7         PEAK FLOW RATE(CFS) =     406.72
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.02   FLOW VELOCITY(FEET/SEC.) =   2.96
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.508
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    32
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.01      0.20     1.000    83
  COMMERCIAL                 A        1.68      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     412.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.98
  AVERAGE FLOW DEPTH(FEET) =   1.03   TRAVEL TIME(MIN.) =   2.52
  Tc(MIN.) =   28.16
  SUBAREA AREA(ACRES) =     9.31       SUBAREA RUNOFF(CFS) =   11.59
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  EFFECTIVE AREA(ACRES) =    277.93     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      316.0         PEAK FLOW RATE(CFS) =     406.72
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.02   FLOW VELOCITY(FEET/SEC.) =   2.96
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      316.0  TC(MIN.) =     28.16
  EFFECTIVE AREA(ACRES) =    277.93  AREA-AVERAGED Fm(INCH/HR)=  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap = 0.444
  PEAK FLOW RATE(CFS)   =     406.72

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      364.12   21.64    1.753  0.27( 0.12) 0.45     201.8      11.01
      2      386.50   24.04    1.651  0.27( 0.12) 0.44     233.9      11.06
      3      406.72   28.16    1.508  0.28( 0.12) 0.44     277.9      13.00
      4      372.54   34.76    1.336  0.27( 0.12) 0.45     304.0      16.10
      5      351.86   39.12    1.249  0.27( 0.12) 0.45     316.0       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: P010_B.DAT
  TIME/DATE OF STUDY: 09:37 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.224
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   3.06   Tc(MIN.) =   10.54
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.648
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.49
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.53
  FLOW VELOCITY(FEET/SEC.) =  1.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   3.22   Tc(MIN.) =   13.75
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.273
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.46
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.97
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   3.21   Tc(MIN.) =   16.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.016
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   12.14
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      15.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.76
  FLOW VELOCITY(FEET/SEC.) =  2.88   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.57
  STREET FLOW TRAVEL TIME(MIN.) =   3.22   Tc(MIN.) =   20.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.825
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   12.12
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      26.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.66
  FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      27.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =   22.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.705
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    2.23
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      26.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.82
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.76   Tc(MIN.) =   25.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.597
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   17.42
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      42.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  25.04
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   2.23
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      68.49
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.88
  STREET FLOW TRAVEL TIME(MIN.) =   2.75   Tc(MIN.) =   28.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.505
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    75
  SCHOOL                     D        9.91      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   52.21
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =      92.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.75   HALFSTREET FLOOD WIDTH(FEET) =  34.30
  FLOW VELOCITY(FEET/SEC.) =  4.59   DEPTH*VELOCITY(FT*FT/SEC.) =   3.45
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS   93.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.30
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.13
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   29.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   29.36
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.472
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   14.95
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     105.00

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.78
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     105.00
```

```
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   30.18
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   30.18
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.449
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      13.88      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       4.45      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =   18.33      SUBAREA RUNOFF(CFS) =   23.50
  EFFECTIVE AREA(ACRES) =     99.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       99.4       PEAK FLOW RATE(CFS) =     126.82

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   940.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.399
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D      24.16      0.20     1.000    83
  CONDOMINIUMS               D       4.43      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     142.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.17
  AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   1.92
  Tc(MIN.) =   32.10
  SUBAREA AREA(ACRES) =    28.59       SUBAREA RUNOFF(CFS) =   31.37
  EFFECTIVE AREA(ACRES) =    127.94     AREA-AVERAGED Fm(INCH/HR) =   0.06
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.32
  TOTAL AREA(ACRES) =      127.9         PEAK FLOW RATE(CFS) =     153.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.02   FLOW VELOCITY(FEET/SEC.) =   8.37
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      127.9  TC(MIN.) =     32.10
  EFFECTIVE AREA(ACRES) =    127.94  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.321
  PEAK FLOW RATE(CFS)   =     153.69
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage C

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: P010_C.DAT
  TIME/DATE OF STUDY: 09:37 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    106.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.003
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.250
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA       Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.53      0.20     1.000    93   14.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.82
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      2.82

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =   16.47
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                  D        4.73      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.73      SUBAREA RUNOFF(CFS) =    7.88
  EFFECTIVE AREA(ACRES) =      6.26    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      10.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.18
  FLOW VELOCITY(FEET/SEC.) =  2.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.43
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   17.35
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     83.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.990
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        2.81      0.20     0.100    75
  CONDOMINIUMS              D        2.09      0.20     0.350    75
  CONDOMINIUMS              D        3.05      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    7.95      SUBAREA RUNOFF(CFS) =   13.86
  EFFECTIVE AREA(ACRES) =     14.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       14.2       PEAK FLOW RATE(CFS) =      23.95

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.24
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.95
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   17.86
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.86
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.957
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.73      0.20     0.100    75
  CONDOMINIUMS               D        1.21      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.256
  SUBAREA AREA(ACRES) =    1.94      SUBAREA RUNOFF(CFS) =    3.33
  EFFECTIVE AREA(ACRES) =     16.15   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      26.86

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.38
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.86
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   18.22
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.22
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.935
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.32      0.20     0.100    75
  CONDOMINIUMS               D        2.49      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.322
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    4.73
  EFFECTIVE AREA(ACRES) =     18.96   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       19.0       PEAK FLOW RATE(CFS) =      31.27

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.81
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.27
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   18.86
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     86.00 =    1780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.86
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.897
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.14      0.20     0.350    75
  COMMERCIAL                 D        0.62      0.20     0.100    75
  PUBLIC PARK                D        1.37      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.453
  SUBAREA AREA(ACRES) =    5.13      SUBAREA RUNOFF(CFS) =    8.34
  EFFECTIVE AREA(ACRES) =     24.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      38.96

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.96
  PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =   19.99
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     87.00 =    2410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.99
   *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.835
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.51      0.20     0.350    75
  COMMERCIAL                 D        1.12      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.43      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    5.06      SUBAREA RUNOFF(CFS) =    8.04
  EFFECTIVE AREA(ACRES) =     29.15   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       29.1       PEAK FLOW RATE(CFS) =      45.65

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     88.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.57
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.65
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   20.47
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     88.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     88.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.47
   *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.34      0.20     0.350    75
  COMMERCIAL                 D        0.48      0.20     0.100    75
  CONDOMINIUMS               D        2.16      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    7.98      SUBAREA RUNOFF(CFS) =   12.52
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      57.51

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.14
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.51
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   20.92
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     89.00 =    2960.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.788
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        2.41      0.20     0.350    75
  COMMERCIAL                 D        2.55      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.221
  SUBAREA AREA(ACRES) =    4.96      SUBAREA RUNOFF(CFS) =    7.78
  EFFECTIVE AREA(ACRES) =     42.09   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       42.1       PEAK FLOW RATE(CFS) =      64.56

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.55
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.56
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   21.80
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.314
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.842
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.88      0.20     0.100    75    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.24

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     92.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =   11.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.529
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       1.06      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.59
  FLOW VELOCITY(FEET/SEC.) =  2.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     92.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.43
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   13.36
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     93.00 =    1190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     93.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.36
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.312
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D       5.84      0.20     0.350    75
  COMMERCIAL                 D       2.34      0.20     0.100    75
  CONDOMINIUMS               D       8.66      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.315
  SUBAREA AREA(ACRES) =   16.84      SUBAREA RUNOFF(CFS) =   34.08
  EFFECTIVE AREA(ACRES) =     18.78   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =      38.09

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.04
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.09
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.80
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     94.00 =    1430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.80
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.269
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D       3.80      0.20     0.850    75
```

```
  COMMERCIAL                 D        0.27      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    4.07      SUBAREA RUNOFF(CFS) =    7.73
  EFFECTIVE AREA(ACRES) =     22.85   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      45.09

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.56
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.09
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   14.13
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     95.00 =    1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.13
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.238
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    75
  CONDOMINIUMS               D        2.24      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    4.77
  EFFECTIVE AREA(ACRES) =     25.29   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      49.23

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.23
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.67
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     96.00 =    1930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.191
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        5.07      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    5.07      SUBAREA RUNOFF(CFS) =    9.22
  EFFECTIVE AREA(ACRES) =     30.36   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      57.37

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.14
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.37
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   15.04
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       57.37   15.04    2.159  0.20( 0.09) 0.46      30.4      90.00
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       64.56   21.80    1.746  0.20( 0.08) 0.42      42.1      80.00
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      113.00   15.04    2.159  0.20( 0.09) 0.44      59.4      90.00
      2      110.46   21.80    1.746  0.20( 0.09) 0.43      72.4      80.00
    TOTAL AREA(ACRES) =        72.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      113.00  Tc(MIN.) =   15.044
  EFFECTIVE AREA(ACRES) =     59.40  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       72.4
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.00
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   15.44
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     98.00 =    3800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     98.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.44
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.128
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       22.13      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   31.89      SUBAREA RUNOFF(CFS) =   55.33
  EFFECTIVE AREA(ACRES) =     91.29   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =      104.3       PEAK FLOW RATE(CFS) =     164.40
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      104.3  TC(MIN.) =     15.44
```

```
  EFFECTIVE AREA(ACRES) =     91.29  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.634
  PEAK FLOW RATE(CFS)   =     164.40

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      164.40   15.44    2.128  0.20( 0.13) 0.63      91.3      90.00
      2      150.87   22.20    1.728  0.20( 0.12) 0.61     104.3      80.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

b) Expected Value (50% Confidence) Events

i. EV 100-Year Storm Event

Drainage A

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: P025_A.DAT
  TIME/DATE OF STUDY: 09:36 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.603
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    75    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   3.16   Tc(MIN.) =   11.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.02
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    8.18
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      12.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.70
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   15.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =   14.42
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =      25.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.63
  FLOW VELOCITY(FEET/SEC.) =  2.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.63
    HALFSTREET FLOOD WIDTH(FEET) =   26.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =   17.11
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      40.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.67   HALFSTREET FLOOD WIDTH(FEET) =  28.16
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      58.57
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.73
    HALFSTREET FLOOD WIDTH(FEET) =   33.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =   20.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.163
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      18.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   35.55
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      74.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.78   HALFSTREET FLOOD WIDTH(FEET) =  35.58
  FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   2.64
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  360.0 FT WITH ELEVATION-DROP =   1.8 FT, IS   56.2 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      7.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.11
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   21.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.27
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.126
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       6.24      0.20     0.100    75
  PUBLIC PARK                D       6.35      0.20     0.850    75
  COMMERCIAL                 D       2.47      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D       3.55      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.528
  SUBAREA AREA(ACRES) =   18.61      SUBAREA RUNOFF(CFS) =   33.83
  EFFECTIVE AREA(ACRES) =     57.14   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       57.1       PEAK FLOW RATE(CFS) =     106.64

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
```

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  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.64
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   21.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.987
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       13.41      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     117.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.95
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   2.44
  Tc(MIN.) =   23.96
  SUBAREA AREA(ACRES) =    13.41       SUBAREA RUNOFF(CFS) =   21.57
  EFFECTIVE AREA(ACRES) =     70.55     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.40
  TOTAL AREA(ACRES) =       70.6         PEAK FLOW RATE(CFS) =     121.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   6.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.890
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        9.71      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     128.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.96
  AVERAGE FLOW DEPTH(FEET) =   1.00   TRAVEL TIME(MIN.) =   2.22
  Tc(MIN.) =   26.18
  SUBAREA AREA(ACRES) =     9.71       SUBAREA RUNOFF(CFS) =   14.77
  EFFECTIVE AREA(ACRES) =     80.26     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.47
  TOTAL AREA(ACRES) =       80.3         PEAK FLOW RATE(CFS) =     129.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   4.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.824
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        3.89      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     132.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.01
  AVERAGE FLOW DEPTH(FEET) =   1.02   TRAVEL TIME(MIN.) =   1.70
  Tc(MIN.) =   27.88
  SUBAREA AREA(ACRES) =     3.89       SUBAREA RUNOFF(CFS) =    5.69
  EFFECTIVE AREA(ACRES) =     84.15     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.50
  TOTAL AREA(ACRES) =       84.2         PEAK FLOW RATE(CFS) =     130.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   5.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.01 TO NODE     11.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     99.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.375
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.630
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.19      0.20     0.100    75    5.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.79
  TOTAL AREA(ACRES) =      0.19   PEAK FLOW RATE(CFS) =      0.79

****************************************************************************
  FLOW PROCESS FROM NODE     11.02 TO NODE     11.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =    7.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.742
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        1.84      0.20     0.850    75
  COMMERCIAL                 D        0.25      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.64      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.816
  SUBAREA AREA(ACRES) =    2.73      SUBAREA RUNOFF(CFS) =    8.79
  EFFECTIVE AREA(ACRES) =      2.92    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.77
```

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  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       9.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.55
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.03 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.03 TO NODE     11.04 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.43
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    9.10
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.04 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.10
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.436
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.18      0.20     0.100    75
  CONDOMINIUMS               D        1.15      0.20     0.350    75
  CONDOMINIUMS               D        4.75      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.308
  SUBAREA AREA(ACRES) =    7.08      SUBAREA RUNOFF(CFS) =   21.50
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      30.13

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.75
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.13
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    9.87
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.05 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     11.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.283
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        6.10      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   17.64
  EFFECTIVE AREA(ACRES) =     16.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      46.40

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.59
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.40
  PIPE TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       46.40   11.45    3.018  0.20( 0.08) 0.41      16.1      11.01
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      130.59   27.88    1.824  0.20( 0.10) 0.50      84.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      137.17   11.45    3.018  0.20( 0.09) 0.47      50.7      11.01
      2      158.12   27.88    1.824  0.20( 0.10) 0.48     100.2       1.00
    TOTAL AREA(ACRES) =       100.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      158.12  Tc(MIN.) =   27.878
  EFFECTIVE AREA(ACRES) =    100.25  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      100.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.06 TO NODE     11.07 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =     90.00  DOWNSTREAM(FEET) =     86.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.011
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.456
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.54      0.20     0.350    75    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      4.69
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      4.69

****************************************************************************
  FLOW PROCESS FROM NODE     11.07 TO NODE     11.08 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.50
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.69
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.08 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.38
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.191
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.43      0.20     0.100    75
  CONDOMINIUMS               D        1.14      0.20     0.350    75
  CONDOMINIUMS               D        4.05      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.331
  SUBAREA AREA(ACRES) =    5.62      SUBAREA RUNOFF(CFS) =   15.81
  EFFECTIVE AREA(ACRES) =      7.16   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        7.2       PEAK FLOW RATE(CFS) =      20.13

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.09 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.77
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.13
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.09 =    1290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  CONDOMINIUMS               D        1.13      0.20     0.350    75
  CONDOMINIUMS               D        0.62      0.20     0.350    75
  CONDOMINIUMS               D        0.48      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =    2.64      SUBAREA RUNOFF(CFS) =    7.02
  EFFECTIVE AREA(ACRES) =      9.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        9.8       PEAK FLOW RATE(CFS) =      26.04

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   730.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.35
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.04
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   12.91
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.10 =    2020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.91
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.820
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.01      0.20     0.100    75
  CONDOMINIUMS               D        2.10      0.20     0.350    75
  CONDOMINIUMS               D        1.33      0.20     0.350    75
  CONDOMINIUMS               D        7.17      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.328
  SUBAREA AREA(ACRES) =   11.61      SUBAREA RUNOFF(CFS) =   28.78
  EFFECTIVE AREA(ACRES) =     21.41   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       21.4       PEAK FLOW RATE(CFS) =      53.08

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.08
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   13.75
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.11 =    2530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     11.11 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.75
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.721
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.44      0.20     0.100    75
  CONDOMINIUMS               D        6.60      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  SUBAREA AREA(ACRES) =    7.04      SUBAREA RUNOFF(CFS) =   16.81
  EFFECTIVE AREA(ACRES) =     28.45   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       28.5       PEAK FLOW RATE(CFS) =      67.97

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.63
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.97
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   14.13
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       67.97   14.13    2.679  0.20( 0.07) 0.33      28.5      11.06
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      137.17   11.45    3.018  0.20( 0.09) 0.47      50.7      11.01
      2      158.12   27.88    1.824  0.20( 0.10) 0.48     100.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      199.38   11.45    3.018  0.20( 0.09) 0.43      73.7      11.01
      2      208.56   14.13    2.679  0.20( 0.09) 0.43      87.2      11.06
      3      203.84   27.88    1.824  0.20( 0.09) 0.45     128.7       1.00
    TOTAL AREA(ACRES) =       128.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      208.56  Tc(MIN.) =   14.130
  EFFECTIVE AREA(ACRES) =     87.20  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      128.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.12
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     208.56
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   14.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.60
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.630
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        3.58      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.58      SUBAREA RUNOFF(CFS) =    7.83
  EFFECTIVE AREA(ACRES) =     90.78   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      132.3       PEAK FLOW RATE(CFS) =     208.56
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    75    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.53
  TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      9.53

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.07
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.53
  PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.986
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    56
  PUBLIC PARK                D        3.71      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.268
  SUBAREA AREA(ACRES) =   35.55      SUBAREA RUNOFF(CFS) =   93.26
  EFFECTIVE AREA(ACRES) =     38.72   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       38.7       PEAK FLOW RATE(CFS) =     101.67

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.887
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       13.96      0.40     1.000    46
  COMMERCIAL                 D        2.65      0.20     0.100    75
  PUBLIC PARK                A        1.60      0.40     0.850    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     137.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  18.07
  AVERAGE FLOW DEPTH(FEET) =   1.95   TRAVEL TIME(MIN.) =   0.72
  Tc(MIN.) =   12.38
  SUBAREA AREA(ACRES) =    29.85       SUBAREA RUNOFF(CFS) =   71.57
  EFFECTIVE AREA(ACRES) =     68.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.33  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =       68.6         PEAK FLOW RATE(CFS) =     169.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.11   FLOW VELOCITY(FEET/SEC.) =  19.06
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.14
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.77
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   12.86
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.60 =    3100.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.86
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.826
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.13      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.83
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.33  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =     169.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.50  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.416
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.759
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.80      0.20     0.350    75   13.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      4.36
  TOTAL AREA(ACRES) =      1.80   PEAK FLOW RATE(CFS) =      4.36

****************************************************************************
  FLOW PROCESS FROM NODE     16.20 TO NODE     16.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.636
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        2.42      0.30     0.350    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        1.92      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.490
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.92
  AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   1.13
  Tc(MIN.) =   14.54
  SUBAREA AREA(ACRES) =     5.24       SUBAREA RUNOFF(CFS) =   11.74
  EFFECTIVE AREA(ACRES) =      7.04     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.45
  TOTAL AREA(ACRES) =        7.0         PEAK FLOW RATE(CFS) =      15.89

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.


  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.50   FLOW VELOCITY(FEET/SEC.) =   7.06

  ==>FLOWDEPTH EXCEEDS MAXIMUM ALLOWABLE DEPTH

  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.30 =     730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.30 TO NODE     16.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   790.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.89
  PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =   16.30
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.40 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.471
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.09      0.30     0.100    56
  PUBLIC PARK                B        2.54      0.30     0.850    56
  PUBLIC PARK                B        2.54      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    8.17      SUBAREA RUNOFF(CFS) =   16.92
  EFFECTIVE AREA(ACRES) =     15.21   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       15.2       PEAK FLOW RATE(CFS) =      31.77

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.84
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.77
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   17.04
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.410
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.85      0.20     0.100    75
  CONDOMINIUMS               D        2.51      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    4.36      SUBAREA RUNOFF(CFS) =    9.27
  EFFECTIVE AREA(ACRES) =     19.57   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       19.6       PEAK FLOW RATE(CFS) =      40.20

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   950.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.39
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.20
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   18.73
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.60 =    2860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.285
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D       2.21      0.20     0.850    75
  COMMERCIAL                 D       2.81      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.430
  SUBAREA AREA(ACRES) =    5.02      SUBAREA RUNOFF(CFS) =    9.93
  EFFECTIVE AREA(ACRES) =     24.59   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       24.6       PEAK FLOW RATE(CFS) =      47.92

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       47.92   18.73    2.285  0.27( 0.12) 0.45      24.6      16.10
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    2860.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      169.77   12.86    2.826  0.33( 0.13) 0.40      69.7      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      210.92   12.86    2.826  0.32( 0.13) 0.41      86.6      13.00
      2      183.55   18.73    2.285  0.31( 0.13) 0.42      94.3      16.10
    TOTAL AREA(ACRES) =        94.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      210.92  Tc(MIN.) =   12.862
  EFFECTIVE AREA(ACRES) =     86.59  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       94.3
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  50.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.78
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     210.92
  PIPE TRAVEL TIME(MIN.) =   1.90    Tc(MIN.) =   14.76
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
  MAINLINE Tc(MIN.) =   14.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.614
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        8.07      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    32
  COMMERCIAL                 A        3.62      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.542
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   38.39
  EFFECTIVE AREA(ACRES) =    104.39   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      112.1       PEAK FLOW RATE(CFS) =     231.84

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  46.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.30
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     231.84
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   15.08
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.583
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.09      0.40     1.000    46
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    78
  COMMERCIAL                 A        2.82      0.40     0.100    32
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.417
  SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   51.09
  EFFECTIVE AREA(ACRES) =    127.89   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      135.6       PEAK FLOW RATE(CFS) =     280.01

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.478
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.68      0.40     1.000    46
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     293.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.87
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =   16.22
  SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =   26.01
  EFFECTIVE AREA(ACRES) =    140.30     AREA-AVERAGED Fm(INCH/HR) =   0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      148.0         PEAK FLOW RATE(CFS) =     293.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =   8.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.299
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     295.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.62
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   2.29
  Tc(MIN.) =   18.52
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =    141.88     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =      149.6         PEAK FLOW RATE(CFS) =     293.95
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   2.62
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      293.95   18.52    2.299  0.35( 0.15) 0.42     141.9      13.00
      2      256.41   24.65    1.956  0.35( 0.15) 0.42     149.6      16.10
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      199.38   11.92    2.950  0.20( 0.09) 0.45      77.3      11.01
      2      208.56   14.60    2.630  0.20( 0.09) 0.45      90.8      11.06
      3      204.03   28.35    1.807  0.20( 0.09) 0.46     132.3       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      445.86   11.92    2.950  0.28( 0.12) 0.44     168.6      11.01
      2      475.99   14.60    2.630  0.28( 0.12) 0.43     202.6      11.06
      3      501.22   18.52    2.299  0.29( 0.12) 0.44     244.5      13.00
      4      461.66   24.65    1.956  0.28( 0.12) 0.44     270.7      16.10
      5      439.33   28.35    1.807  0.27( 0.12) 0.44     281.9       1.00
    TOTAL AREA(ACRES) =       281.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      501.22  Tc(MIN.) =   18.518
  EFFECTIVE AREA(ACRES) =    244.49  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      281.9
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

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 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0050
 CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.115
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    32
 NATURAL FAIR COVER
 "OPEN BRUSH"               D        5.63      0.20     1.000    83
 COMMERCIAL                 A        1.56      0.40     0.100    32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.428
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     518.41
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.24
 AVERAGE FLOW DEPTH(FEET) =   1.18   TRAVEL TIME(MIN.) =   2.93
 Tc(MIN.) =   21.45
 SUBAREA AREA(ACRES) =    19.06       SUBAREA RUNOFF(CFS) =   34.36
 EFFECTIVE AREA(ACRES) =    263.55     AREA-AVERAGED Fm(INCH/HR) =   0.12
 AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.43
 TOTAL AREA(ACRES) =      300.9         PEAK FLOW RATE(CFS) =     501.22
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6140.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0050
 CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.960
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        1.73      0.40     0.100    32
 NATURAL FAIR COVER
 "OPEN BRUSH"               D        4.03      0.20     1.000    83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.730
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     505.91
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.22
 AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   3.10
 Tc(MIN.) =   24.56
 SUBAREA AREA(ACRES) =     5.76       SUBAREA RUNOFF(CFS) =    9.37
 EFFECTIVE AREA(ACRES) =    269.31     AREA-AVERAGED Fm(INCH/HR) =   0.12
 AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
 TOTAL AREA(ACRES) =      306.7         PEAK FLOW RATE(CFS) =     501.22
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6740.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0050
 CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.862
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    32
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 NATURAL FAIR COVER
 "OPEN BRUSH"               D        4.01      0.20     1.000    83
 COMMERCIAL                 A        1.68      0.40     0.100    32
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     508.50
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.22
 AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.33
 Tc(MIN.) =   26.88
 SUBAREA AREA(ACRES) =     9.31       SUBAREA RUNOFF(CFS) =   14.56
 EFFECTIVE AREA(ACRES) =    278.62     AREA-AVERAGED Fm(INCH/HR) =   0.12
 AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
 TOTAL AREA(ACRES) =      316.0         PEAK FLOW RATE(CFS) =     501.22
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.21
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7190.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      316.0  TC(MIN.) =     26.88
 EFFECTIVE AREA(ACRES) =    278.62  AREA-AVERAGED Fm(INCH/HR)=  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap = 0.444
 PEAK FLOW RATE(CFS)   =     501.22

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      445.86   20.63    2.163  0.27( 0.12) 0.45     202.7      11.01
     2      475.99   23.11    2.028  0.27( 0.12) 0.44     236.8      11.06
     3      501.22   26.88    1.862  0.28( 0.12) 0.44     278.6      13.00
     4      461.66   33.27    1.650  0.27( 0.12) 0.45     304.8      16.10
     5      439.33   37.15    1.550  0.27( 0.12) 0.45     316.0       1.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
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Drainage B

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              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2007 Advanced Engineering Software (aes)
              Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                             Analysis prepared by:





----------------------------------------------------------------------------
  FILE NAME: P025_B.DAT
  TIME/DATE OF STUDY: 09:36 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.841
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.86
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.86

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   10.44
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.180
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.12   Tc(MIN.) =   13.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.743
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.76
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.84
  FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   16.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.443
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =   14.74
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      18.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.16
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   19.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =   14.77
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =      31.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   22.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      32.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.54
  FLOW VELOCITY(FEET/SEC.) =  3.44   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   25.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.62   Tc(MIN.) =   24.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.951
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =   21.34
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      51.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.65   HALFSTREET FLOOD WIDTH(FEET) =  27.07
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   2.49
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.11
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.74
    HALFSTREET FLOOD WIDTH(FEET) =   33.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   27.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.846
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    75
  SCHOOL                     D        9.91      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   64.38
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =     113.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.80   HALFSTREET FLOOD WIDTH(FEET) =  36.44
  FLOW VELOCITY(FEET/SEC.) =  4.91   DEPTH*VELOCITY(FT*FT/SEC.) =   3.90
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  680.0 FT WITH ELEVATION-DROP =   6.8 FT, IS  112.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     58.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.45
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   28.36
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   28.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.806
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =   18.39
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     129.35

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.34
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.35
```

```
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   29.15
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   29.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D      13.88      0.20     0.100    75
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       4.45      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =   18.33      SUBAREA RUNOFF(CFS) =   28.93
  EFFECTIVE AREA(ACRES) =     99.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =       99.4       PEAK FLOW RATE(CFS) =     156.26

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   940.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.719
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D      24.16      0.20     1.000    83
  CONDOMINIUMS               D       4.43      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     176.08
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.73
  AVERAGE FLOW DEPTH(FEET) =   1.10   TRAVEL TIME(MIN.) =   1.79
  Tc(MIN.) =   30.94
  SUBAREA AREA(ACRES) =    28.59       SUBAREA RUNOFF(CFS) =   39.61
  EFFECTIVE AREA(ACRES) =    127.94     AREA-AVERAGED Fm(INCH/HR) =   0.06
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.32
  TOTAL AREA(ACRES) =      127.9         PEAK FLOW RATE(CFS) =     190.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   8.99
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      127.9  TC(MIN.) =     30.94
  EFFECTIVE AREA(ACRES) =    127.94  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.321
  PEAK FLOW RATE(CFS)   =     190.59
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Drainage C

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                         Analysis prepared by:



----------------------------------------------------------------------------
  FILE NAME: P025_C.DAT
  TIME/DATE OF STUDY: 09:37 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    106.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.003
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.693
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.53      0.20     1.000    93   14.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =  12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   2.36   Tc(MIN.) =   16.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.466
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.73      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.73      SUBAREA RUNOFF(CFS) =    9.65
  EFFECTIVE AREA(ACRES) =      6.26    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      12.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
  FLOW VELOCITY(FEET/SEC.) =  2.75   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.77
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   17.21
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     83.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.396
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.81      0.20     0.100    75
  CONDOMINIUMS               D        2.09      0.20     0.350    75
  CONDOMINIUMS               D        3.05      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    7.95      SUBAREA RUNOFF(CFS) =   16.77
  EFFECTIVE AREA(ACRES) =     14.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       14.2       PEAK FLOW RATE(CFS) =      29.14

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.42
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.14
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   17.71
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.71
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.358
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.73      0.20     0.100    75
  CONDOMINIUMS               D        1.21      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.256
  SUBAREA AREA(ACRES) =    1.94      SUBAREA RUNOFF(CFS) =    4.03
  EFFECTIVE AREA(ACRES) =     16.15   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      32.68

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.88
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.68
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   18.05
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.05
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.32      0.20     0.100    75
  CONDOMINIUMS               D        2.49      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.322
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    5.74
  EFFECTIVE AREA(ACRES) =     18.96   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       19.0       PEAK FLOW RATE(CFS) =      38.05

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.04
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.05
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   18.67
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     86.00 =    1780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.288
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.14      0.20     0.350    75
  COMMERCIAL                 D        0.62      0.20     0.100    75
  PUBLIC PARK                D        1.37      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.453
  SUBAREA AREA(ACRES) =    5.13      SUBAREA RUNOFF(CFS) =   10.15
  EFFECTIVE AREA(ACRES) =     24.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      47.44

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.61
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.44
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   19.77
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     87.00 =    2410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.216
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.51      0.20     0.350    75
  COMMERCIAL                 D        1.12      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.43      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    5.06      SUBAREA RUNOFF(CFS) =    9.77
  EFFECTIVE AREA(ACRES) =     29.15   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       29.1       PEAK FLOW RATE(CFS) =      55.64

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     88.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.64
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   20.23
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     88.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     88.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   20.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.187
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.34      0.20     0.350    75
  COMMERCIAL                 D        0.48      0.20     0.100    75
  CONDOMINIUMS               D        2.16      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    7.98      SUBAREA RUNOFF(CFS) =   15.22
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      70.11

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.68
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.11
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   20.65
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     89.00 =    2960.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.161
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        2.41      0.20     0.350    75
  COMMERCIAL                 D        2.55      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.221
  SUBAREA AREA(ACRES) =    4.96      SUBAREA RUNOFF(CFS) =    9.45
  EFFECTIVE AREA(ACRES) =     42.09   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       42.1       PEAK FLOW RATE(CFS) =      78.71

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.08
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.71
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   21.49
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.314
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.392
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.88      0.20     0.100    75    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.67
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     92.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =   11.35
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.034
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       1.06      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    2.88
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.43
  FLOW VELOCITY(FEET/SEC.) =  2.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     92.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.62
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.26
  PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   13.21
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     93.00 =    1190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     93.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D       5.84      0.20     0.350    75
  COMMERCIAL                 D       2.34      0.20     0.100    75
  CONDOMINIUMS               D       8.66      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.315
  SUBAREA AREA(ACRES) =   16.84      SUBAREA RUNOFF(CFS) =   41.22
  EFFECTIVE AREA(ACRES) =     18.78   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =      46.04

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.58
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.04
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   13.63
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     94.00 =    1430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.734
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D       3.80      0.20     0.850    75
```

```
  COMMERCIAL                  D        0.27      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    4.07      SUBAREA RUNOFF(CFS) =    9.43
  EFFECTIVE AREA(ACRES) =     22.85   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      54.65

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.07
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.65
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   13.95
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     95.00 =    1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.95
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.699
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.20      0.20     0.100    75
  CONDOMINIUMS                D        2.24      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    5.78
  EFFECTIVE AREA(ACRES) =     25.29   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      59.71

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.71
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   14.45
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     96.00 =    1930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.645
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        5.07      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    5.07      SUBAREA RUNOFF(CFS) =   11.29
  EFFECTIVE AREA(ACRES) =     30.36   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      69.78

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.78
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   14.81
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       69.78   14.81    2.609  0.20( 0.09) 0.46      30.4      90.00
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       78.71   21.49    2.113  0.20( 0.08) 0.42      42.1      80.00
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      137.27   14.81    2.609  0.20( 0.09) 0.44      59.4      90.00
      2      134.75   21.49    2.113  0.20( 0.09) 0.43      72.4      80.00
    TOTAL AREA(ACRES) =        72.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      137.27  Tc(MIN.) =   14.813
  EFFECTIVE AREA(ACRES) =     59.37  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      72.4
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     137.27
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   15.18
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     98.00 =    3800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     98.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.573
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       22.13      0.20     1.000    83
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   31.89      SUBAREA RUNOFF(CFS) =   68.10
  EFFECTIVE AREA(ACRES) =     91.26   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =      104.3       PEAK FLOW RATE(CFS) =     200.88
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      104.3  TC(MIN.) =     15.18
```

EFFECTIVE AREA(ACRES) = 91.26 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.634
PEAK FLOW RATE(CFS) = 200.88

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	200.88	15.18	2.573	0.20(0.13)	0.63	91.3	90.00
2	185.08	21.87	2.092	0.20(0.12)	0.61	104.3	80.00

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END OF RATIONAL METHOD ANALYSIS

ii. EV 2-Year Storm Event

Drainage A

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______________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: P002_A.DAT
  TIME/DATE OF STUDY: 09:37 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    106.20  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.372
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.180
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.68      0.20     0.200    57    8.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.33
  STREET FLOW TRAVEL TIME(MIN.) =   3.86   Tc(MIN.) =   12.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.949
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.13      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    0.92
  EFFECTIVE AREA(ACRES) =      1.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       1.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.34
  FLOW VELOCITY(FEET/SEC.) =  1.34   DEPTH*VELOCITY(FT*FT/SEC.) =   0.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =   15.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.839
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.39      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =    2.44
  EFFECTIVE AREA(ACRES) =      5.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =       3.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.51
  FLOW VELOCITY(FEET/SEC.) =  1.58   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
  STREET FLOW TRAVEL TIME(MIN.) =   2.95   Tc(MIN.) =   18.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.758
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        6.51      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    6.51      SUBAREA RUNOFF(CFS) =    4.21
  EFFECTIVE AREA(ACRES) =     11.71    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.7        PEAK FLOW RATE(CFS) =       7.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.34
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   21.78
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.682
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        8.39      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.39      SUBAREA RUNOFF(CFS) =    5.00
  EFFECTIVE AREA(ACRES) =     20.10    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       20.1        PEAK FLOW RATE(CFS) =      11.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.23
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   2.67   Tc(MIN.) =   24.45
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.638
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       18.43      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   18.43      SUBAREA RUNOFF(CFS) =   10.25
  EFFECTIVE AREA(ACRES) =     38.53    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       38.5        PEAK FLOW RATE(CFS) =      21.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.84
  FLOW VELOCITY(FEET/SEC.) =  2.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1910.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.21
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   25.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    2460.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   25.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.625
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.24      0.20     0.100    57
  PUBLIC PARK                D        6.35      0.20     0.850    57
  COMMERCIAL                 D        2.47      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        3.55      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.528
  SUBAREA AREA(ACRES) =   18.61      SUBAREA RUNOFF(CFS) =    8.69
  EFFECTIVE AREA(ACRES) =     57.14   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       57.1       PEAK FLOW RATE(CFS) =      29.45

**************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.1000
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.45
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   25.71
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    2890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.570
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       13.41      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      31.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.59
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   4.04
  Tc(MIN.) =   29.75
  SUBAREA AREA(ACRES) =    13.41       SUBAREA RUNOFF(CFS) =    4.46
  EFFECTIVE AREA(ACRES) =     70.55     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.40
  TOTAL AREA(ACRES) =       70.6         PEAK FLOW RATE(CFS) =      31.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   3.54
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    3760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   660.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.532
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        9.71      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.92
  AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   3.76
  Tc(MIN.) =   33.51
  SUBAREA AREA(ACRES) =     9.71       SUBAREA RUNOFF(CFS) =    2.90
  EFFECTIVE AREA(ACRES) =     80.26     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.47
  TOTAL AREA(ACRES) =       80.3         PEAK FLOW RATE(CFS) =      31.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.43   FLOW VELOCITY(FEET/SEC.) =   2.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    4420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.507
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       3.89      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.93
  AVERAGE FLOW DEPTH(FEET) =   0.43   TRAVEL TIME(MIN.) =   2.90
  Tc(MIN.) =   36.42
  SUBAREA AREA(ACRES) =     3.89       SUBAREA RUNOFF(CFS) =    1.08
  EFFECTIVE AREA(ACRES) =     84.15     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.50
  TOTAL AREA(ACRES) =       84.2         PEAK FLOW RATE(CFS) =      31.61
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.43   FLOW VELOCITY(FEET/SEC.) =   2.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.01 TO NODE     11.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  ELEVATION DATA: UPSTREAM(FEET) =    100.00  DOWNSTREAM(FEET) =     99.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.375
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.522
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D       0.19      0.20     0.100    57    5.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.19   PEAK FLOW RATE(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE     11.02 TO NODE     11.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.52
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    4.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
  STREET FLOW TRAVEL TIME(MIN.) =   3.01   Tc(MIN.) =    8.38
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.179
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D       1.84      0.20     0.850    57
  COMMERCIAL                 D       0.25      0.20     0.100    57
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       0.64      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.816
  SUBAREA AREA(ACRES) =    2.73      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      2.92    AREA-AVERAGED Fm(INCH/HR) =  0.15
```

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  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.77
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       2.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.41
  FLOW VELOCITY(FEET/SEC.) =  1.97   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.03 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.03 TO NODE     11.04 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.69
  PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =   10.09
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.04 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.09
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.060
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.18      0.20     0.100    57
  CONDOMINIUMS               D        1.15      0.20     0.350    57
  CONDOMINIUMS               D        4.75      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.308
  SUBAREA AREA(ACRES) =    7.08      SUBAREA RUNOFF(CFS) =    6.36
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =       8.74

****************************************************************************
  FLOW PROCESS FROM NODE     11.04 TO NODE     11.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.74
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     11.05 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     11.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.002
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        6.10      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =    5.11
  EFFECTIVE AREA(ACRES) =     16.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      13.33

****************************************************************************
  FLOW PROCESS FROM NODE     11.05 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
```

```
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.06
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.33
  PIPE TRAVEL TIME(MIN.) =   2.15    Tc(MIN.) =   13.29
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.33   13.29    0.905  0.20( 0.08) 0.41      16.1      11.01
  LONGEST FLOWPATH FROM NODE     11.01 TO NODE     12.00 =    2250.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.61   36.42    0.507  0.20( 0.10) 0.50      84.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       36.11   13.29    0.905  0.20( 0.09) 0.47      46.8      11.01
      2       38.51   36.42    0.507  0.20( 0.10) 0.48     100.2       1.00
    TOTAL AREA(ACRES) =       100.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       38.51  Tc(MIN.) =   36.418
  EFFECTIVE AREA(ACRES) =    100.25  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      100.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.06 TO NODE     11.07 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   340.00
  ELEVATION DATA: UPSTREAM(FEET) =     90.00  DOWNSTREAM(FEET) =     86.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.011
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.131
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D       1.54      0.20     0.350    57    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      1.47
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      1.47

****************************************************************************
  FLOW PROCESS FROM NODE     11.07 TO NODE     11.08 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.03
```

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  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.47
  PIPE TRAVEL TIME(MIN.) =   1.86    Tc(MIN.) =   10.87
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.08 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.016
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.43      0.20     0.100    57
  CONDOMINIUMS               D        1.14      0.20     0.350    57
  CONDOMINIUMS               D        4.05      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.331
  SUBAREA AREA(ACRES) =    5.62      SUBAREA RUNOFF(CFS) =    4.80
  EFFECTIVE AREA(ACRES) =      7.16   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        7.2       PEAK FLOW RATE(CFS) =       6.11

****************************************************************************
  FLOW PROCESS FROM NODE     11.08 TO NODE     11.09 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.11
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   12.34
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.09 =    1290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.34
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.945
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    57
  CONDOMINIUMS               D        1.13      0.20     0.350    57
  CONDOMINIUMS               D        0.62      0.20     0.350    57
  CONDOMINIUMS               D        0.48      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =    2.64      SUBAREA RUNOFF(CFS) =    2.10
  EFFECTIVE AREA(ACRES) =      9.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        9.8       PEAK FLOW RATE(CFS) =       7.75

****************************************************************************
  FLOW PROCESS FROM NODE     11.09 TO NODE     11.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   730.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.75
  PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =   14.29
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.10 =    2020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.29
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.868
```

```
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.01      0.20     0.100    57
  CONDOMINIUMS               D        2.10      0.20     0.350    57
  CONDOMINIUMS               D        1.33      0.20     0.350    57
  CONDOMINIUMS               D        7.17      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.328
  SUBAREA AREA(ACRES) =   11.61      SUBAREA RUNOFF(CFS) =    8.39
  EFFECTIVE AREA(ACRES) =     21.41   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       21.4       PEAK FLOW RATE(CFS) =      15.46

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.44
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.46
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   15.43
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     11.11 =    2530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     11.11 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.831
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.44      0.20     0.100    57
  CONDOMINIUMS               D        6.60      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  SUBAREA AREA(ACRES) =    7.04      SUBAREA RUNOFF(CFS) =    4.84
  EFFECTIVE AREA(ACRES) =     28.45   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       28.5       PEAK FLOW RATE(CFS) =      19.58

****************************************************************************
  FLOW PROCESS FROM NODE     11.11 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.74
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.58
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   15.95
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.58   15.95    0.815  0.20( 0.07) 0.33      28.5      11.06
  LONGEST FLOWPATH FROM NODE     11.06 TO NODE     12.00 =    2770.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       36.11   13.29    0.905  0.20( 0.09) 0.47      46.8      11.01
      2       38.51   36.42    0.507  0.20( 0.10) 0.48     100.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

  ** PEAK FLOW RATE TABLE **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       54.38   13.29    0.905  0.20( 0.08) 0.42      70.5      11.01
    2       55.97   15.95    0.815  0.20( 0.08) 0.42      81.4      11.06
    3       50.04   36.42    0.507  0.20( 0.09) 0.45     128.7       1.00
  TOTAL AREA(ACRES) =       128.7

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       55.97  Tc(MIN.) =   15.948
EFFECTIVE AREA(ACRES) =     81.40  AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
TOTAL AREA(ACRES) =      128.7
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    4930.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
REPRESENTATIVE SLOPE =  0.0200
FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  13.24
ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      55.97
PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   16.59
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   16.59
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.797
SUBAREA LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"               D        3.58      0.20     1.000    67
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =     3.58      SUBAREA RUNOFF(CFS) =    1.92
EFFECTIVE AREA(ACRES) =     84.98   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
TOTAL AREA(ACRES) =      132.3       PEAK FLOW RATE(CFS) =      55.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
ELEVATION DATA: UPSTREAM(FEET) =    102.50  DOWNSTREAM(FEET) =    100.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.373
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.106
SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"11+ DWELLINGS/ACRE"       D        3.17      0.20     0.200    57    9.37
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA RUNOFF(CFS) =      3.04
TOTAL AREA(ACRES) =      3.17   PEAK FLOW RATE(CFS) =      3.04
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =  1660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.04
  PIPE TRAVEL TIME(MIN.) =   3.10    Tc(MIN.) =   12.47
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =    2030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.939
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       31.84      0.30     0.200    36
  PUBLIC PARK                D        3.71      0.20     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.268
  SUBAREA AREA(ACRES) =   35.55      SUBAREA RUNOFF(CFS) =   27.75
  EFFECTIVE AREA(ACRES) =     38.72   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =       38.7       PEAK FLOW RATE(CFS) =      30.31

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.899
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D       11.64      0.20     0.200    57
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       13.96      0.40     1.000    28
  COMMERCIAL                 D        2.65      0.20     0.100    57
  PUBLIC PARK                A        1.60      0.40     0.850    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      39.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.28
  AVERAGE FLOW DEPTH(FEET) =   1.22   TRAVEL TIME(MIN.) =   0.98
  Tc(MIN.) =   13.45
  SUBAREA AREA(ACRES) =    29.85       SUBAREA RUNOFF(CFS) =   18.17
  EFFECTIVE AREA(ACRES) =     68.57     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.33  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =       68.6         PEAK FLOW RATE(CFS) =      47.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.31   FLOW VELOCITY(FEET/SEC.) =  13.77
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =    2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.09
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   14.09
```

```
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.60 =    3100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.09
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.875
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.13      0.40     0.100    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    0.85
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.33  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =      47.09
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    105.50  DOWNSTREAM(FEET) =    105.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.416
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.900
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.80      0.20     0.350    57   13.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      1.34
  TOTAL AREA(ACRES) =      1.80   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE     16.20 TO NODE     16.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.846
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        2.42      0.30     0.350    36
  COMMERCIAL                 B        0.90      0.30     0.100    36
  PUBLIC PARK                B        1.92      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.490
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.36
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   1.53
  Tc(MIN.) =   14.94
  SUBAREA AREA(ACRES) =     5.24       SUBAREA RUNOFF(CFS) =    3.30
  EFFECTIVE AREA(ACRES) =      7.04     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.45
  TOTAL AREA(ACRES) =        7.0         PEAK FLOW RATE(CFS) =       4.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   4.82
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.30 =     730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.30 TO NODE     16.40 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   790.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.55
  PIPE TRAVEL TIME(MIN.) =   2.41    Tc(MIN.) =   17.35
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.40 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.777
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.09      0.30     0.100    36
  PUBLIC PARK                B        2.54      0.30     0.850    36
  PUBLIC PARK                B        2.54      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    8.17      SUBAREA RUNOFF(CFS) =    4.46
  EFFECTIVE AREA(ACRES) =     15.21   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       15.2       PEAK FLOW RATE(CFS) =       8.57

****************************************************************************
  FLOW PROCESS FROM NODE     16.40 TO NODE     16.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.57
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   18.38
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.38
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.751
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.85      0.20     0.100    57
  CONDOMINIUMS               D        2.51      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    4.36      SUBAREA RUNOFF(CFS) =    2.76
  EFFECTIVE AREA(ACRES) =     19.57   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       19.6       PEAK FLOW RATE(CFS) =      10.99

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   950.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.99
  PIPE TRAVEL TIME(MIN.) =   2.32    Tc(MIN.) =   20.70
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.60 =    2860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.60 TO NODE     16.60 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.702
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        2.21      0.20     0.850    57
  COMMERCIAL                 D        2.81      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.430
  SUBAREA AREA(ACRES) =    5.02      SUBAREA RUNOFF(CFS) =    2.78
  EFFECTIVE AREA(ACRES) =     24.59   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       24.6       PEAK FLOW RATE(CFS) =      12.90

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.90   20.70    0.702  0.27( 0.12) 0.45      24.6      16.10
  LONGEST FLOWPATH FROM NODE     16.10 TO NODE     16.50 =    2860.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       47.09   14.09    0.875  0.33( 0.13) 0.40      69.7      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       58.49   14.09    0.875  0.32( 0.13) 0.41      86.4      13.00
      2       48.98   20.70    0.702  0.31( 0.13) 0.42      94.3      16.10
    TOTAL AREA(ACRES) =        94.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.49  Tc(MIN.) =   14.093
  EFFECTIVE AREA(ACRES) =     86.44  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       94.3
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.50 =    3100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     16.50 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.50 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =  1230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.90
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.49
  PIPE TRAVEL TIME(MIN.) =   2.60    Tc(MIN.) =   16.69
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =    4330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.69
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.794
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        8.07      0.40     1.000    28
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       A        6.11      0.40     0.200    17
  COMMERCIAL                 A        3.62      0.40     0.100    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.542
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =    9.25
  EFFECTIVE AREA(ACRES) =    104.24   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      112.1       PEAK FLOW RATE(CFS) =      60.81

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.81
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   17.13
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    4600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.782
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.09      0.40     1.000    28
  NATURAL POOR COVER
  "BARREN"                   A        4.65      0.40     1.000    61
  COMMERCIAL                 A        2.82      0.40     0.100    17
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       13.94      0.40     0.200    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.417
  SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   13.02
  EFFECTIVE AREA(ACRES) =    127.74   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      135.6       PEAK FLOW RATE(CFS) =      72.72

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.736
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        2.68      0.40     1.000    28
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        9.73      0.40     0.200    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.373
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      76.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.29
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.92
  Tc(MIN.) =   19.05
  SUBAREA AREA(ACRES) =    12.41       SUBAREA RUNOFF(CFS) =    6.56
  EFFECTIVE AREA(ACRES) =    140.15     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      148.0         PEAK FLOW RATE(CFS) =      73.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   5.25
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    5210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.661
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.58      0.40     0.100    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      74.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   3.92
  Tc(MIN.) =   22.98
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    0.88
  EFFECTIVE AREA(ACRES) =    141.73     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.35  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =      149.6         PEAK FLOW RATE(CFS) =      73.95
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   1.52
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       73.95   22.98    0.661  0.35( 0.15) 0.42     141.7      13.00
      2       62.40   30.13    0.566  0.35( 0.15) 0.42     149.6      16.10
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       54.38   13.95    0.880  0.20( 0.09) 0.45      74.1      11.01
      2       55.97   16.59    0.797  0.20( 0.09) 0.44      85.0      11.06
      3       50.04   37.09    0.502  0.20( 0.09) 0.46     132.3       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    5440.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      118.49   13.95    0.880  0.28( 0.12) 0.43     160.1      11.01
      2      123.51   16.59    0.797  0.28( 0.12) 0.43     187.3      11.06
      3      128.07   22.98    0.661  0.29( 0.12) 0.43     241.5      13.00
      4      114.45   30.13    0.566  0.28( 0.12) 0.44     265.8      16.10
      5      102.96   37.09    0.502  0.27( 0.12) 0.44     281.9       1.00
    TOTAL AREA(ACRES) =       281.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      128.07  Tc(MIN.) =   22.978
  EFFECTIVE AREA(ACRES) =    241.45  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      281.9
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    5570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.591
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A       11.87      0.40     0.200    17
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        5.63      0.20     1.000    67
  COMMERCIAL                 A        1.56      0.40     0.100    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.428
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     132.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.91
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   4.97
  Tc(MIN.) =   27.95
  SUBAREA AREA(ACRES) =    19.06       SUBAREA RUNOFF(CFS) =    8.21
  EFFECTIVE AREA(ACRES) =    260.51     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.43
  TOTAL AREA(ACRES) =      300.9         PEAK FLOW RATE(CFS) =     128.07
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   1.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    6140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.535
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.73      0.40     0.100    17
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.03      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.730
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     129.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.89
  AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   5.28
  Tc(MIN.) =   33.23
  SUBAREA AREA(ACRES) =     5.76       SUBAREA RUNOFF(CFS) =    1.98
  EFFECTIVE AREA(ACRES) =    266.27     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      306.7         PEAK FLOW RATE(CFS) =     128.07
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   1.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     22.00 =    6740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0050
  CHANNEL BASE(FEET) =  130.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   6.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.502
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       A        3.62      0.40     0.200    17
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        4.01      0.20     1.000    67
  COMMERCIAL                 A        1.68      0.40     0.100    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     129.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.90
  AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   3.94
  Tc(MIN.) =   37.17
```

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  SUBAREA AREA(ACRES) =     9.31       SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =    275.58     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.44
  TOTAL AREA(ACRES) =      316.0         PEAK FLOW RATE(CFS) =     128.07
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   1.90
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     23.00 =    7190.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      316.0  TC(MIN.) =     37.17
  EFFECTIVE AREA(ACRES) =    275.58  AREA-AVERAGED Fm(INCH/HR)=  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap = 0.443
  PEAK FLOW RATE(CFS)   =     128.07

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      118.49   28.53    0.584  0.27( 0.12) 0.45     194.3      11.01
      2      123.51   30.97    0.557  0.27( 0.12) 0.44     221.4      11.06
      3      128.07   37.17    0.502  0.28( 0.12) 0.44     275.6      13.00
      4      114.45   44.94    0.450  0.27( 0.12) 0.45     299.9      16.10
      5      102.96   52.50    0.411  0.27( 0.12) 0.45     316.0       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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Drainage B

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2007 Advanced Engineering Software (aes)
             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:






----------------------------------------------------------------------------
  FILE NAME: P002_B.DAT
  TIME/DATE OF STUDY: 09:38 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    110.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.477
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.259
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20      0.100    57    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
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  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
  STREET FLOW TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   10.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.056
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.63      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       1.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   3.34
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.41
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    4.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   13.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.885
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.72      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       1.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   4.84
  FLOW VELOCITY(FEET/SEC.) =  1.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.45
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
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  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =   17.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.765
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        6.76      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    6.76      SUBAREA RUNOFF(CFS) =    4.53
  EFFECTIVE AREA(ACRES) =      8.65    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =       5.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  2.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   4.07   Tc(MIN.) =   21.88
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.680
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        7.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    7.46      SUBAREA RUNOFF(CFS) =    4.43
  EFFECTIVE AREA(ACRES) =     16.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       16.1        PEAK FLOW RATE(CFS) =       9.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
  FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    2150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
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  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   3.23   Tc(MIN.) =   25.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.628
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.47      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =     17.58    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =       9.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    2650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.74
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   3.52   Tc(MIN.) =   28.63
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.583
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       12.28      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   12.28      SUBAREA RUNOFF(CFS) =    6.22
  EFFECTIVE AREA(ACRES) =     29.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       29.9        PEAK FLOW RATE(CFS) =      15.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.60
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    3230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   680.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.66
  STREET FLOW TRAVEL TIME(MIN.) =   3.53   Tc(MIN.) =   32.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.545
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       29.81      0.20     0.100    57
  SCHOOL                     D        9.91      0.20     0.600    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.225
  SUBAREA AREA(ACRES) =   39.72      SUBAREA RUNOFF(CFS) =   17.87
  EFFECTIVE AREA(ACRES) =     69.58    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       69.6        PEAK FLOW RATE(CFS) =      31.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  3.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    3910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   760.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.85
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.98
  PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =   33.59
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    4670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   33.59
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.532
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       11.44      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =   11.44      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =     81.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =      36.41

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   580.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.01
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.41
```

```
 PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   34.67
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    5250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   34.67
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.522
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D       13.88      0.20     0.100    57
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.45      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
 SUBAREA AREA(ACRES) =   18.33      SUBAREA RUNOFF(CFS) =    8.20
 EFFECTIVE AREA(ACRES) =     99.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
 TOTAL AREA(ACRES) =       99.4       PEAK FLOW RATE(CFS) =      43.91

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   940.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0350
 CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.499
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               D       24.16      0.20     1.000    67
 CONDOMINIUMS               D        4.43      0.20     0.350    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      48.03
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.63
 AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   2.78
 Tc(MIN.) =   37.45
 SUBAREA AREA(ACRES) =    28.59       SUBAREA RUNOFF(CFS) =    8.22
 EFFECTIVE AREA(ACRES) =    127.94     AREA-AVERAGED Fm(INCH/HR) =   0.06
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.32
 TOTAL AREA(ACRES) =      127.9         PEAK FLOW RATE(CFS) =      50.11

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.53   FLOW VELOCITY(FEET/SEC.) =   5.69
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     61.00 =    6190.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      127.9  TC(MIN.) =     37.45
 EFFECTIVE AREA(ACRES) =    127.94  AREA-AVERAGED Fm(INCH/HR)=  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.321
 PEAK FLOW RATE(CFS)   =      50.11
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
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Drainage C

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____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 13.5  Release Date: 02/06/2007  License ID 1355

                           Analysis prepared by:







----------------------------------------------------------------------------
  FILE NAME: P002_C.DAT
  TIME/DATE OF STUDY: 09:38 04/09/2008
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.5740
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.3810

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    106.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.003
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.878
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.53      0.20     1.000    83   14.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.93
  TOTAL AREA(ACRES) =      1.53   PEAK FLOW RATE(CFS) =      0.93

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
  STREET FLOW TRAVEL TIME(MIN.) =   3.08   Tc(MIN.) =   17.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.784
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        4.73      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.73      SUBAREA RUNOFF(CFS) =    2.48
  EFFECTIVE AREA(ACRES) =      6.26    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =       3.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.28
  FLOW VELOCITY(FEET/SEC.) =  2.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.91
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   1.22    Tc(MIN.) =   18.30
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     83.00 =    1010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     83.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.30
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.753
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.81      0.20     0.100    57
  CONDOMINIUMS               D        2.09      0.20     0.350    57
  CONDOMINIUMS               D        3.05      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    7.95      SUBAREA RUNOFF(CFS) =    5.01
  EFFECTIVE AREA(ACRES) =     14.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       14.2       PEAK FLOW RATE(CFS) =       8.13

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.13
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   18.97
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     84.00 =    1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.738
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       0.73      0.20     0.100    57
  CONDOMINIUMS               D       1.21      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.256
  SUBAREA AREA(ACRES) =    1.94      SUBAREA RUNOFF(CFS) =    1.20
  EFFECTIVE AREA(ACRES) =     16.15   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =       9.14

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.14
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   19.43
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.728
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       0.32      0.20     0.100    57
  CONDOMINIUMS               D       2.49      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.322
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    1.68
  EFFECTIVE AREA(ACRES) =     18.96   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       19.0       PEAK FLOW RATE(CFS) =      10.66

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.66
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   20.27
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     86.00 =    1780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.710
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D       3.14      0.20     0.350    57
  COMMERCIAL                 D       0.62      0.20     0.100    57
  PUBLIC PARK                D       1.37      0.20     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.453
  SUBAREA AREA(ACRES) =    5.13      SUBAREA RUNOFF(CFS) =    2.86
  EFFECTIVE AREA(ACRES) =     24.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
```

```
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      13.23

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.05
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.23
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   21.76
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     87.00 =    2410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.76
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.682
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        3.51      0.20     0.350    57
  COMMERCIAL                 D        1.12      0.20     0.100    57
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.43      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    5.06      SUBAREA RUNOFF(CFS) =    2.79
  EFFECTIVE AREA(ACRES) =     29.15   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       29.1       PEAK FLOW RATE(CFS) =      15.40

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     88.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.43
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.40
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   22.39
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     88.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     88.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.671
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.34      0.20     0.350    57
  COMMERCIAL                 D        0.48      0.20     0.100    57
  CONDOMINIUMS               D        2.16      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    7.98      SUBAREA RUNOFF(CFS) =    4.34
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      19.45

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.74
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.45
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   22.97
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     89.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     89.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.661
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        2.41      0.20     0.350    57
  COMMERCIAL                 D        2.55      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.221
  SUBAREA AREA(ACRES) =    4.96      SUBAREA RUNOFF(CFS) =    2.75
  EFFECTIVE AREA(ACRES) =     42.09   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       42.1       PEAK FLOW RATE(CFS) =      21.87

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.87
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   24.12
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    108.00  DOWNSTREAM(FEET) =    107.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.314
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.110
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.88      0.20     0.100    57    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     92.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
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  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    4.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =   11.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.974
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.06      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       1.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   5.41
  FLOW VELOCITY(FEET/SEC.) =  1.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.47
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     92.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   630.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.29
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.67
  PIPE TRAVEL TIME(MIN.) =   2.45    Tc(MIN.) =   14.14
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     93.00 =    1190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     93.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.873
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        5.84      0.20     0.350    57
  COMMERCIAL                 D        2.34      0.20     0.100    57
  CONDOMINIUMS               D        8.66      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.315
  SUBAREA AREA(ACRES) =   16.84      SUBAREA RUNOFF(CFS) =   12.28
  EFFECTIVE AREA(ACRES) =     18.78   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =      13.77

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.09
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.77
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   14.71
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     94.00 =    1430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.71
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.854
```

```
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        3.80      0.20     0.850    57
  COMMERCIAL                 D        0.27      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    4.07      SUBAREA RUNOFF(CFS) =    2.54
  EFFECTIVE AREA(ACRES) =     22.85   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      15.98

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.98
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   15.13
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     95.00 =    1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.840
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    57
  CONDOMINIUMS               D        2.24      0.20     0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =     25.29   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      17.40

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.40
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   15.81
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     96.00 =    1930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.819
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        5.07      0.20     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    5.07      SUBAREA RUNOFF(CFS) =    2.96
  EFFECTIVE AREA(ACRES) =     30.36   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      19.89

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     97.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.89
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   16.30
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.89   16.30    0.805  0.20( 0.09) 0.46      30.4      90.00
  LONGEST FLOWPATH FROM NODE     90.00 TO NODE     97.00 =    2160.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       21.87   24.12    0.643  0.20( 0.08) 0.42      42.1      80.00
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       38.96   16.30    0.805  0.20( 0.09) 0.44      58.8      90.00
      2       37.24   24.12    0.643  0.20( 0.09) 0.43      72.4      80.00
    TOTAL AREA(ACRES) =        72.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       38.96  Tc(MIN.) =   16.303
  EFFECTIVE AREA(ACRES) =     58.81  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       72.4
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     97.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.96
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   16.80
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     98.00 =    3800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     98.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.80
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.791
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       22.13      0.20     1.000    67
  NATURAL POOR COVER
  "BARREN"                   D        9.76      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   31.89      SUBAREA RUNOFF(CFS) =   16.96
  EFFECTIVE AREA(ACRES) =     90.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
```

```
  TOTAL AREA(ACRES) =      104.3       PEAK FLOW RATE(CFS) =      54.19
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      104.3  TC(MIN.) =     16.80
  EFFECTIVE AREA(ACRES) =     90.70  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.636
  PEAK FLOW RATE(CFS)   =      54.19

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       54.19   16.80    0.791  0.20( 0.13) 0.64      90.7      90.00
      2       48.23   24.64    0.635  0.20( 0.12) 0.61     104.3      80.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B3 Existing Condition Small Area Unit Hydrograph Calculations

a) High Confidence Events

i. Infiltration Analysis

INFILTRATION RATE CALCULATION SUMMARY

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION
100-YEAR HIGH-CONFIDENCE EVENT

Existing Condition											
Node	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Total Area (ac)	349.56	135.09	63.61	14.29	97.15	5.80	1.75	6.99	1.06	11.00	6.30
Y	0.89	0.95	0.89	0.93	0.96	0.84	0.84	0.84	0.84	0.84	0.84
Ybar	0.11	0.05	0.11	0.07	0.04	0.16	0.16	0.16	0.16	0.16	0.16
Average a_p	0.64	0.37	1.00	0.68	0.30	0.20	0.20	0.20	0.20	0.20	0.20
Total Fm (in/hr)	0.15	0.07	0.20	0.14	0.06	0.08	0.08	0.08	0.08	0.08	0.08

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

100-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \dots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \dots + Y_m A_m}{A_1 + A_2 + \dots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 349.56

Y = 0.89

Ybar = 1 - Y = **0.11**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.64

Total Fm (in/hr) = **0.15**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	52	9.23	1.85	0.20	0.000	0.10	0.40	0.04	0.001
					Impervious	6.81	0.019	100	0.00	0.00	1.00	0.019				
2	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	91	0.99	0.20	0.82	0.001	0.10	0.20	0.02	0.000
					Impervious	2.39	0.007	100	0.00	0.00	1.00	0.007				
3	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.026	52	9.23	1.85	0.20	0.005	0.20	0.40	0.08	0.010
					Impervious	36.22	0.104	100	0.00	0.00	1.00	0.104				
4	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.018	76	3.16	0.63	0.54	0.010	0.20	0.30	0.06	0.005
					Impervious	25.47	0.073	100	0.00	0.00	1.00	0.073				
5	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.015	91	0.99	0.20	0.82	0.012	0.20	0.20	0.04	0.003
					Impervious	21.21	0.061	100	0.00	0.00	1.00	0.061				
6	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.009	91	0.99	0.20	0.82	0.007	0.10	0.20	0.02	0.002
					Impervious	28.72	0.082	100	0.00	0.00	1.00	0.082				
7	Oil Operations	100%	11.89	D	Pervious	11.89	0.034	99	0.10	0.02	0.98	0.033	1.00	0.20	0.20	0.007
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
8	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.048	66	5.15	1.03	0.39	0.018	1.00	0.40	0.40	0.019
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
9	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	93	0.75	0.15	0.86	0.002	0.10	0.40	0.04	0.001
					Impervious	5.90	0.017	100	0.00	0.00	1.00	0.017				

Onsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	4.78	A	Pervious	4.78	0.014	93	0.75	0.15	0.86	0.012	1.00	0.40	0.40	0.005
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
2	Oil Operations / Barren Area	100%	10.98	D	Pervious	10.98	0.031	93	0.75	0.15	0.86	0.027	1.00	0.20	0.20	0.006
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
3	Open Space / Habitat Area	100%	152.97	D	Pervious	152.97	0.438	96	0.42	0.08	0.92	0.401	1.00	0.20	0.20	0.088
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				

Total Area = **349.56**

Y = **0.89**

Ybar = 1 - Y = **0.11**

Total F_m = **0.15**

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

100-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + \ldots + Y_mA_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 135.09

Y = 0.95

Ybar = 1 - Y = **0.05**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.37

Total Fm (in/hr) = **0.07**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	91	0.99	0.20	0.82	0.003	0.10	0.20	0.02	0.001
					Impervious	4.82	0.036	100	0.00	0.00	1.00	0.036				
2	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	91	0.99	0.20	0.82	0.007	0.20	0.20	0.04	0.002
					Impervious	4.75	0.035	100	0.00	0.00	1.00	0.035				
3	Commercial / Industrial	10%	80.09	D	Pervious	8.01	0.059	91	0.99	0.20	0.82	0.048	0.10	0.20	0.02	0.012
					Impervious	72.08	0.534	100	0.00	0.00	1.00	0.534				
4	School	60%	9.91	D	Pervious	5.95	0.044	91	0.99	0.20	0.82	0.036	0.60	0.20	0.12	0.009
					Impervious	3.96	0.029	100	0.00	0.00	1.00	0.029				

Onsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	12.82	D	Pervious	12.82	0.095	91	0.99	0.20	0.82	0.077	1.00	0.20	0.20	0.019
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
2	Open Space / Habitat Area	100%	20.98	D	Pervious	20.98	0.155	96	0.42	0.08	0.92	0.142	1.00	0.20	0.20	0.031
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
		Total Area =	**135.09**								Y =	**0.95**			Total F_m =	**0.07**
											Ybar = 1 - Y =	**0.05**				

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

100-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 63.61

Y = 0.89

Ybar = 1 - Y = **0.11**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 1.00

Total Fm (in/hr) = **0.20**

Onsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	17.24	D	Pervious	17.24	0.271	91	0.99	0.20	0.82	0.221	1.00	0.20	0.20	0.054
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
2	Open Space / Habitat Area	100%	46.37	D	Pervious	46.37	0.729	96	0.42	0.08	0.92	0.668	1.00	0.20	0.20	0.146
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
		Total Area =	**63.61**								Y =	**0.89**			Total F_m =	**0.20**
											Ybar = 1 - Y =	**0.11**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA D

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 14.29

Y = 0.93

Ybar = 1 - Y = **0.07**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.68

Total Fm (in/hr) = **0.14**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.68	D	Pervious	1.14	0.079	91	0.99	0.20	0.82	0.065	0.20	0.20	0.04	0.016
					Impervious	4.54	0.318	100	0.00	0.00	1.00	0.318				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Open Space / Habitat Area	100%	8.61	D	Pervious	8.61	0.603	96	0.42	0.08	0.92	0.552	1.00	0.20	0.20	0.121
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
		Total Area =	**14.29**								Y =	**0.93**		Total F_m =	**0.14**	
											Ybar = 1 - Y =	**0.07**				

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA E

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 97.15

Y = 0.96

Ybar = 1 - Y = **0.04**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.30

Total Fm (in/hr) = **0.06**

Offsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	44.48	D	Pervious	8.90	0.092	91	0.99	0.20	0.82	0.075	0.20	0.20	0.04	0.018
					Impervious	35.58	0.366	100	0.00	0.00	1.00	0.366				
2	Commercial / Industrial	10%	36.05	D	Pervious	3.61	0.037	91	0.99	0.20	0.82	0.030	0.10	0.20	0.02	0.007
					Impervious	32.45	0.334	100	0.00	0.00	1.00	0.334				
3	Open Space / Habitat Area	100%	16.62	D	Pervious	16.62	0.171	96	0.42	0.08	0.92	0.157	1.00	0.20	0.20	0.034
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
		Total Area =	**97.15**								Y =	**0.96**			Total F_m =	**0.06**
											Ybar = 1 - Y =	**0.04**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63
P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 5.80
Y = 0.84
Ybar = 1 - Y = **0.16**

ap - See Figure C-4
Fp - See Table C-2
Average a_p = 0.20
Total Fm (in/hr) = **0.08**

Offsite Area -F

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.80	A	Pervious	1.16	0.200	52	9.23	1.85	0.20	0.039	0.20	0.40	0.08	0.080
					Impervious	4.64	0.800	100	0.00	0.00	1.00	0.800				
		Total Area =	**5.80**								Y =	**0.84**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.16**				

Offsite Area -G

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.75	A	Pervious	0.35	0.200	52	9.23	1.85	0.20	0.039	0.20	0.40	0.08	0.080
					Impervious	1.40	0.800	100	0.00	0.00	1.00	0.800				
		Total Area =	**1.75**								Y =	**0.84**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.16**				

Offsite Area -H

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.99	A	Pervious	1.40	0.200	52	9.23	1.85	0.20	0.039	0.20	0.40	0.08	0.080
					Impervious	5.59	0.800	100	0.00	0.00	1.00	0.800				
		Total Area =	**6.99**								Y =	**0.84**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.16**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

Offsite Area -I

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.06	A	Pervious	0.21	0.200	52	9.23	1.85	0.20	0.039	0.20	0.40	0.08	0.080
					Impervious	0.85	0.800	100	0.00	0.00	1.00	0.800				
		Total Area =	**1.06**								Y =	**0.84**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.16**				

Offsite Area -J

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	11.00	A	Pervious	2.20	0.200	52	9.23	1.85	0.20	0.039	0.20	0.40	0.08	0.080
					Impervious	8.80	0.800	100	0.00	0.00	1.00	0.800				
		Total Area =	**11.00**								Y =	**0.84**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.16**				

Offsite Area -K

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.30	A	Pervious	1.26	0.200	52	9.23	1.85	0.20	0.039	0.20	0.40	0.08	0.080
					Impervious	5.04	0.800	100	0.00	0.00	1.00	0.800				
		Total Area =	**6.30**								Y =	**0.84**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.16**				

INFILTRATION RATE CALCULATION SUMMARY
NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION
25-YEAR HIGH-CONFIDENCE EVENT

Existing Condition											
Node	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Total Area (ac)	349.56	135.09	63.61	14.29	97.15	5.80	1.75	6.99	1.06	11.00	6.30
Y	0.69	0.83	0.66	0.70	0.83	0.76	0.76	0.76	0.76	0.76	0.76
Ybar	0.31	0.17	0.34	0.30	0.17	0.24	0.24	0.24	0.24	0.24	0.24
Average a_p	0.64	0.37	1.00	0.68	0.30	0.20	0.20	0.20	0.20	0.20	0.20
Total Fm (in/hr)	0.15	0.07	0.20	0.14	0.06	0.08	0.08	0.08	0.08	0.08	0.08

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

25-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 349.56

Y = 0.69

Ybar = 1 - Y = **0.31**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.64

Total Fm (in/hr) = **0.15**

Offsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.00	0.000	0.10	0.40	0.04	0.001	0.002
						Impervious	6.81	0.019	98	0.20	0.04	0.95	0.018					
2	9	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.45	0.000	0.10	0.20	0.02	0.000	0.001
						Impervious	2.39	0.007	98	0.20	0.04	0.95	0.006					
3	9	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.026	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.010	0.026
						Impervious	36.22	0.104	98	0.20	0.04	0.95	0.098					
4	9	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.018	56	7.86	1.57	0.18	0.003	0.20	0.30	0.06	0.005	0.018
						Impervious	25.47	0.073	98	0.20	0.04	0.95	0.069					
5	9	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.015	75	3.33	0.67	0.45	0.007	0.20	0.20	0.04	0.003	0.015
						Impervious	21.21	0.061	98	0.20	0.04	0.95	0.057					
6	9	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.009	75	3.33	0.67	0.45	0.004	0.10	0.20	0.02	0.002	0.009
						Impervious	28.72	0.082	98	0.20	0.04	0.95	0.078					
7	1	Oil Operations	100%	11.89	D	Pervious	11.89	0.034	93	0.75	0.15	0.82	0.028	1.00	0.20	0.20	0.007	0.034
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
8	6	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.048	46	11.74	2.35	0.07	0.004	1.00	0.40	0.40	0.019	0.048
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
9	1	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.51	0.001	0.10	0.40	0.04	0.001	0.002
						Impervious	5.90	0.017	98	0.20	0.04	0.95	0.016					

Onsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	1	Oil Operations / Barren Area	100%	4.78	A	Pervious	4.78	0.014	78	2.82	0.56	0.51	0.007	1.00	0.40	0.40	0.005	0.014
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
2	1	Oil Operations / Barren Area	100%	10.98	D	Pervious	10.98	0.031	93	0.75	0.15	0.82	0.026	1.00	0.20	0.20	0.006	0.031
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
3	6	Open Space / Habitat Area	100%	152.97	D	Pervious	152.97	0.438	83	2.05	0.41	0.61	0.265	1.00	0.20	0.20	0.088	0.438
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**349.56**								Y =	**0.69**			Total F_m =	**0.15**	**0.64**
												Ybar = 1 - Y =	**0.31**					

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION
25-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 135.09

Y = 0.83

Ybar = 1 - Y = **0.17**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.37

Total Fm (in/hr) = **0.07**

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
Offsite Area																		
1	9	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.45	0.002	0.10	0.20	0.02	0.001	0.004
						Impervious	4.82	0.036	98	0.20	0.04	0.95	0.034					
2	9	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.45	0.004	0.20	0.20	0.04	0.002	0.009
						Impervious	4.75	0.035	98	0.20	0.04	0.95	0.033					
3	9	Commercial / Industrial	10%	80.09	D	Pervious	8.01	0.059	75	3.33	0.67	0.45	0.027	0.10	0.20	0.02	0.012	0.059
						Impervious	72.08	0.534	98	0.20	0.04	0.95	0.506					
4	9	School	60%	9.91	D	Pervious	5.95	0.044	75	3.33	0.67	0.45	0.020	0.60	0.20	0.12	0.009	0.044
						Impervious	3.96	0.029	98	0.20	0.04	0.95	0.028					
Onsite Area																		
1	1	Oil Operations / Barren Area	100%	12.82	D	Pervious	12.82	0.095	93	0.75	0.15	0.82	0.078	1.00	0.20	0.20	0.019	0.095
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
2	6	Open Space / Habitat Area	100%	20.98	D	Pervious	20.98	0.155	83	2.05	0.41	0.61	0.094	1.00	0.20	0.20	0.031	0.155
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**135.09**								Y =	**0.83**			Total F_m =	**0.07**	**0.37**
												Ybar = 1 - Y =	**0.17**					

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

25-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 63.61

Y = 0.66

Ybar = 1 - Y = **0.34**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 1.00

Total Fm (in/hr) = **0.20**

Onsite Area

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	1	Oil Operations / Barren Area	100%	17.24	D	Pervious	17.24	0.271	93	0.75	0.15	0.82	0.223	1.00	0.20	0.20	0.054	0.271
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
2	6	Open Space / Habitat Area	100%	46.37	D	Pervious	46.37	0.729	83	2.05	0.41	0.61	0.441	1.00	0.20	0.20	0.146	0.729
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**63.61**								Y =	**0.66**			Total F_m =	**0.20**	**1.00**
												Ybar = 1 - Y =	**0.34**					

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
25-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA D

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + ... + Y_mA_m}{A_1 + A_2 + ... + A_m} = \sum Y_jA_j$$

$$F_m = a_pF_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 14.29

Y = 0.70

Ybar = 1 - Y = **0.30**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.68

Total Fm (in/hr) = **0.14**

Offsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	5.68	D	Pervious	1.14	0.079	75	3.33	0.67	0.45	0.036	0.20	0.20	0.04	0.016	0.079
						Impervious	4.54	0.318	98	0.20	0.04	0.95	0.301					

Onsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	6	Open Space / Habitat Area	100%	8.61	D	Pervious	8.61	0.603	83	2.05	0.41	0.61	0.365	1.00	0.20	0.20	0.121	0.603
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**14.29**							Y =		**0.70**		Total F_m =		**0.14**	**0.68**
											Ybar = 1 - Y =		**0.30**					

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
25-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA E

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49
P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 97.15
Y = 0.83
Ybar = 1 - Y = **0.17**

ap - See Figure C-4
Fp - See Table C-2
Average a_p = 0.30
Total Fm (in/hr) = **0.06**

Offsite Area

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	44.48	D	Pervious	8.90	0.092	75	3.33	0.67	0.45	0.042	0.20	0.20	0.04	0.018	0.092
						Impervious	35.58	0.366	98	0.20	0.04	0.95	0.347					
2	9	Commercial / Industrial	10%	36.05	D	Pervious	3.61	0.037	75	3.33	0.67	0.45	0.017	0.10	0.20	0.02	0.007	0.037
						Impervious	32.45	0.334	98	0.20	0.04	0.95	0.316					
3	6	Open Space / Habitat Area	100%	16.62	D	Pervious	16.62	0.171	83	2.05	0.41	0.61	0.104	1.00	0.20	0.20	0.034	0.171
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**97.15**								Y =	**0.83**			Total F_m =	**0.06**	**0.30**
												Ybar = 1 - Y =	**0.17**					

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
25-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 5.80

Y = 0.76

Ybar = 1 - Y = **0.24**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.20

Total Fm (in/hr) = **0.08**

Offsite Area -F

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	5.80	A	Pervious	1.16	0.200	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.080	0.200
						Impervious	4.64	0.800	98	0.20	0.04	0.95	0.758					

Total Area = **5.80** Y = **0.76** Total F_m = **0.08** **0.20**

Ybar = 1 - Y = **0.24**

Offsite Area -G

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	1.75	A	Pervious	0.35	0.200	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.080	0.200
						Impervious	1.40	0.800	98	0.20	0.04	0.95	0.758					

Total Area = **1.75** Y = **0.76** Total F_m = **0.08** **0.20**

Ybar = 1 - Y = **0.24**

Offsite Area -H

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	6.99	A	Pervious	1.40	0.200	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.080	0.200
						Impervious	5.59	0.800	98	0.20	0.04	0.95	0.758					

Total Area = **6.99** Y = **0.76** Total F_m = **0.08** **0.20**

Ybar = 1 - Y = **0.24**

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

25-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

Offsite Area -I

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	1.06	A	Pervious	0.21	0.200	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.080	0.200
						Impervious	0.85	0.800	98	0.20	0.04	0.95	0.758					
			Total Area =	**1.06**								Y =	**0.76**			Total F_m =	**0.08**	**0.20**
												Ybar = 1 - Y =	**0.24**					

Offsite Area -J

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	11.00	A	Pervious	2.20	0.200	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.080	0.200
						Impervious	8.80	0.800	98	0.20	0.04	0.95	0.758					
			Total Area =	**11.00**								Y =	**0.76**			Total F_m =	**0.08**	**0.20**
												Ybar = 1 - Y =	**0.24**					

Offsite Area -K

No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (>10 dwellings/acre)	20%	6.30	A	Pervious	1.26	0.200	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.080	0.200
						Impervious	5.04	0.800	98	0.20	0.04	0.95	0.758					
			Total Area =	**6.30**								Y =	**0.76**			Total F_m =	**0.08**	**0.20**
												Ybar = 1 - Y =	**0.24**					

INFILTRATION RATE CALCULATION SUMMARY
NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION
10-YEAR HIGH-CONFIDENCE EVENT

Existing Condition											
Node	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Total Area (ac)	349.56	135.09	63.61	14.29	97.15	5.80	1.75	6.99	1.06	11.00	6.30
Y	0.65	0.80	0.61	0.66	0.80	0.75	0.75	0.75	0.75	0.75	0.75
Ybar	0.35	0.20	0.39	0.34	0.20	0.25	0.25	0.25	0.25	0.25	0.25
Average a_p	0.64	0.37	1.00	0.68	0.30	0.20	0.20	0.20	0.20	0.20	0.20
Total Fm (in/hr)	0.15	0.07	0.20	0.14	0.06	0.08	0.08	0.08	0.08	0.08	0.08

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

10-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 25-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 349.56

Y = 0.65

Ybar = 1 - Y = **0.35**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.64

Total Fm (in/hr) = **0.15**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.00	0.000	0.10	0.40	0.04	0.001
					Impervious	6.81	0.019	98	0.20	0.04	0.94	0.018				
2	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.39	0.000	0.10	0.20	0.02	0.000
					Impervious	2.39	0.007	98	0.20	0.04	0.94	0.006				
3	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.026	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.010
					Impervious	36.22	0.104	98	0.20	0.04	0.94	0.097				
4	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.018	56	7.86	1.57	0.12	0.002	0.20	0.30	0.06	0.005
					Impervious	25.47	0.073	98	0.20	0.04	0.94	0.068				
5	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.015	75	3.33	0.67	0.39	0.006	0.20	0.20	0.04	0.003
					Impervious	21.21	0.061	98	0.20	0.04	0.94	0.057				
6	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.009	75	3.33	0.67	0.39	0.004	0.10	0.20	0.02	0.002
					Impervious	28.72	0.082	98	0.20	0.04	0.94	0.077				
7	Oil Operations	100%	11.89	D	Pervious	11.89	0.034	93	0.75	0.15	0.79	0.027	1.00	0.20	0.20	0.007
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
8	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.048	46	11.74	2.35	0.04	0.002	1.00	0.40	0.40	0.019
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
9	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.44	0.001	0.10	0.40	0.04	0.001
					Impervious	5.90	0.017	98	0.20	0.04	0.94	0.016				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	4.78	A	Pervious	4.78	0.014	78	2.82	0.56	0.44	0.006	1.00	0.40	0.40	0.005
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
2	Oil Operations / Barren Area	100%	10.98	D	Pervious	10.98	0.031	93	0.75	0.15	0.79	0.025	1.00	0.20	0.20	0.006
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
3	Open Space / Habitat Area	100%	152.97	D	Pervious	152.97	0.438	83	2.05	0.41	0.55	0.239	1.00	0.20	0.20	0.088
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
		Total Area =	**349.56**								Y =	**0.65**		Total F_m =	**0.15**	
											Ybar = 1 - Y =	**0.35**				

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

10-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 25-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 135.09

Y = 0.80

Ybar = 1 - Y = **0.20**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.37

Total Fm (in/hr) = **0.07**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.39	0.002	0.10	0.20	0.02	0.001
					Impervious	4.82	0.036	98	0.20	0.04	0.94	0.033				
2	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.39	0.003	0.20	0.20	0.04	0.002
					Impervious	4.75	0.035	98	0.20	0.04	0.94	0.033				
3	Commercial / Industrial	10%	80.09	D	Pervious	8.01	0.059	75	3.33	0.67	0.39	0.023	0.10	0.20	0.02	0.012
					Impervious	72.08	0.534	98	0.20	0.04	0.94	0.500				
4	School	60%	9.91	D	Pervious	5.95	0.044	75	3.33	0.67	0.39	0.017	0.60	0.20	0.12	0.009
					Impervious	3.96	0.029	98	0.20	0.04	0.94	0.027				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	12.82	D	Pervious	12.82	0.095	93	0.75	0.15	0.79	0.075	1.00	0.20	0.20	0.019
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
2	Open Space / Habitat Area	100%	20.98	D	Pervious	20.98	0.155	83	2.05	0.41	0.55	0.085	1.00	0.20	0.20	0.031
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				

Total Area = **135.09**

Y = **0.80**

Ybar = 1 - Y = **0.20**

Total F_m = **0.07**

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

10-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + \ldots + Y_mA_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_jA_j$$

$$F_m = a_pF_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 25-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 63.61

Y = 0.61

Ybar = 1 - Y = **0.39**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 1.00

Total Fm (in/hr) = **0.20**

Onsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	17.24	D	Pervious	17.24	0.271	93	0.75	0.15	0.79	0.214	1.00	0.20	0.20	0.054
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
2	Open Space / Habitat Area	100%	46.37	D	Pervious	46.37	0.729	83	2.05	0.41	0.55	0.398	1.00	0.20	0.20	0.146
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
		Total Area =	**63.61**								Y =	**0.61**			Total F_m =	**0.20**
											Ybar = 1 - Y =	**0.39**				

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

10-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA D

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 25-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 14.29

Y = 0.66

Ybar = 1 - Y = **0.34**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.68

Total Fm (in/hr) = **0.14**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.68	D	Pervious	1.14	0.079	75	3.33	0.67	0.39	0.031	0.20	0.20	0.04	0.016
					Impervious	4.54	0.318	98	0.20	0.04	0.94	0.298				

Onsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Open Space / Habitat Area	100%	8.61	D	Pervious	8.61	0.603	83	2.05	0.41	0.55	0.329	1.00	0.20	0.20	0.121
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				

Total Area = **14.29**

Y = **0.66**

Ybar = 1 - Y = **0.34**

Total F_m = **0.14**

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
10-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA E

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 25-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 97.15

Y = 0.80

Ybar = 1 - Y = **0.20**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.30

Total Fm (in/hr) = **0.06**

Offsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	44.48	D	Pervious	8.90	0.092	75	3.33	0.67	0.39	0.036	0.20	0.20	0.04	0.018
					Impervious	35.58	0.366	98	0.20	0.04	0.94	0.343				
2	Commercial / Industrial	10%	36.05	D	Pervious	3.61	0.037	75	3.33	0.67	0.39	0.014	0.10	0.20	0.02	0.007
					Impervious	32.45	0.334	98	0.20	0.04	0.94	0.313				
3	Open Space / Habitat Area	100%	16.62	D	Pervious	16.62	0.171	83	2.05	0.41	0.55	0.093	1.00	0.20	0.20	0.034
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
		Total Area =	**97.15**								Y =	**0.80**			Total F_m =	**0.06**
											Ybar = 1 - Y =	**0.20**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
10-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 3.68
P24, 25-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 5.80
Y = 0.75
Ybar = 1 - Y = **0.25**

ap - See Figure C-4
Fp - See Table C-2
Average a_p = 0.20
Total Fm (in/hr) = **0.08**

Offsite Area -F

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.80	A	Pervious	1.16	0.200	32	21.25	4.25	0.00	0.001	0.20	0.40	0.08	0.080
					Impervious	4.64	0.800	98	0.20	0.04	0.94	0.749				

Total Area = **5.80** Y = **0.75** Total F_m = **0.08**
Ybar = 1 - Y = **0.25**

Offsite Area -G

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.75	A	Pervious	0.35	0.200	32	21.25	4.25	0.00	0.001	0.20	0.40	0.08	0.080
					Impervious	1.40	0.800	98	0.20	0.04	0.94	0.749				

Total Area = **1.75** Y = **0.75** Total F_m = **0.08**
Ybar = 1 - Y = **0.25**

Offsite Area -H

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.99	A	Pervious	1.40	0.200	32	21.25	4.25	0.00	0.001	0.20	0.40	0.08	0.080
					Impervious	5.59	0.800	98	0.20	0.04	0.94	0.749				

Total Area = **6.99** Y = **0.75** Total F_m = **0.08**
Ybar = 1 - Y = **0.25**

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
10-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

Offsite Area -I

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.06	A	Pervious	0.21	0.200	32	21.25	4.25	0.00	0.001	0.20	0.40	0.08	0.080
					Impervious	0.85	0.800	98	0.20	0.04	0.94	0.749				
		Total Area =	**1.06**								Y =	**0.75**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.25**				

Offsite Area -J

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	11.00	A	Pervious	2.20	0.200	32	21.25	4.25	0.00	0.001	0.20	0.40	0.08	0.080
					Impervious	8.80	0.800	98	0.20	0.04	0.94	0.749				
		Total Area =	**11.00**								Y =	**0.75**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.25**				

Offsite Area -K

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.30	A	Pervious	1.26	0.200	32	21.25	4.25	0.00	0.001	0.20	0.40	0.08	0.080
					Impervious	5.04	0.800	98	0.20	0.04	0.94	0.749				
		Total Area =	**6.30**								Y =	**0.75**			Total F_m =	**0.08**
											Ybar = 1 - Y =	**0.25**				

ii. HC 100-Year Storm Event

Drainage A

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                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  349.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.150
    LOW LOSS FRACTION = 0.110
    TIME OF CONCENTRATION(MIN.) = 25.36
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =   131.68
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    32.34

****************************************************************************
  TIME     VOLUME       Q    0.      177.5     355.0     532.5     710.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.36      0.3668     24.57  .Q         .         .         .         .
  0.78      1.2292     24.81  .Q         .         .         .         .
  1.21      2.1061     25.39  .Q         .         .         .         .
  1.63      2.9983     25.69  .Q         .         .         .         .
  2.05      3.9068     26.33  .Q         .         .         .         .
  2.47      4.8323     26.66  .Q         .         .         .         .
  2.90      5.7758     27.36  .Q         .         .         .         .
  3.32      6.7379     27.73  .Q         .         .         .         .
  3.74      7.7200     28.50  .Q         .         .         .         .
  4.17      8.7227     28.91  .Q         .         .         .         .
  4.59      9.7478     29.78  .Q         .         .         .         .
  5.01     10.7961     30.24  .Q         .         .         .         .
  5.43     11.8694     31.22  .Q         .         .         .         .
  5.86     12.9689     31.74  .Q         .         .         .         .
  6.28     14.0968     32.85  .Q         .         .         .         .
  6.70     15.2546     33.44  .Q         .         .         .         .
  7.12     16.4450     34.72  .Q         .         .         .         .
  7.55     17.6698     35.41  .Q         .         .         .         .
  7.97     18.9325     36.89  . Q        .         .         .         .
  8.39     20.2354     37.70  . Q        .         .         .         .
  8.81     21.5832     39.46  . Q        .         .         .         .
  9.24     22.9785     40.43  . Q        .         .         .         .
  9.66     24.4279     42.56  . Q        .         .         .         .
 10.08     25.9350     43.73  . Q        .         .         .         .
 10.51     27.5086     46.37  . Q        .         .         .         .
 10.93     29.1540     47.84  . Q        .         .         .         .
 11.35     30.8841     51.21  . Q        .         .         .         .
 11.77     32.7065     53.14  . Q        .         .         .         .
 12.20     34.6921     60.55  .  Q       .         .         .         .
 12.62     37.0650     75.31  .    Q     .         .         .         .
 13.04     39.8132     82.03  .    Q     .         .         .         .
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13.46     42.7499     86.11  .   Q     .         .         .         .
13.89     45.9372     96.38  .    Q    .         .         .         .
14.31     49.4211    103.09  .    Q    .         .         .         .
14.73     53.3554    122.17  .     Q   .         .         .         .
15.15     57.8636    135.95  .      Q  .         .         .         .
15.58     63.3405    177.63  .         Q         .         .         .
16.00     70.3328    222.72  .         . Q       .         .         .
16.42     86.6200    709.81  .         .         .         .        Q.
16.85    101.7331    155.50  .       Q .         .         .         .
17.27    106.4012    111.78  .     Q   .         .         .         .
17.69    109.9400     90.83  .    Q    .         .         .         .
18.11    112.8968     78.47  .   Q     .         .         .         .
18.54    115.2325     55.26  .  Q      .         .         .         .
18.96    117.0614     49.45  . Q       .         .         .         .
19.38    118.7111     45.00  . Q       .         .         .         .
19.80    120.2211     41.46  . Q       .         .         .         .
20.23    121.6186     38.56  . Q       .         .         .         .
20.65    122.9231     36.13  . Q       .         .         .         .
21.07    124.1490     34.06  .Q        .         .         .         .
21.49    125.3077     32.28  .Q        .         .         .         .
21.92    126.4080     30.72  .Q        .         .         .         .
22.34    127.4569     29.34  .Q        .         .         .         .
22.76    128.4602     28.11  .Q        .         .         .         .
23.19    129.4227     27.00  .Q        .         .         .         .
23.61    130.3485     26.00  .Q        .         .         .         .
24.03    131.2411     25.10  .Q        .         .         .         .
24.45    131.6794      0.00  Q         .         .         .         .
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Drainage B

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                            Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  135.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.070
    LOW LOSS FRACTION = 0.050
    TIME OF CONCENTRATION(MIN.) = 29.40
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    53.95
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     9.43

****************************************************************************
  TIME     VOLUME       Q    0.       65.0     130.0     195.0     260.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.32     0.0000      0.00  Q         .         .         .         .
  0.81     0.2083     10.29  .Q        .         .         .         .
  1.30     0.6276     10.42  .Q        .         .         .         .
  1.79     1.0556     10.72  .Q        .         .         .         .
  2.28     1.4927     10.87  .Q        .         .         .         .
  2.77     1.9394     11.20  .Q        .         .         .         .
  3.26     2.3963     11.37  .Q        .         .         .         .
  3.75     2.8641     11.74  .Q        .         .         .         .
  4.24     3.3433     11.93  .Q        .         .         .         .
  4.73     3.8349     12.35  .Q        .         .         .         .
  5.22     4.3394     12.57  .Q        .         .         .         .
  5.71     4.8583     13.05  . Q       .         .         .         .
  6.20     5.3921     13.31  . Q       .         .         .         .
  6.69     5.9424     13.87  . Q       .         .         .         .
  7.18     6.5103     14.17  . Q       .         .         .         .
  7.67     7.0977     14.84  . Q       .         .         .         .
  8.16     7.7058     15.20  . Q       .         .         .         .
  8.65     8.3375     16.00  . Q       .         .         .         .
  9.14     8.9943     16.44  . Q       .         .         .         .
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  9.63      9.6802     17.43  . Q       .         .         .         .
 10.12     10.3973     17.99  . Q       .         .         .         .
 10.61     11.1513     19.25  . Q       .         .         .         .
 11.10     11.9456     19.98  .  Q      .         .         .         .
 11.59     12.7887     21.66  .  Q      .         .         .         .
 12.08     13.6862     22.66  .  Q      .         .         .         .
 12.57     14.7783     31.28  .   Q     .         .         .         .
 13.06     16.0763     32.83  .    Q    .         .         .         .
 13.55     17.4851     36.75  .    Q    .         .         .         .
 14.04     19.0246     39.28  .     Q   .         .         .         .
 14.53     20.7635     46.60  .      Q  .         .         .         .
 15.02     22.7570     51.85  .      Q  .         .         .         .
 15.51     25.2380     70.68  .         Q         .         .         .
 16.00     28.3734     84.17  .         . Q       .         .         .
 16.49     35.3364    259.72  .         .         .         .        Q.
 16.98     41.7960     59.31  .        Q.         .         .         .
 17.47     43.8560     42.43  .     Q   .         .         .         .
 17.96     45.4164     34.63  .    Q    .         .         .         .
 18.45     46.6297     25.29  .  Q      .         .         .         .
 18.94     47.5624     20.78  .  Q      .         .         .         .
 19.43     48.3595     18.59  . Q       .         .         .         .
 19.92     49.0785     16.92  . Q       .         .         .         .
 20.41     49.7366     15.59  . Q       .         .         .         .
 20.90     50.3457     14.50  . Q       .         .         .         .
 21.39     50.9142     13.58  . Q       .         .         .         .
 21.88     51.4486     12.81  .Q        .         .         .         .
 22.37     51.9536     12.13  .Q        .         .         .         .
 22.86     52.4331     11.55  .Q        .         .         .         .
 23.35     52.8902     11.03  .Q        .         .         .         .
 23.84     53.3275     10.57  .Q        .         .         .         .
 24.33     53.7471     10.15  .Q        .         .         .         .
 24.82     53.9526      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage C

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                           Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   63.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.200
    LOW LOSS FRACTION = 0.110
    TIME OF CONCENTRATION(MIN.) = 17.98
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    23.95
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     5.89

****************************************************************************
  TIME     VOLUME       Q    0.        40.0      80.0     120.0     160.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.12      0.0216      4.45  .Q         .         .         .         .
  0.42      0.1321      4.47  .Q         .         .         .         .
  0.72      0.2437      4.54  .Q         .         .         .         .
  1.02      0.3567      4.58  .Q         .         .         .         .
  1.32      0.4711      4.66  .Q         .         .         .         .
  1.62      0.5869      4.70  .Q         .         .         .         .
  1.92      0.7042      4.78  .Q         .         .         .         .
  2.22      0.8230      4.82  .Q         .         .         .         .
  2.52      0.9435      4.91  .Q         .         .         .         .
  2.81      1.0656      4.95  .Q         .         .         .         .
  3.11      1.1895      5.05  .Q         .         .         .         .
  3.41      1.3151      5.10  .Q         .         .         .         .
  3.71      1.4426      5.20  .Q         .         .         .         .
  4.01      1.5720      5.25  .Q         .         .         .         .
  4.31      1.7035      5.36  .Q         .         .         .         .
  4.61      1.8370      5.42  .Q         .         .         .         .
  4.91      1.9727      5.54  .Q         .         .         .         .
  5.21      2.1106      5.60  .Q         .         .         .         .
  5.51      2.2510      5.73  .Q         .         .         .         .
  5.81      2.3938      5.80  .Q         .         .         .         .
  6.11      2.5392      5.94  .Q         .         .         .         .
  6.41      2.6873      6.02  .Q         .         .         .         .
  6.71      2.8383      6.18  .Q         .         .         .         .
  7.01      2.9923      6.26  .Q         .         .         .         .
  7.31      3.1495      6.43  .Q         .         .         .         .
  7.61      3.3100      6.53  .Q         .         .         .         .
  7.91      3.4741      6.72  .Q         .         .         .         .
  8.21      3.6418      6.83  .Q         .         .         .         .
  8.51      3.8136      7.05  .Q         .         .         .         .
  8.81      3.9896      7.16  .Q         .         .         .         .
  9.11      4.1701      7.42  .Q         .         .         .         .
```

```
  9.41      4.3555      7.55  .Q        .         .         .         .
  9.71      4.5460      7.84  .Q        .         .         .         .
 10.01      4.7420      7.99  .Q        .         .         .         .
 10.31      4.9441      8.33  . Q       .         .         .         .
 10.61      5.1527      8.51  . Q       .         .         .         .
 10.91      5.3684      8.91  . Q       .         .         .         .
 11.21      5.5917      9.13  . Q       .         .         .         .
 11.51      5.8237      9.61  . Q       .         .         .         .
 11.80      6.0649      9.87  . Q       .         .         .         .
 12.10      6.3175     10.53  . Q       .         .         .         .
 12.40      6.6154     13.53  .  Q      .         .         .         .
 12.70      6.9604     14.33  .  Q      .         .         .         .
 13.00      7.3209     14.79  .  Q      .         .         .         .
 13.30      7.7002     15.84  .  Q      .         .         .         .
 13.60      8.1001     16.45  .   Q     .         .         .         .
 13.90      8.5258     17.92  .   Q     .         .         .         .
 14.20      8.9807     18.81  .   Q     .         .         .         .
 14.50      9.4757     21.16  .    Q    .         .         .         .
 14.80     10.0178     22.61  .    Q    .         .         .         .
 15.10     10.6280     26.67  .     Q   .         .         .         .
 15.40     11.3258     29.68  .      Q  .         .         .         .
 15.70     12.1425     36.27  .        Q.         .         .         .
 16.00     13.2067     49.67  .         . Q       .         .         .
 16.30     15.7668    157.07  .         .         .         .        Q.
 16.60     18.1141     32.49  .       Q .         .         .         .
 16.90     18.8185     24.40  .     Q   .         .         .         .
 17.20     19.3677     19.95  .   Q     .         .         .         .
 17.50     19.8270     17.14  .   Q     .         .         .         .
 17.80     20.2286     15.29  .  Q      .         .         .         .
 18.10     20.5902     13.91  .  Q      .         .         .         .
 18.40     20.8882     10.16  . Q       .         .         .         .
 18.70     21.1299      9.36  . Q       .         .         .         .
 19.00     21.3536      8.70  . Q       .         .         .         .
 19.30     21.5624      8.16  . Q       .         .         .         .
 19.60     21.7586      7.69  .Q        .         .         .         .
 19.90     21.9441      7.29  .Q        .         .         .         .
 20.20     22.1202      6.93  .Q        .         .         .         .
 20.49     22.2881      6.62  .Q        .         .         .         .
 20.79     22.4486      6.35  .Q        .         .         .         .
 21.09     22.6027      6.10  .Q        .         .         .         .
 21.39     22.7509      5.87  .Q        .         .         .         .
 21.69     22.8937      5.67  .Q        .         .         .         .
 21.99     23.0317      5.48  .Q        .         .         .         .
 22.29     23.1653      5.31  .Q        .         .         .         .
 22.59     23.2947      5.15  .Q        .         .         .         .
 22.89     23.4204      5.00  .Q        .         .         .         .
 23.19     23.5426      4.86  .Q        .         .         .         .
 23.49     23.6614      4.74  .Q        .         .         .         .
 23.79     23.7773      4.62  .Q        .         .         .         .
 24.09     23.8902      4.51  .Q        .         .         .         .
 24.39     23.9460      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
```

Drainage D

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
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                          Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   14.29
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.140
    LOW LOSS FRACTION = 0.070
    TIME OF CONCENTRATION(MIN.) = 10.27
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     5.60
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.10

****************************************************************************
  TIME     VOLUME      Q    0.       15.0      30.0      45.0      60.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.08      0.0035      1.05  Q         .         .         .         .
  0.25      0.0183      1.05  Q         .         .         .         .
  0.42      0.0332      1.06  Q         .         .         .         .
  0.59      0.0482      1.06  Q         .         .         .         .
  0.77      0.0633      1.07  Q         .         .         .         .
  0.94      0.0785      1.08  Q         .         .         .         .
  1.11      0.0938      1.09  Q         .         .         .         .
  1.28      0.1093      1.09  Q         .         .         .         .
  1.45      0.1248      1.10  Q         .         .         .         .
  1.62      0.1404      1.11  Q         .         .         .         .
  1.79      0.1562      1.12  Q         .         .         .         .
  1.96      0.1721      1.13  Q         .         .         .         .
  2.14      0.1881      1.14  Q         .         .         .         .
  2.31      0.2042      1.14  Q         .         .         .         .
  2.48      0.2205      1.15  Q         .         .         .         .
  2.65      0.2368      1.16  Q         .         .         .         .
  2.82      0.2534      1.17  Q         .         .         .         .
  2.99      0.2700      1.18  Q         .         .         .         .
  3.16      0.2868      1.19  Q         .         .         .         .
  3.33      0.3037      1.20  Q         .         .         .         .
  3.50      0.3208      1.21  Q         .         .         .         .
  3.68      0.3380      1.22  Q         .         .         .         .
  3.85      0.3554      1.23  Q         .         .         .         .
  4.02      0.3729      1.24  Q         .         .         .         .
  4.19      0.3905      1.26  Q         .         .         .         .
  4.36      0.4084      1.26  Q         .         .         .         .
  4.53      0.4263      1.28  Q         .         .         .         .
  4.70      0.4445      1.29  Q         .         .         .         .
  4.87      0.4628      1.30  Q         .         .         .         .
```

```
 5.05      0.4813      1.31  Q         .         .         .         .
 5.22      0.5000      1.33  Q         .         .         .         .
 5.39      0.5189      1.34  Q         .         .         .         .
 5.56      0.5380      1.36  Q         .         .         .         .
 5.73      0.5572      1.37  Q         .         .         .         .
 5.90      0.5767      1.38  Q         .         .         .         .
 6.07      0.5963      1.39  Q         .         .         .         .
 6.24      0.6162      1.41  Q         .         .         .         .
 6.41      0.6363      1.43  Q         .         .         .         .
 6.59      0.6566      1.45  Q         .         .         .         .
 6.76      0.6771      1.46  Q         .         .         .         .
 6.93      0.6979      1.48  Q         .         .         .         .
 7.10      0.7189      1.49  Q         .         .         .         .
 7.27      0.7402      1.52  .Q        .         .         .         .
 7.44      0.7617      1.53  .Q        .         .         .         .
 7.61      0.7835      1.55  .Q        .         .         .         .
 7.78      0.8056      1.57  .Q        .         .         .         .
 7.96      0.8280      1.59  .Q        .         .         .         .
 8.13      0.8506      1.61  .Q        .         .         .         .
 8.30      0.8736      1.64  .Q        .         .         .         .
 8.47      0.8968      1.65  .Q        .         .         .         .
 8.64      0.9204      1.68  .Q        .         .         .         .
 8.81      0.9444      1.70  .Q        .         .         .         .
 8.98      0.9687      1.73  .Q        .         .         .         .
 9.15      0.9934      1.75  .Q        .         .         .         .
 9.32      1.0184      1.79  .Q        .         .         .         .
 9.50      1.0439      1.81  .Q        .         .         .         .
 9.67      1.0697      1.85  .Q        .         .         .         .
 9.84      1.0960      1.87  .Q        .         .         .         .
10.01      1.1228      1.91  .Q        .         .         .         .
10.18      1.1500      1.94  .Q        .         .         .         .
10.35      1.1777      1.98  .Q        .         .         .         .
10.52      1.2059      2.01  .Q        .         .         .         .
10.69      1.2347      2.06  .Q        .         .         .         .
10.86      1.2641      2.09  .Q        .         .         .         .
11.04      1.2940      2.15  .Q        .         .         .         .
11.21      1.3246      2.18  .Q        .         .         .         .
11.38      1.3559      2.24  .Q        .         .         .         .
11.55      1.3879      2.28  .Q        .         .         .         .
11.72      1.4206      2.35  .Q        .         .         .         .
11.89      1.4541      2.39  .Q        .         .         .         .
12.06      1.4888      2.51  .Q        .         .         .         .
12.23      1.5289      3.16  . Q       .         .         .         .
12.41      1.5743      3.26  . Q       .         .         .         .
12.58      1.6208      3.31  . Q       .         .         .         .
12.75      1.6685      3.43  . Q       .         .         .         .
12.92      1.7175      3.50  . Q       .         .         .         .
13.09      1.7679      3.63  . Q       .         .         .         .
13.26      1.8199      3.71  . Q       .         .         .         .
13.43      1.8735      3.87  . Q       .         .         .         .
13.60      1.9290      3.97  . Q       .         .         .         .
13.77      1.9865      4.17  . Q       .         .         .         .
13.95      2.0462      4.28  . Q       .         .         .         .
14.12      2.1087      4.55  .  Q      .         .         .         .
14.29      2.1741      4.70  .  Q      .         .         .         .
14.46      2.2430      5.04  .  Q      .         .         .         .
14.63      2.3156      5.23  .  Q      .         .         .         .
14.80      2.3928      5.69  .  Q      .         .         .         .
14.97      2.4754      5.98  .  Q      .         .         .         .
15.14      2.5649      6.69  .   Q     .         .         .         .
15.32      2.6627      7.14  .   Q     .         .         .         .
15.49      2.7668      7.57  .    Q    .         .         .         .
15.66      2.8793      8.34  .    Q    .         .         .         .
15.83      3.0223     11.87  .      Q  .         .         .         .
16.00      3.2210     16.22  .         Q         .         .         .
16.17      3.6950     50.80  .         .         .         .  Q      .
16.34      4.1228      9.68  .     Q   .         .         .         .
16.51      4.2458      7.71  .    Q    .         .         .         .
16.68      4.3449      6.30  .   Q     .         .         .         .
16.86      4.4280      5.45  .  Q      .         .         .         .
17.03      4.5009      4.86  .  Q      .         .         .         .
17.20      4.5664      4.40  . Q       .         .         .         .
17.37      4.6263      4.06  . Q       .         .         .         .
17.54      4.6818      3.79  . Q       .         .         .         .
17.71      4.7338      3.56  . Q       .         .         .         .
17.88      4.7829      3.37  . Q       .         .         .         .
18.05      4.8294      3.21  . Q       .         .         .         .
18.23      4.8693      2.43  .Q        .         .         .         .
18.40      4.9029      2.31  .Q        .         .         .         .
```

18.57	4.9349	2.21	.Q	.	.	.	.
18.74	4.9655	2.12	.Q	.	.	.	.
18.91	4.9948	2.03	.Q	.	.	.	.
19.08	5.0231	1.96	.Q	.	.	.	.
19.25	5.0503	1.89	.Q	.	.	.	.
19.42	5.0766	1.83	.Q	.	.	.	.
19.59	5.1021	1.77	.Q	.	.	.	.
19.77	5.1267	1.72	.Q	.	.	.	.
19.94	5.1507	1.67	.Q	.	.	.	.
20.11	5.1740	1.62	.Q	.	.	.	.
20.28	5.1966	1.58	.Q	.	.	.	.
20.45	5.2187	1.54	.Q	.	.	.	.
20.62	5.2402	1.50	.Q	.	.	.	.
20.79	5.2612	1.47	Q	.	.	.	.
20.96	5.2818	1.44	Q	.	.	.	.
21.14	5.3019	1.40	Q	.	.	.	.
21.31	5.3215	1.38	Q	.	.	.	.
21.48	5.3408	1.35	Q	.	.	.	.
21.65	5.3597	1.32	Q	.	.	.	.
21.82	5.3782	1.30	Q	.	.	.	.
21.99	5.3963	1.27	Q	.	.	.	.
22.16	5.4141	1.25	Q	.	.	.	.
22.33	5.4317	1.23	Q	.	.	.	.
22.50	5.4489	1.21	Q	.	.	.	.
22.68	5.4658	1.19	Q	.	.	.	.
22.85	5.4824	1.17	Q	.	.	.	.
23.02	5.4988	1.15	Q	.	.	.	.
23.19	5.5150	1.13	Q	.	.	.	.
23.36	5.5308	1.11	Q	.	.	.	.
23.53	5.5465	1.10	Q	.	.	.	.
23.70	5.5619	1.08	Q	.	.	.	.
23.87	5.5771	1.07	Q	.	.	.	.
24.04	5.5921	1.05	Q	.	.	.	.
24.22	5.5996	0.00	Q	.	.	.	.

Drainage E

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                          Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   97.20
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.040
    TIME OF CONCENTRATION(MIN.) = 26.62
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    39.43
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     6.18

****************************************************************************
  TIME     VOLUME       Q    0.        50.0     100.0     150.0     200.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.03     0.0000      0.00  Q         .         .         .         .
  0.47     0.1354      7.39  .Q        .         .         .         .
  0.92     0.4079      7.47  .Q        .         .         .         .
  1.36     0.6853      7.66  .Q        .         .         .         .
  1.80     0.9679      7.76  .Q        .         .         .         .
  2.25     1.2560      7.96  .Q        .         .         .         .
  2.69     1.5498      8.07  .Q        .         .         .         .
  3.13     1.8497      8.29  .Q        .         .         .         .
  3.58     2.1559      8.41  .Q        .         .         .         .
  4.02     2.4689      8.66  .Q        .         .         .         .
  4.46     2.7890      8.80  .Q        .         .         .         .
  4.91     3.1168      9.08  .Q        .         .         .         .
  5.35     3.4525      9.23  .Q        .         .         .         .
  5.80     3.7969      9.56  .Q        .         .         .         .
  6.24     4.1505      9.73  .Q        .         .         .         .
  6.68     4.5140     10.10  . Q       .         .         .         .
  7.13     4.8880     10.30  . Q       .         .         .         .
  7.57     5.2736     10.73  . Q       .         .         .         .
  8.01     5.6714     10.97  . Q       .         .         .         .
  8.46     6.0830     11.48  . Q       .         .         .         .
  8.90     6.5091     11.76  . Q       .         .         .         .
  9.35     6.9517     12.38  . Q       .         .         .         .
  9.79     7.4119     12.72  . Q       .         .         .         .
 10.23     7.8924     13.49  . Q       .         .         .         .
 10.68     8.3949     13.92  . Q       .         .         .         .
 11.12     8.9231     14.90  . Q       .         .         .         .
 11.56     9.4796     15.46  .  Q      .         .         .         .
 12.01    10.0704     16.76  .  Q      .         .         .         .
 12.45    10.7423     19.89  .  Q      .         .         .         .
 12.89    11.5464     23.97  .   Q     .         .         .         .
 13.34    12.4473     25.17  .    Q    .         .         .         .
```

```
 13.78     13.4251     28.17  .    Q    .         .         .         .
 14.23     14.4936     30.11  .     Q   .         .         .         .
 14.67     15.7003     35.71  .      Q  .         .         .         .
 15.11     17.0835     39.74  .      Q  .         .         .         .
 15.56     18.7774     52.66  .         Q         .         .         .
 16.00     20.9327     64.90  .         . Q       .         .         .
 16.44     25.7767    199.32  .         .         .         .        Q.
 16.89     30.2641     45.45  .        Q.         .         .         .
 17.33     31.6957     32.63  .     Q   .         .         .         .
 17.77     32.7806     26.55  .    Q    .         .         .         .
 18.22     33.6877     22.93  .   Q     .         .         .         .
 18.66     34.4028     16.08  .  Q      .         .         .         .
 19.11     34.9613     14.39  . Q       .         .         .         .
 19.55     35.4651     13.09  . Q       .         .         .         .
 19.99     35.9262     12.06  . Q       .         .         .         .
 20.44     36.3529     11.22  . Q       .         .         .         .
 20.88     36.7513     10.51  . Q       .         .         .         .
 21.32     37.1256      9.91  .Q        .         .         .         .
 21.77     37.4795      9.39  .Q        .         .         .         .
 22.21     37.8154      8.94  .Q        .         .         .         .
 22.66     38.1357      8.53  .Q        .         .         .         .
 23.10     38.4421      8.18  .Q        .         .         .         .
 23.54     38.7360      7.86  .Q        .         .         .         .
 23.99     39.0188      7.57  .Q        .         .         .         .
 24.43     39.2920      7.34  .Q        .         .         .         .
 24.87     39.4266      0.00  Q         .         .         .         .
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Drainage F

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                           Analysis prepared by:




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 Problem Descriptions:


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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    5.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.160
    TIME OF CONCENTRATION(MIN.) =  7.97
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.11
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.61

****************************************************************************
  TIME     VOLUME      Q    0.        7.5      15.0      22.5      30.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.06      0.0000      0.00  Q         .         .         .         .
  0.19      0.0021      0.38  Q         .         .         .         .
  0.33      0.0063      0.39  Q         .         .         .         .
  0.46      0.0106      0.39  Q         .         .         .         .
  0.59      0.0149      0.39  Q         .         .         .         .
  0.72      0.0192      0.39  Q         .         .         .         .
  0.86      0.0235      0.39  Q         .         .         .         .
  0.99      0.0278      0.40  Q         .         .         .         .
  1.12      0.0322      0.40  Q         .         .         .         .
  1.26      0.0366      0.40  Q         .         .         .         .
  1.39      0.0410      0.40  Q         .         .         .         .
  1.52      0.0454      0.41  Q         .         .         .         .
  1.65      0.0499      0.41  Q         .         .         .         .
  1.79      0.0544      0.41  Q         .         .         .         .
  1.92      0.0589      0.41  Q         .         .         .         .
  2.05      0.0635      0.42  Q         .         .         .         .
  2.19      0.0681      0.42  Q         .         .         .         .
  2.32      0.0727      0.42  Q         .         .         .         .
  2.45      0.0773      0.42  Q         .         .         .         .
  2.58      0.0819      0.43  Q         .         .         .         .
  2.72      0.0866      0.43  Q         .         .         .         .
  2.85      0.0913      0.43  Q         .         .         .         .
  2.98      0.0961      0.43  Q         .         .         .         .
  3.12      0.1009      0.44  Q         .         .         .         .
  3.25      0.1057      0.44  Q         .         .         .         .
  3.38      0.1105      0.44  Q         .         .         .         .
  3.51      0.1154      0.44  Q         .         .         .         .
  3.65      0.1203      0.45  Q         .         .         .         .
  3.78      0.1252      0.45  Q         .         .         .         .
  3.91      0.1302      0.45  Q         .         .         .         .
```

4.05	0.1352	0.46	Q	.	.	.	.
4.18	0.1402	0.46	Q	.	.	.	.
4.31	0.1453	0.46	Q	.	.	.	.
4.44	0.1504	0.47	Q	.	.	.	.
4.58	0.1555	0.47	Q	.	.	.	.
4.71	0.1607	0.47	Q	.	.	.	.
4.84	0.1659	0.48	Q	.	.	.	.
4.97	0.1712	0.48	Q	.	.	.	.
5.11	0.1765	0.48	Q	.	.	.	.
5.24	0.1818	0.49	Q	.	.	.	.
5.37	0.1872	0.49	Q	.	.	.	.
5.51	0.1926	0.50	Q	.	.	.	.
5.64	0.1981	0.50	Q	.	.	.	.
5.77	0.2036	0.50	Q	.	.	.	.
5.90	0.2092	0.51	Q	.	.	.	.
6.04	0.2148	0.51	Q	.	.	.	.
6.17	0.2204	0.52	Q	.	.	.	.
6.30	0.2261	0.52	Q	.	.	.	.
6.44	0.2318	0.52	Q	.	.	.	.
6.57	0.2376	0.53	Q	.	.	.	.
6.70	0.2435	0.53	Q	.	.	.	.
6.83	0.2494	0.54	Q	.	.	.	.
6.97	0.2553	0.54	Q	.	.	.	.
7.10	0.2613	0.55	Q	.	.	.	.
7.23	0.2674	0.55	Q	.	.	.	.
7.37	0.2735	0.56	Q	.	.	.	.
7.50	0.2797	0.56	Q	.	.	.	.
7.63	0.2859	0.57	Q	.	.	.	.
7.76	0.2922	0.58	Q	.	.	.	.
7.90	0.2985	0.58	Q	.	.	.	.
8.03	0.3050	0.59	Q	.	.	.	.
8.16	0.3115	0.60	Q	.	.	.	.
8.30	0.3180	0.60	Q	.	.	.	.
8.43	0.3246	0.61	Q	.	.	.	.
8.56	0.3313	0.61	Q	.	.	.	.
8.69	0.3381	0.62	Q	.	.	.	.
8.83	0.3450	0.63	Q	.	.	.	.
8.96	0.3519	0.64	Q	.	.	.	.
9.09	0.3589	0.64	Q	.	.	.	.
9.23	0.3660	0.65	Q	.	.	.	.
9.36	0.3732	0.66	Q	.	.	.	.
9.49	0.3805	0.67	Q	.	.	.	.
9.62	0.3878	0.67	Q	.	.	.	.
9.76	0.3953	0.69	Q	.	.	.	.
9.89	0.4028	0.69	Q	.	.	.	.
10.02	0.4105	0.70	Q	.	.	.	.
10.16	0.4183	0.71	Q	.	.	.	.
10.29	0.4261	0.72	Q	.	.	.	.
10.42	0.4341	0.73	Q	.	.	.	.
10.55	0.4422	0.75	Q	.	.	.	.
10.69	0.4505	0.75	.Q	.	.	.	.
10.82	0.4588	0.77	.Q	.	.	.	.
10.95	0.4673	0.78	.Q	.	.	.	.
11.09	0.4759	0.79	.Q	.	.	.	.
11.22	0.4847	0.80	.Q	.	.	.	.
11.35	0.4936	0.82	.Q	.	.	.	.
11.48	0.5027	0.83	.Q	.	.	.	.
11.62	0.5119	0.85	.Q	.	.	.	.
11.75	0.5214	0.86	.Q	.	.	.	.
11.88	0.5310	0.89	.Q	.	.	.	.
12.02	0.5408	0.90	.Q	.	.	.	.
12.15	0.5520	1.16	.Q	.	.	.	.
12.28	0.5648	1.17	.Q	.	.	.	.
12.41	0.5778	1.20	.Q	.	.	.	.
12.55	0.5911	1.22	.Q	.	.	.	.
12.68	0.6046	1.25	.Q	.	.	.	.
12.81	0.6185	1.27	.Q	.	.	.	.
12.94	0.6326	1.31	.Q	.	.	.	.
13.08	0.6470	1.33	.Q	.	.	.	.
13.21	0.6618	1.37	.Q	.	.	.	.
13.34	0.6769	1.39	.Q	.	.	.	.
13.48	0.6925	1.44	.Q	.	.	.	.
13.61	0.7084	1.47	.Q	.	.	.	.
13.74	0.7249	1.52	. Q	.	.	.	.
13.87	0.7418	1.56	. Q	.	.	.	.
14.01	0.7592	1.63	. Q	.	.	.	.
14.14	0.7773	1.67	. Q	.	.	.	.
14.27	0.7961	1.76	. Q	.	.	.	.
14.41	0.8157	1.80	. Q	.	.	.	.

```
 14.54      0.8361      1.91  . Q       .         .         .         .
 14.67      0.8574      1.97  . Q       .         .         .         .
 14.80      0.8798      2.11  . Q       .         .         .         .
 14.94      0.9034      2.19  . Q       .         .         .         .
 15.07      0.9288      2.42  .  Q      .         .         .         .
 15.20      0.9562      2.57  .  Q      .         .         .         .
 15.34      0.9863      2.92  .  Q      .         .         .         .
 15.47      1.0183      2.92  .  Q      .         .         .         .
 15.60      1.0526      3.34  .   Q     .         .         .         .
 15.73      1.0918      3.81  .    Q    .         .         .         .
 15.87      1.1435      5.60  .      Q  .         .         .         .
 16.00      1.2170      7.80  .         Q         .         .         .
 16.13      1.3935     24.36  .         .         .         . Q       .
 16.27      1.5519      4.50  .     Q   .         .         .         .
 16.40      1.5929      2.98  .  Q      .         .         .         .
 16.53      1.6243      2.73  .  Q      .         .         .         .
 16.66      1.6519      2.30  .  Q      .         .         .         .
 16.80      1.6757      2.04  . Q       .         .         .         .
 16.93      1.6971      1.86  . Q       .         .         .         .
 17.06      1.7167      1.71  . Q       .         .         .         .
 17.20      1.7348      1.59  . Q       .         .         .         .
 17.33      1.7517      1.50  .Q        .         .         .         .
 17.46      1.7677      1.41  .Q        .         .         .         .
 17.59      1.7829      1.35  .Q        .         .         .         .
 17.73      1.7973      1.29  .Q        .         .         .         .
 17.86      1.8111      1.23  .Q        .         .         .         .
 17.99      1.8244      1.19  .Q        .         .         .         .
 18.13      1.8361      0.95  .Q        .         .         .         .
 18.26      1.8462      0.87  .Q        .         .         .         .
 18.39      1.8556      0.84  .Q        .         .         .         .
 18.52      1.8647      0.81  .Q        .         .         .         .
 18.66      1.8734      0.79  .Q        .         .         .         .
 18.79      1.8819      0.76  .Q        .         .         .         .
 18.92      1.8901      0.74  Q         .         .         .         .
 19.06      1.8981      0.72  Q         .         .         .         .
 19.19      1.9059      0.70  Q         .         .         .         .
 19.32      1.9135      0.68  Q         .         .         .         .
 19.45      1.9208      0.66  Q         .         .         .         .
 19.59      1.9280      0.65  Q         .         .         .         .
 19.72      1.9350      0.63  Q         .         .         .         .
 19.85      1.9419      0.62  Q         .         .         .         .
 19.98      1.9486      0.60  Q         .         .         .         .
 20.12      1.9551      0.59  Q         .         .         .         .
 20.25      1.9616      0.58  Q         .         .         .         .
 20.38      1.9679      0.57  Q         .         .         .         .
 20.52      1.9740      0.56  Q         .         .         .         .
 20.65      1.9801      0.55  Q         .         .         .         .
 20.78      1.9860      0.54  Q         .         .         .         .
 20.91      1.9919      0.53  Q         .         .         .         .
 21.05      1.9976      0.52  Q         .         .         .         .
 21.18      2.0033      0.51  Q         .         .         .         .
 21.31      2.0088      0.50  Q         .         .         .         .
 21.45      2.0143      0.49  Q         .         .         .         .
 21.58      2.0197      0.49  Q         .         .         .         .
 21.71      2.0250      0.48  Q         .         .         .         .
 21.84      2.0302      0.47  Q         .         .         .         .
 21.98      2.0353      0.47  Q         .         .         .         .
 22.11      2.0404      0.46  Q         .         .         .         .
 22.24      2.0454      0.45  Q         .         .         .         .
 22.38      2.0503      0.45  Q         .         .         .         .
 22.51      2.0552      0.44  Q         .         .         .         .
 22.64      2.0600      0.44  Q         .         .         .         .
 22.77      2.0647      0.43  Q         .         .         .         .
 22.91      2.0694      0.42  Q         .         .         .         .
 23.04      2.0741      0.42  Q         .         .         .         .
 23.17      2.0786      0.41  Q         .         .         .         .
 23.31      2.0832      0.41  Q         .         .         .         .
 23.44      2.0876      0.40  Q         .         .         .         .
 23.57      2.0920      0.40  Q         .         .         .         .
 23.70      2.0964      0.40  Q         .         .         .         .
 23.84      2.1007      0.39  Q         .         .         .         .
 23.97      2.1050      0.39  Q         .         .         .         .
 24.10      2.1092      0.38  Q         .         .         .         .
 24.24      2.1113      0.00  Q         .         .         .         .
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Drainage G

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                        SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                            Analysis prepared by:




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 Problem Descriptions:


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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.160
    TIME OF CONCENTRATION(MIN.) =  8.11
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.66
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.19

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  TIME     VOLUME      Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.05      0.0000     0.00  Q         .         .         .         .
  0.19      0.0007     0.12  Q         .         .         .         .
  0.32      0.0020     0.12  Q         .         .         .         .
  0.46      0.0033     0.12  Q         .         .         .         .
  0.59      0.0047     0.12  Q         .         .         .         .
  0.73      0.0061     0.12  Q         .         .         .         .
  0.86      0.0074     0.12  Q         .         .         .         .
  1.00      0.0088     0.12  Q         .         .         .         .
  1.13      0.0102     0.12  Q         .         .         .         .
  1.27      0.0116     0.12  Q         .         .         .         .
  1.40      0.0129     0.13  Q         .         .         .         .
  1.54      0.0144     0.13  Q         .         .         .         .
  1.67      0.0158     0.13  Q         .         .         .         .
  1.81      0.0172     0.13  Q         .         .         .         .
  1.94      0.0186     0.13  Q         .         .         .         .
  2.08      0.0201     0.13  Q         .         .         .         .
  2.21      0.0215     0.13  Q         .         .         .         .
  2.35      0.0230     0.13  Q         .         .         .         .
  2.48      0.0244     0.13  Q         .         .         .         .
  2.62      0.0259     0.13  Q         .         .         .         .
  2.75      0.0274     0.13  Q         .         .         .         .
  2.89      0.0289     0.13  Q         .         .         .         .
  3.02      0.0304     0.13  Q         .         .         .         .
  3.16      0.0319     0.14  Q         .         .         .         .
  3.29      0.0334     0.14  Q         .         .         .         .
  3.43      0.0349     0.14  Q         .         .         .         .
  3.56      0.0365     0.14  Q         .         .         .         .
  3.70      0.0380     0.14  Q         .         .         .         .
  3.84      0.0396     0.14  Q         .         .         .         .
  3.97      0.0412     0.14  Q         .         .         .         .
```

4.11	0.0427	0.14	Q	.	.	.	.
4.24	0.0443	0.14	Q	.	.	.	.
4.38	0.0459	0.14	Q	.	.	.	.
4.51	0.0476	0.15	Q	.	.	.	.
4.65	0.0492	0.15	Q	.	.	.	.
4.78	0.0508	0.15	Q	.	.	.	.
4.92	0.0525	0.15	Q	.	.	.	.
5.05	0.0542	0.15	Q	.	.	.	.
5.19	0.0558	0.15	Q	.	.	.	.
5.32	0.0575	0.15	Q	.	.	.	.
5.46	0.0592	0.15	Q	.	.	.	.
5.59	0.0610	0.15	Q	.	.	.	.
5.73	0.0627	0.16	Q	.	.	.	.
5.86	0.0644	0.16	Q	.	.	.	.
6.00	0.0662	0.16	Q	.	.	.	.
6.13	0.0680	0.16	Q	.	.	.	.
6.27	0.0698	0.16	Q	.	.	.	.
6.40	0.0716	0.16	Q	.	.	.	.
6.54	0.0734	0.16	Q	.	.	.	.
6.67	0.0753	0.17	Q	.	.	.	.
6.81	0.0771	0.17	Q	.	.	.	.
6.94	0.0790	0.17	Q	.	.	.	.
7.08	0.0809	0.17	Q	.	.	.	.
7.21	0.0828	0.17	Q	.	.	.	.
7.35	0.0847	0.17	Q	.	.	.	.
7.48	0.0867	0.18	Q	.	.	.	.
7.62	0.0886	0.18	Q	.	.	.	.
7.75	0.0906	0.18	Q	.	.	.	.
7.89	0.0926	0.18	Q	.	.	.	.
8.03	0.0946	0.18	Q	.	.	.	.
8.16	0.0967	0.18	Q	.	.	.	.
8.30	0.0988	0.19	Q	.	.	.	.
8.43	0.1009	0.19	Q	.	.	.	.
8.57	0.1030	0.19	Q	.	.	.	.
8.70	0.1051	0.19	Q	.	.	.	.
8.84	0.1073	0.20	Q	.	.	.	.
8.97	0.1095	0.20	Q	.	.	.	.
9.11	0.1117	0.20	Q	.	.	.	.
9.24	0.1139	0.20	Q	.	.	.	.
9.38	0.1162	0.21	Q	.	.	.	.
9.51	0.1185	0.21	Q	.	.	.	.
9.65	0.1208	0.21	Q	.	.	.	.
9.78	0.1232	0.21	Q	.	.	.	.
9.92	0.1256	0.22	Q	.	.	.	.
10.05	0.1280	0.22	Q	.	.	.	.
10.19	0.1305	0.22	Q	.	.	.	.
10.32	0.1330	0.22	Q	.	.	.	.
10.46	0.1355	0.23	Q	.	.	.	.
10.59	0.1381	0.23	Q	.	.	.	.
10.73	0.1407	0.24	Q	.	.	.	.
10.86	0.1433	0.24	Q	.	.	.	.
11.00	0.1460	0.24	Q	.	.	.	.
11.13	0.1488	0.25	Q	.	.	.	.
11.27	0.1515	0.25	.Q	.	.	.	.
11.40	0.1544	0.26	.Q	.	.	.	.
11.54	0.1573	0.26	.Q	.	.	.	.
11.67	0.1602	0.26	.Q	.	.	.	.
11.81	0.1632	0.27	.Q	.	.	.	.
11.95	0.1663	0.28	.Q	.	.	.	.
12.08	0.1695	0.31	.Q	.	.	.	.
12.22	0.1733	0.36	.Q	.	.	.	.
12.35	0.1774	0.37	.Q	.	.	.	.
12.49	0.1815	0.37	.Q	.	.	.	.
12.62	0.1858	0.38	.Q	.	.	.	.
12.76	0.1901	0.39	.Q	.	.	.	.
12.89	0.1945	0.40	.Q	.	.	.	.
13.03	0.1990	0.41	.Q	.	.	.	.
13.16	0.2036	0.42	.Q	.	.	.	.
13.30	0.2084	0.43	.Q	.	.	.	.
13.43	0.2132	0.44	.Q	.	.	.	.
13.57	0.2182	0.45	.Q	.	.	.	.
13.70	0.2234	0.47	.Q	.	.	.	.
13.84	0.2287	0.48	.Q	.	.	.	.
13.97	0.2341	0.50	.Q	.	.	.	.
14.11	0.2398	0.51	. Q	.	.	.	.
14.24	0.2457	0.54	. Q	.	.	.	.
14.38	0.2518	0.55	. Q	.	.	.	.
14.51	0.2582	0.59	. Q	.	.	.	.
14.65	0.2648	0.61	. Q	.	.	.	.

```
 14.78      0.2718      0.65  . Q       .         .         .         .
 14.92      0.2792      0.67  . Q       .         .         .         .
 15.05      0.2872      0.74  . Q       .         .         .         .
 15.19      0.2957      0.79  .  Q      .         .         .         .
 15.32      0.3051      0.90  .  Q      .         .         .         .
 15.46      0.3152      0.91  .  Q      .         .         .         .
 15.59      0.3260      1.02  .   Q     .         .         .         .
 15.73      0.3383      1.17  .   Q     .         .         .         .
 15.86      0.3544      1.72  .     Q   .         .         .         .
 16.00      0.3774      2.39  .        Q.         .         .         .
 16.14      0.4325      7.48  .         .         .        Q.         .
 16.27      0.4820      1.38  .    Q    .         .         .         .
 16.41      0.4948      0.92  .  Q      .         .         .         .
 16.54      0.5046      0.84  .  Q      .         .         .         .
 16.68      0.5133      0.71  . Q       .         .         .         .
 16.81      0.5207      0.63  . Q       .         .         .         .
 16.95      0.5274      0.57  . Q       .         .         .         .
 17.08      0.5335      0.53  . Q       .         .         .         .
 17.22      0.5392      0.49  .Q        .         .         .         .
 17.35      0.5445      0.46  .Q        .         .         .         .
 17.49      0.5495      0.44  .Q        .         .         .         .
 17.62      0.5542      0.41  .Q        .         .         .         .
 17.76      0.5588      0.40  .Q        .         .         .         .
 17.89      0.5631      0.38  .Q        .         .         .         .
 18.03      0.5672      0.36  .Q        .         .         .         .
 18.16      0.5708      0.28  .Q        .         .         .         .
 18.30      0.5739      0.27  .Q        .         .         .         .
 18.43      0.5768      0.26  .Q        .         .         .         .
 18.57      0.5797      0.25  Q         .         .         .         .
 18.70      0.5824      0.24  Q         .         .         .         .
 18.84      0.5851      0.23  Q         .         .         .         .
 18.97      0.5876      0.23  Q         .         .         .         .
 19.11      0.5901      0.22  Q         .         .         .         .
 19.24      0.5926      0.21  Q         .         .         .         .
 19.38      0.5949      0.21  Q         .         .         .         .
 19.51      0.5972      0.20  Q         .         .         .         .
 19.65      0.5995      0.20  Q         .         .         .         .
 19.78      0.6017      0.19  Q         .         .         .         .
 19.92      0.6038      0.19  Q         .         .         .         .
 20.06      0.6059      0.19  Q         .         .         .         .
 20.19      0.6079      0.18  Q         .         .         .         .
 20.33      0.6099      0.18  Q         .         .         .         .
 20.46      0.6119      0.17  Q         .         .         .         .
 20.60      0.6138      0.17  Q         .         .         .         .
 20.73      0.6157      0.17  Q         .         .         .         .
 20.87      0.6176      0.16  Q         .         .         .         .
 21.00      0.6194      0.16  Q         .         .         .         .
 21.14      0.6212      0.16  Q         .         .         .         .
 21.27      0.6230      0.16  Q         .         .         .         .
 21.41      0.6247      0.15  Q         .         .         .         .
 21.54      0.6264      0.15  Q         .         .         .         .
 21.68      0.6281      0.15  Q         .         .         .         .
 21.81      0.6297      0.15  Q         .         .         .         .
 21.95      0.6314      0.14  Q         .         .         .         .
 22.08      0.6330      0.14  Q         .         .         .         .
 22.22      0.6346      0.14  Q         .         .         .         .
 22.35      0.6361      0.14  Q         .         .         .         .
 22.49      0.6377      0.14  Q         .         .         .         .
 22.62      0.6392      0.14  Q         .         .         .         .
 22.76      0.6407      0.13  Q         .         .         .         .
 22.89      0.6422      0.13  Q         .         .         .         .
 23.03      0.6436      0.13  Q         .         .         .         .
 23.16      0.6451      0.13  Q         .         .         .         .
 23.30      0.6465      0.13  Q         .         .         .         .
 23.43      0.6479      0.13  Q         .         .         .         .
 23.57      0.6493      0.12  Q         .         .         .         .
 23.70      0.6507      0.12  Q         .         .         .         .
 23.84      0.6521      0.12  Q         .         .         .         .
 23.97      0.6534      0.12  Q         .         .         .         .
 24.11      0.6547      0.12  Q         .         .         .         .
 24.25      0.6554      0.00  Q         .         .         .         .
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Drainage H

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                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                          Analysis prepared by:




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 Problem Descriptions:


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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    7.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.160
    TIME OF CONCENTRATION(MIN.) =  8.07
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.55
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.73

****************************************************************************
  TIME     VOLUME      Q    0.        7.5      15.0      22.5      30.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.13      0.0026      0.46  Q         .         .         .         .
  0.26      0.0077      0.47  Q         .         .         .         .
  0.40      0.0129      0.47  Q         .         .         .         .
  0.53      0.0181      0.47  Q         .         .         .         .
  0.67      0.0234      0.47  Q         .         .         .         .
  0.80      0.0286      0.48  Q         .         .         .         .
  0.94      0.0339      0.48  Q         .         .         .         .
  1.07      0.0393      0.48  Q         .         .         .         .
  1.21      0.0446      0.48  Q         .         .         .         .
  1.34      0.0500      0.49  Q         .         .         .         .
  1.47      0.0554      0.49  Q         .         .         .         .
  1.61      0.0609      0.49  Q         .         .         .         .
  1.74      0.0663      0.49  Q         .         .         .         .
  1.88      0.0719      0.50  Q         .         .         .         .
  2.01      0.0774      0.50  Q         .         .         .         .
  2.15      0.0830      0.50  Q         .         .         .         .
  2.28      0.0886      0.51  Q         .         .         .         .
  2.42      0.0942      0.51  Q         .         .         .         .
  2.55      0.0999      0.51  Q         .         .         .         .
  2.68      0.1056      0.52  Q         .         .         .         .
  2.82      0.1114      0.52  Q         .         .         .         .
  2.95      0.1172      0.52  Q         .         .         .         .
  3.09      0.1230      0.53  Q         .         .         .         .
  3.22      0.1289      0.53  Q         .         .         .         .
  3.36      0.1348      0.53  Q         .         .         .         .
  3.49      0.1407      0.54  Q         .         .         .         .
  3.63      0.1467      0.54  Q         .         .         .         .
  3.76      0.1527      0.54  Q         .         .         .         .
  3.90      0.1588      0.55  Q         .         .         .         .
  4.03      0.1649      0.55  Q         .         .         .         .
```

```
  4.16      0.1710      0.55  Q         .         .         .         .
  4.30      0.1772      0.56  Q         .         .         .         .
  4.43      0.1835      0.56  Q         .         .         .         .
  4.57      0.1898      0.57  Q         .         .         .         .
  4.70      0.1961      0.57  Q         .         .         .         .
  4.84      0.2025      0.58  Q         .         .         .         .
  4.97      0.2089      0.58  Q         .         .         .         .
  5.11      0.2154      0.59  Q         .         .         .         .
  5.24      0.2219      0.59  Q         .         .         .         .
  5.37      0.2285      0.59  Q         .         .         .         .
  5.51      0.2351      0.60  Q         .         .         .         .
  5.64      0.2418      0.60  Q         .         .         .         .
  5.78      0.2485      0.61  Q         .         .         .         .
  5.91      0.2553      0.61  Q         .         .         .         .
  6.05      0.2621      0.62  Q         .         .         .         .
  6.18      0.2690      0.62  Q         .         .         .         .
  6.32      0.2760      0.63  Q         .         .         .         .
  6.45      0.2830      0.64  Q         .         .         .         .
  6.59      0.2901      0.64  Q         .         .         .         .
  6.72      0.2972      0.65  Q         .         .         .         .
  6.85      0.3045      0.65  Q         .         .         .         .
  6.99      0.3117      0.66  Q         .         .         .         .
  7.12      0.3191      0.66  Q         .         .         .         .
  7.26      0.3265      0.67  Q         .         .         .         .
  7.39      0.3340      0.68  Q         .         .         .         .
  7.53      0.3415      0.68  Q         .         .         .         .
  7.66      0.3492      0.69  Q         .         .         .         .
  7.80      0.3569      0.70  Q         .         .         .         .
  7.93      0.3647      0.70  Q         .         .         .         .
  8.06      0.3725      0.71  Q         .         .         .         .
  8.20      0.3805      0.72  Q         .         .         .         .
  8.33      0.3885      0.73  Q         .         .         .         .
  8.47      0.3966      0.73  Q         .         .         .         .
  8.60      0.4049      0.74  Q         .         .         .         .
  8.74      0.4132      0.75  .Q        .         .         .         .
  8.87      0.4216      0.76  .Q        .         .         .         .
  9.01      0.4301      0.77  .Q        .         .         .         .
  9.14      0.4387      0.78  .Q        .         .         .         .
  9.27      0.4474      0.79  .Q        .         .         .         .
  9.41      0.4562      0.80  .Q        .         .         .         .
  9.54      0.4651      0.81  .Q        .         .         .         .
  9.68      0.4742      0.82  .Q        .         .         .         .
  9.81      0.4833      0.83  .Q        .         .         .         .
  9.95      0.4926      0.84  .Q        .         .         .         .
 10.08      0.5020      0.85  .Q        .         .         .         .
 10.22      0.5116      0.87  .Q        .         .         .         .
 10.35      0.5213      0.88  .Q        .         .         .         .
 10.49      0.5311      0.89  .Q        .         .         .         .
 10.62      0.5411      0.90  .Q        .         .         .         .
 10.75      0.5512      0.92  .Q        .         .         .         .
 10.89      0.5615      0.93  .Q        .         .         .         .
 11.02      0.5720      0.95  .Q        .         .         .         .
 11.16      0.5826      0.96  .Q        .         .         .         .
 11.29      0.5934      0.98  .Q        .         .         .         .
 11.43      0.6044      1.00  .Q        .         .         .         .
 11.56      0.6156      1.02  .Q        .         .         .         .
 11.70      0.6270      1.03  .Q        .         .         .         .
 11.83      0.6387      1.06  .Q        .         .         .         .
 11.97      0.6506      1.08  .Q        .         .         .         .
 12.10      0.6636      1.28  .Q        .         .         .         .
 12.23      0.6785      1.40  .Q        .         .         .         .
 12.37      0.6943      1.44  .Q        .         .         .         .
 12.50      0.7104      1.46  .Q        .         .         .         .
 12.64      0.7269      1.50  .Q        .         .         .         .
 12.77      0.7437      1.52  . Q       .         .         .         .
 12.91      0.7608      1.56  . Q       .         .         .         .
 13.04      0.7783      1.59  . Q       .         .         .         .
 13.18      0.7963      1.64  . Q       .         .         .         .
 13.31      0.8147      1.67  . Q       .         .         .         .
 13.44      0.8335      1.73  . Q       .         .         .         .
 13.58      0.8529      1.76  . Q       .         .         .         .
 13.71      0.8728      1.83  . Q       .         .         .         .
 13.85      0.8934      1.87  . Q       .         .         .         .
 13.98      0.9146      1.95  . Q       .         .         .         .
 14.12      0.9365      2.00  . Q       .         .         .         .
 14.25      0.9593      2.11  . Q       .         .         .         .
 14.39      0.9831      2.16  . Q       .         .         .         .
 14.52      1.0078      2.29  .  Q      .         .         .         .
 14.65      1.0337      2.36  .  Q      .         .         .         .
```

```
 14.79      1.0609      2.53  .  Q      .         .         .         .
 14.92      1.0896      2.63  .  Q      .         .         .         .
 15.06      1.1203      2.90  .  Q      .         .         .         .
 15.19      1.1535      3.07  .   Q     .         .         .         .
 15.33      1.1901      3.50  .   Q     .         .         .         .
 15.46      1.2292      3.54  .   Q     .         .         .         .
 15.60      1.2710      3.99  .    Q    .         .         .         .
 15.73      1.3186      4.56  .     Q   .         .         .         .
 15.87      1.3812      6.70  .       Q .         .         .         .
 16.00      1.4703      9.34  .         . Q       .         .         .
 16.13      1.6843     29.18  .         .         .         .       Q .
 16.27      1.8765      5.39  .      Q  .         .         .         .
 16.40      1.9262      3.57  .   Q     .         .         .         .
 16.54      1.9642      3.27  .   Q     .         .         .         .
 16.67      1.9977      2.76  .  Q      .         .         .         .
 16.81      2.0266      2.44  .  Q      .         .         .         .
 16.94      2.0526      2.22  . Q       .         .         .         .
 17.08      2.0764      2.05  . Q       .         .         .         .
 17.21      2.0984      1.91  . Q       .         .         .         .
 17.34      2.1189      1.79  . Q       .         .         .         .
 17.48      2.1383      1.70  . Q       .         .         .         .
 17.61      2.1567      1.61  . Q       .         .         .         .
 17.75      2.1743      1.54  . Q       .         .         .         .
 17.88      2.1910      1.48  .Q        .         .         .         .
 18.02      2.2072      1.42  .Q        .         .         .         .
 18.15      2.2211      1.09  .Q        .         .         .         .
 18.29      2.2330      1.05  .Q        .         .         .         .
 18.42      2.2444      1.01  .Q        .         .         .         .
 18.56      2.2554      0.97  .Q        .         .         .         .
 18.69      2.2661      0.94  .Q        .         .         .         .
 18.82      2.2764      0.91  .Q        .         .         .         .
 18.96      2.2863      0.88  .Q        .         .         .         .
 19.09      2.2960      0.86  .Q        .         .         .         .
 19.23      2.3054      0.84  .Q        .         .         .         .
 19.36      2.3146      0.81  .Q        .         .         .         .
 19.50      2.3235      0.79  .Q        .         .         .         .
 19.63      2.3322      0.77  .Q        .         .         .         .
 19.77      2.3407      0.76  .Q        .         .         .         .
 19.90      2.3491      0.74  Q         .         .         .         .
 20.03      2.3572      0.72  Q         .         .         .         .
 20.17      2.3651      0.71  Q         .         .         .         .
 20.30      2.3729      0.69  Q         .         .         .         .
 20.44      2.3806      0.68  Q         .         .         .         .
 20.57      2.3880      0.67  Q         .         .         .         .
 20.71      2.3954      0.65  Q         .         .         .         .
 20.84      2.4026      0.64  Q         .         .         .         .
 20.98      2.4097      0.63  Q         .         .         .         .
 21.11      2.4166      0.62  Q         .         .         .         .
 21.25      2.4235      0.61  Q         .         .         .         .
 21.38      2.4302      0.60  Q         .         .         .         .
 21.51      2.4368      0.59  Q         .         .         .         .
 21.65      2.4434      0.58  Q         .         .         .         .
 21.78      2.4498      0.57  Q         .         .         .         .
 21.92      2.4561      0.57  Q         .         .         .         .
 22.05      2.4624      0.56  Q         .         .         .         .
 22.19      2.4685      0.55  Q         .         .         .         .
 22.32      2.4746      0.54  Q         .         .         .         .
 22.46      2.4806      0.53  Q         .         .         .         .
 22.59      2.4865      0.53  Q         .         .         .         .
 22.73      2.4923      0.52  Q         .         .         .         .
 22.86      2.4980      0.51  Q         .         .         .         .
 22.99      2.5037      0.51  Q         .         .         .         .
 23.13      2.5093      0.50  Q         .         .         .         .
 23.26      2.5149      0.50  Q         .         .         .         .
 23.40      2.5204      0.49  Q         .         .         .         .
 23.53      2.5258      0.48  Q         .         .         .         .
 23.67      2.5311      0.48  Q         .         .         .         .
 23.80      2.5364      0.47  Q         .         .         .         .
 23.94      2.5417      0.47  Q         .         .         .         .
 24.07      2.5469      0.46  Q         .         .         .         .
 24.20      2.5494      0.00  Q         .         .         .         .
---------------------------------------------------------------------------
```

Drainage I

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                          Analysis prepared by:




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----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.160
    TIME OF CONCENTRATION(MIN.) =  9.54
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.40
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.12

****************************************************************************
  TIME     VOLUME       Q    0.         2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.10      0.0000      0.00  Q          .         .         .         .
  0.26      0.0005      0.07  Q          .         .         .         .
  0.42      0.0014      0.07  Q          .         .         .         .
  0.58      0.0024      0.07  Q          .         .         .         .
  0.74      0.0034      0.07  Q          .         .         .         .
  0.90      0.0044      0.07  Q          .         .         .         .
  1.05      0.0054      0.08  Q          .         .         .         .
  1.21      0.0063      0.08  Q          .         .         .         .
  1.37      0.0073      0.08  Q          .         .         .         .
  1.53      0.0084      0.08  Q          .         .         .         .
  1.69      0.0094      0.08  Q          .         .         .         .
  1.85      0.0104      0.08  Q          .         .         .         .
  2.01      0.0114      0.08  Q          .         .         .         .
  2.17      0.0125      0.08  Q          .         .         .         .
  2.33      0.0135      0.08  Q          .         .         .         .
  2.49      0.0146      0.08  Q          .         .         .         .
  2.64      0.0156      0.08  Q          .         .         .         .
  2.80      0.0167      0.08  Q          .         .         .         .
  2.96      0.0177      0.08  Q          .         .         .         .
  3.12      0.0188      0.08  Q          .         .         .         .
  3.28      0.0199      0.08  Q          .         .         .         .
  3.44      0.0210      0.08  Q          .         .         .         .
  3.60      0.0221      0.08  Q          .         .         .         .
  3.76      0.0232      0.09  Q          .         .         .         .
  3.92      0.0244      0.09  Q          .         .         .         .
  4.07      0.0255      0.09  Q          .         .         .         .
  4.23      0.0267      0.09  Q          .         .         .         .
  4.39      0.0278      0.09  Q          .         .         .         .
  4.55      0.0290      0.09  Q          .         .         .         .
  4.71      0.0301      0.09  Q          .         .         .         .
  4.87      0.0313      0.09  Q          .         .         .         .
```

```
  5.03     0.0325     0.09  Q         .         .         .         .
  5.19     0.0337     0.09  Q         .         .         .         .
  5.35     0.0349     0.09  Q         .         .         .         .
  5.51     0.0362     0.09  Q         .         .         .         .
  5.66     0.0374     0.09  Q         .         .         .         .
  5.82     0.0387     0.10  Q         .         .         .         .
  5.98     0.0399     0.10  Q         .         .         .         .
  6.14     0.0412     0.10  Q         .         .         .         .
  6.30     0.0425     0.10  Q         .         .         .         .
  6.46     0.0438     0.10  Q         .         .         .         .
  6.62     0.0451     0.10  Q         .         .         .         .
  6.78     0.0464     0.10  Q         .         .         .         .
  6.94     0.0478     0.10  Q         .         .         .         .
  7.10     0.0491     0.10  Q         .         .         .         .
  7.25     0.0505     0.11  Q         .         .         .         .
  7.41     0.0519     0.11  Q         .         .         .         .
  7.57     0.0533     0.11  Q         .         .         .         .
  7.73     0.0547     0.11  Q         .         .         .         .
  7.89     0.0562     0.11  Q         .         .         .         .
  8.05     0.0576     0.11  Q         .         .         .         .
  8.21     0.0591     0.11  Q         .         .         .         .
  8.37     0.0606     0.11  Q         .         .         .         .
  8.53     0.0621     0.12  Q         .         .         .         .
  8.69     0.0636     0.12  Q         .         .         .         .
  8.85     0.0652     0.12  Q         .         .         .         .
  9.00     0.0668     0.12  Q         .         .         .         .
  9.16     0.0684     0.12  Q         .         .         .         .
  9.32     0.0700     0.12  Q         .         .         .         .
  9.48     0.0716     0.13  Q         .         .         .         .
  9.64     0.0733     0.13  Q         .         .         .         .
  9.80     0.0750     0.13  Q         .         .         .         .
  9.96     0.0767     0.13  Q         .         .         .         .
 10.12     0.0785     0.13  Q         .         .         .         .
 10.28     0.0802     0.14  Q         .         .         .         .
 10.43     0.0821     0.14  Q         .         .         .         .
 10.59     0.0839     0.14  Q         .         .         .         .
 10.75     0.0858     0.14  Q         .         .         .         .
 10.91     0.0877     0.15  Q         .         .         .         .
 11.07     0.0896     0.15  Q         .         .         .         .
 11.23     0.0916     0.15  Q         .         .         .         .
 11.39     0.0936     0.16  Q         .         .         .         .
 11.55     0.0957     0.16  Q         .         .         .         .
 11.71     0.0978     0.16  Q         .         .         .         .
 11.87     0.1000     0.17  Q         .         .         .         .
 12.02     0.1022     0.17  Q         .         .         .         .
 12.18     0.1047     0.21  Q         .         .         .         .
 12.34     0.1075     0.22  Q         .         .         .         .
 12.50     0.1105     0.23  Q         .         .         .         .
 12.66     0.1136     0.24  Q         .         .         .         .
 12.82     0.1167     0.24  Q         .         .         .         .
 12.98     0.1199     0.25  Q         .         .         .         .
 13.14     0.1232     0.25  .Q        .         .         .         .
 13.30     0.1266     0.26  .Q        .         .         .         .
 13.46     0.1301     0.27  .Q        .         .         .         .
 13.62     0.1337     0.28  .Q        .         .         .         .
 13.77     0.1374     0.29  .Q        .         .         .         .
 13.93     0.1412     0.30  .Q        .         .         .         .
 14.09     0.1453     0.31  .Q        .         .         .         .
 14.25     0.1495     0.33  .Q        .         .         .         .
 14.41     0.1539     0.34  .Q        .         .         .         .
 14.57     0.1585     0.36  .Q        .         .         .         .
 14.73     0.1634     0.38  .Q        .         .         .         .
 14.89     0.1685     0.41  .Q        .         .         .         .
 15.05     0.1741     0.44  .Q        .         .         .         .
 15.20     0.1802     0.50  .Q        .         .         .         .
 15.36     0.1870     0.54  . Q       .         .         .         .
 15.52     0.1942     0.56  . Q       .         .         .         .
 15.68     0.2021     0.64  . Q       .         .         .         .
 15.84     0.2126     0.95  .  Q      .         .         .         .
 16.00     0.2275     1.32  .    Q    .         .         .         .
 16.16     0.2634     4.15  .         .     Q   .         .         .
 16.32     0.2957     0.76  .  Q      .         .         .         .
 16.48     0.3043     0.56  . Q       .         .         .         .
 16.64     0.3110     0.46  .Q        .         .         .         .
 16.80     0.3167     0.39  .Q        .         .         .         .
 16.95     0.3216     0.35  .Q        .         .         .         .
 17.11     0.3260     0.32  .Q        .         .         .         .
 17.27     0.3300     0.29  .Q        .         .         .         .
 17.43     0.3337     0.27  .Q        .         .         .         .
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 17.59      0.3372     0.26  .Q         .         .         .         .
 17.75      0.3405     0.24  Q          .         .         .         .
 17.91      0.3437     0.23  Q          .         .         .         .
 18.07      0.3466     0.22  Q          .         .         .         .
 18.23      0.3492     0.17  Q          .         .         .         .
 18.39      0.3514     0.16  Q          .         .         .         .
 18.54      0.3534     0.15  Q          .         .         .         .
 18.70      0.3554     0.15  Q          .         .         .         .
 18.86      0.3573     0.14  Q          .         .         .         .
 19.02      0.3592     0.14  Q          .         .         .         .
 19.18      0.3610     0.13  Q          .         .         .         .
 19.34      0.3627     0.13  Q          .         .         .         .
 19.50      0.3643     0.13  Q          .         .         .         .
 19.66      0.3660     0.12  Q          .         .         .         .
 19.82      0.3675     0.12  Q          .         .         .         .
 19.98      0.3691     0.12  Q          .         .         .         .
 20.13      0.3706     0.11  Q          .         .         .         .
 20.29      0.3720     0.11  Q          .         .         .         .
 20.45      0.3734     0.11  Q          .         .         .         .
 20.61      0.3748     0.10  Q          .         .         .         .
 20.77      0.3762     0.10  Q          .         .         .         .
 20.93      0.3775     0.10  Q          .         .         .         .
 21.09      0.3788     0.10  Q          .         .         .         .
 21.25      0.3801     0.10  Q          .         .         .         .
 21.41      0.3814     0.09  Q          .         .         .         .
 21.57      0.3826     0.09  Q          .         .         .         .
 21.72      0.3838     0.09  Q          .         .         .         .
 21.88      0.3850     0.09  Q          .         .         .         .
 22.04      0.3861     0.09  Q          .         .         .         .
 22.20      0.3873     0.09  Q          .         .         .         .
 22.36      0.3884     0.09  Q          .         .         .         .
 22.52      0.3895     0.08  Q          .         .         .         .
 22.68      0.3906     0.08  Q          .         .         .         .
 22.84      0.3917     0.08  Q          .         .         .         .
 23.00      0.3927     0.08  Q          .         .         .         .
 23.16      0.3938     0.08  Q          .         .         .         .
 23.31      0.3948     0.08  Q          .         .         .         .
 23.47      0.3958     0.08  Q          .         .         .         .
 23.63      0.3968     0.08  Q          .         .         .         .
 23.79      0.3978     0.07  Q          .         .         .         .
 23.95      0.3988     0.07  Q          .         .         .         .
 24.11      0.3997     0.07  Q          .         .         .         .
 24.27      0.4002     0.00  Q          .         .         .         .
-----------------------------------------------------------------------
```

Drainage J

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                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                          Analysis prepared by:




****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   11.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.160
    TIME OF CONCENTRATION(MIN.) = 13.39
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     4.01
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.16

****************************************************************************
  TIME     VOLUME       Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.16      0.0047      0.73  Q         .         .         .         .
  0.38      0.0181      0.73  Q         .         .         .         .
  0.60      0.0317      0.74  Q         .         .         .         .
  0.82      0.0454      0.74  Q         .         .         .         .
  1.05      0.0592      0.75  Q         .         .         .         .
  1.27      0.0731      0.76  Q         .         .         .         .
  1.49      0.0872      0.77  Q         .         .         .         .
  1.72      0.1014      0.77  Q         .         .         .         .
  1.94      0.1157      0.78  Q         .         .         .         .
  2.16      0.1302      0.79  Q         .         .         .         .
  2.39      0.1448      0.80  Q         .         .         .         .
  2.61      0.1596      0.80  Q         .         .         .         .
  2.83      0.1745      0.82  Q         .         .         .         .
  3.06      0.1896      0.82  Q         .         .         .         .
  3.28      0.2049      0.83  Q         .         .         .         .
  3.50      0.2203      0.84  Q         .         .         .         .
  3.73      0.2359      0.85  Q         .         .         .         .
  3.95      0.2516      0.86  Q         .         .         .         .
  4.17      0.2676      0.87  Q         .         .         .         .
  4.40      0.2837      0.88  Q         .         .         .         .
  4.62      0.3000      0.89  Q         .         .         .         .
  4.84      0.3165      0.90  Q         .         .         .         .
  5.06      0.3333      0.91  Q         .         .         .         .
  5.29      0.3502      0.92  Q         .         .         .         .
  5.51      0.3674      0.94  Q         .         .         .         .
  5.73      0.3848      0.95  Q         .         .         .         .
  5.96      0.4024      0.96  Q         .         .         .         .
  6.18      0.4202      0.97  Q         .         .         .         .
  6.40      0.4384      0.99  Q         .         .         .         .
  6.63      0.4567      1.00  .Q        .         .         .         .
  6.85      0.4754      1.02  .Q        .         .         .         .
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```
  7.07      0.4943      1.03  .Q        .         .         .         .
  7.30      0.5135      1.05  .Q        .         .         .         .
  7.52      0.5331      1.06  .Q        .         .         .         .
  7.74      0.5529      1.09  .Q        .         .         .         .
  7.97      0.5731      1.10  .Q        .         .         .         .
  8.19      0.5936      1.13  .Q        .         .         .         .
  8.41      0.6145      1.14  .Q        .         .         .         .
  8.64      0.6358      1.17  .Q        .         .         .         .
  8.86      0.6574      1.18  .Q        .         .         .         .
  9.08      0.6795      1.21  .Q        .         .         .         .
  9.30      0.7021      1.23  .Q        .         .         .         .
  9.53      0.7251      1.26  .Q        .         .         .         .
  9.75      0.7485      1.28  .Q        .         .         .         .
  9.97      0.7725      1.32  .Q        .         .         .         .
 10.20      0.7971      1.34  .Q        .         .         .         .
 10.42      0.8222      1.38  .Q        .         .         .         .
 10.64      0.8479      1.41  .Q        .         .         .         .
 10.87      0.8743      1.46  .Q        .         .         .         .
 11.09      0.9015      1.48  .Q        .         .         .         .
 11.31      0.9293      1.54  .Q        .         .         .         .
 11.54      0.9580      1.57  .Q        .         .         .         .
 11.76      0.9876      1.64  .Q        .         .         .         .
 11.98      1.0181      1.67  .Q        .         .         .         .
 12.21      1.0532      2.14  . Q       .         .         .         .
 12.43      1.0937      2.24  . Q       .         .         .         .
 12.65      1.1359      2.34  . Q       .         .         .         .
 12.88      1.1795      2.39  . Q       .         .         .         .
 13.10      1.2248      2.52  . Q       .         .         .         .
 13.32      1.2718      2.58  . Q       .         .         .         .
 13.55      1.3209      2.74  . Q       .         .         .         .
 13.77      1.3722      2.82  . Q       .         .         .         .
 13.99      1.4261      3.03  .  Q      .         .         .         .
 14.21      1.4831      3.15  .  Q      .         .         .         .
 14.44      1.5438      3.44  .  Q      .         .         .         .
 14.66      1.6088      3.61  .  Q      .         .         .         .
 14.88      1.6794      4.04  .   Q     .         .         .         .
 15.11      1.7567      4.35  .   Q     .         .         .         .
 15.33      1.8453      5.27  .    Q    .         .         .         .
 15.55      1.9450      5.55  .    Q    .         .         .         .
 15.78      2.0663      7.60  .      Q  .         .         .         .
 16.00      2.2350     10.70  .         Q         .         .         .
 16.22      2.6458     33.86  .         .         .         .  Q      .
 16.45      3.0140      6.06  .     Q   .         .         .         .
 16.67      3.1138      4.75  .   Q     .         .         .         .
 16.89      3.1927      3.81  .  Q      .         .         .         .
 17.12      3.2581      3.29  .  Q      .         .         .         .
 17.34      3.3154      2.92  . Q       .         .         .         .
 17.56      3.3668      2.66  . Q       .         .         .         .
 17.79      3.4139      2.45  . Q       .         .         .         .
 18.01      3.4577      2.29  . Q       .         .         .         .
 18.23      3.4945      1.71  .Q        .         .         .         .
 18.45      3.5251      1.60  .Q        .         .         .         .
 18.68      3.5538      1.51  .Q        .         .         .         .
 18.90      3.5809      1.43  .Q        .         .         .         .
 19.12      3.6067      1.36  .Q        .         .         .         .
 19.35      3.6312      1.30  .Q        .         .         .         .
 19.57      3.6547      1.25  .Q        .         .         .         .
 19.79      3.6772      1.20  .Q        .         .         .         .
 20.02      3.6989      1.15  .Q        .         .         .         .
 20.24      3.7198      1.11  .Q        .         .         .         .
 20.46      3.7400      1.08  .Q        .         .         .         .
 20.69      3.7595      1.04  .Q        .         .         .         .
 20.91      3.7785      1.01  .Q        .         .         .         .
 21.13      3.7968      0.98  Q         .         .         .         .
 21.36      3.8147      0.96  Q         .         .         .         .
 21.58      3.8321      0.93  Q         .         .         .         .
 21.80      3.8490      0.91  Q         .         .         .         .
 22.03      3.8656      0.89  Q         .         .         .         .
 22.25      3.8817      0.86  Q         .         .         .         .
 22.47      3.8975      0.85  Q         .         .         .         .
 22.69      3.9129      0.83  Q         .         .         .         .
 22.92      3.9280      0.81  Q         .         .         .         .
 23.14      3.9427      0.79  Q         .         .         .         .
 23.36      3.9572      0.78  Q         .         .         .         .
 23.59      3.9714      0.76  Q         .         .         .         .
 23.81      3.9854      0.75  Q         .         .         .         .
 24.03      3.9991      0.74  Q         .         .         .         .
 24.26      4.0058      0.00  Q         .         .         .         .
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Drainage K

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                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:





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 Problem Descriptions:



----------------------------------------------------------------------------



    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    6.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.160
    TIME OF CONCENTRATION(MIN.) = 11.17
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.29
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.66

****************************************************************************
  TIME     VOLUME       Q    0.        7.5      15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.18      0.0030      0.42  Q         .         .         .         .
  0.36      0.0095      0.42  Q         .         .         .         .
  0.55      0.0159      0.42  Q         .         .         .         .
  0.73      0.0225      0.43  Q         .         .         .         .
  0.92      0.0290      0.43  Q         .         .         .         .
  1.11      0.0357      0.43  Q         .         .         .         .
  1.29      0.0423      0.44  Q         .         .         .         .
  1.48      0.0491      0.44  Q         .         .         .         .
  1.67      0.0559      0.44  Q         .         .         .         .
  1.85      0.0627      0.45  Q         .         .         .         .
  2.04      0.0696      0.45  Q         .         .         .         .
  2.22      0.0765      0.45  Q         .         .         .         .
  2.41      0.0836      0.46  Q         .         .         .         .
  2.60      0.0906      0.46  Q         .         .         .         .
  2.78      0.0978      0.47  Q         .         .         .         .
  2.97      0.1050      0.47  Q         .         .         .         .
  3.15      0.1122      0.47  Q         .         .         .         .
  3.34      0.1195      0.48  Q         .         .         .         .
  3.53      0.1269      0.48  Q         .         .         .         .
  3.71      0.1344      0.49  Q         .         .         .         .
  3.90      0.1419      0.49  Q         .         .         .         .
  4.09      0.1495      0.50  Q         .         .         .         .
  4.27      0.1572      0.50  Q         .         .         .         .
  4.46      0.1650      0.51  Q         .         .         .         .
  4.64      0.1728      0.51  Q         .         .         .         .
  4.83      0.1807      0.52  Q         .         .         .         .
  5.02      0.1887      0.52  Q         .         .         .         .
  5.20      0.1968      0.53  Q         .         .         .         .
  5.39      0.2049      0.53  Q         .         .         .         .
  5.57      0.2132      0.54  Q         .         .         .         .
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 5.76      0.2215      0.55  Q         .         .         .         .
 5.95      0.2300      0.55  Q         .         .         .         .
 6.13      0.2385      0.56  Q         .         .         .         .
 6.32      0.2471      0.56  Q         .         .         .         .
 6.51      0.2559      0.57  Q         .         .         .         .
 6.69      0.2647      0.58  Q         .         .         .         .
 6.88      0.2737      0.59  Q         .         .         .         .
 7.06      0.2827      0.59  Q         .         .         .         .
 7.25      0.2919      0.60  Q         .         .         .         .
 7.44      0.3012      0.61  Q         .         .         .         .
 7.62      0.3107      0.62  Q         .         .         .         .
 7.81      0.3202      0.62  Q         .         .         .         .
 7.99      0.3299      0.64  Q         .         .         .         .
 8.18      0.3398      0.64  Q         .         .         .         .
 8.37      0.3498      0.66  Q         .         .         .         .
 8.55      0.3599      0.66  Q         .         .         .         .
 8.74      0.3702      0.68  Q         .         .         .         .
 8.93      0.3806      0.68  Q         .         .         .         .
 9.11      0.3913      0.70  Q         .         .         .         .
 9.30      0.4021      0.71  Q         .         .         .         .
 9.48      0.4130      0.72  Q         .         .         .         .
 9.67      0.4242      0.73  Q         .         .         .         .
 9.86      0.4356      0.75  Q         .         .         .         .
10.04      0.4472      0.76  .Q        .         .         .         .
10.23      0.4590      0.78  .Q        .         .         .         .
10.41      0.4711      0.79  .Q        .         .         .         .
10.60      0.4834      0.81  .Q        .         .         .         .
10.79      0.4960      0.82  .Q        .         .         .         .
10.97      0.5088      0.85  .Q        .         .         .         .
11.16      0.5220      0.86  .Q        .         .         .         .
11.35      0.5354      0.89  .Q        .         .         .         .
11.53      0.5492      0.90  .Q        .         .         .         .
11.72      0.5633      0.93  .Q        .         .         .         .
11.90      0.5778      0.95  .Q        .         .         .         .
12.09      0.5932      1.05  .Q        .         .         .         .
12.28      0.6110      1.26  .Q        .         .         .         .
12.46      0.6307      1.31  .Q        .         .         .         .
12.65      0.6510      1.33  .Q        .         .         .         .
12.84      0.6719      1.38  .Q        .         .         .         .
13.02      0.6934      1.41  .Q        .         .         .         .
13.21      0.7157      1.48  .Q        .         .         .         .
13.39      0.7386      1.51  . Q       .         .         .         .
13.58      0.7624      1.59  . Q       .         .         .         .
13.77      0.7872      1.63  . Q       .         .         .         .
13.95      0.8130      1.73  . Q       .         .         .         .
14.14      0.8400      1.78  . Q       .         .         .         .
14.32      0.8685      1.92  . Q       .         .         .         .
14.51      0.8985      1.99  . Q       .         .         .         .
14.70      0.9305      2.17  . Q       .         .         .         .
14.88      0.9647      2.28  .  Q      .         .         .         .
15.07      1.0021      2.58  .  Q      .         .         .         .
15.26      1.0433      2.79  .  Q      .         .         .         .
15.44      1.0893      3.19  .   Q     .         .         .         .
15.63      1.1393      3.31  .   Q     .         .         .         .
15.81      1.2024      4.90  .     Q   .         .         .         .
16.00      1.2929      6.86  .        Q.         .         .         .
16.19      1.5121     21.62  .         .         .       Q .         .
16.37      1.7085      3.92  .    Q    .         .         .         .
16.56      1.7620      3.04  .   Q     .         .         .         .
16.74      1.8039      2.40  .  Q      .         .         .         .
16.93      1.8384      2.07  . Q       .         .         .         .
17.12      1.8686      1.85  . Q       .         .         .         .
17.30      1.8957      1.68  . Q       .         .         .         .
17.49      1.9205      1.55  . Q       .         .         .         .
17.68      1.9435      1.44  .Q        .         .         .         .
17.86      1.9650      1.36  .Q        .         .         .         .
18.05      1.9853      1.28  .Q        .         .         .         .
18.23      2.0027      0.97  .Q        .         .         .         .
18.42      2.0172      0.92  .Q        .         .         .         .
18.61      2.0310      0.87  .Q        .         .         .         .
18.79      2.0441      0.83  .Q        .         .         .         .
18.98      2.0567      0.80  .Q        .         .         .         .
19.16      2.0688      0.77  .Q        .         .         .         .
19.35      2.0804      0.74  Q         .         .         .         .
19.54      2.0916      0.71  Q         .         .         .         .
19.72      2.1024      0.69  Q         .         .         .         .
19.91      2.1128      0.67  Q         .         .         .         .
20.10      2.1230      0.65  Q         .         .         .         .
20.28      2.1328      0.63  Q         .         .         .         .
```

20.47	2.1424	0.61	Q	.	.	.	.
20.65	2.1517	0.60	Q	.	.	.	.
20.84	2.1607	0.58	Q	.	.	.	.
21.03	2.1696	0.57	Q	.	.	.	.
21.21	2.1782	0.55	Q	.	.	.	.
21.40	2.1867	0.54	Q	.	.	.	.
21.58	2.1949	0.53	Q	.	.	.	.
21.77	2.2030	0.52	Q	.	.	.	.
21.96	2.2109	0.51	Q	.	.	.	.
22.14	2.2187	0.50	Q	.	.	.	.
22.33	2.2263	0.49	Q	.	.	.	.
22.52	2.2337	0.48	Q	.	.	.	.
22.70	2.2411	0.47	Q	.	.	.	.
22.89	2.2483	0.46	Q	.	.	.	.
23.07	2.2553	0.46	Q	.	.	.	.
23.26	2.2623	0.45	Q	.	.	.	.
23.45	2.2691	0.44	Q	.	.	.	.
23.63	2.2758	0.43	Q	.	.	.	.
23.82	2.2825	0.43	Q	.	.	.	.
24.01	2.2890	0.42	Q	.	.	.	.
24.19	2.2922	0.00	Q	.	.	.	.

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iii. HC 25-Year Storm Event

Drainage A

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SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

****

Problem Descriptions:

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 349.60
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.150
LOW LOSS FRACTION = 0.310
TIME OF CONCENTRATION(MIN.) = 26.85
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 25
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.40
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.87
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.15
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.94
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.71
24-HOUR POINT RAINFALL VALUE(INCHES) = 4.49

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 86.12
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 44.68

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	135.0	270.0	405.0	540.0
0.34	0.2071	14.85	.Q	.	.	.	.
0.78	0.7590	14.99	.Q	.	.	.	.
1.23	1.3205	15.37	.Q	.	.	.	.
1.68	1.8925	15.57	.Q	.	.	.	.
2.13	2.4759	15.98	.Q	.	.	.	.
2.57	3.0709	16.20	.Q	.	.	.	.
3.02	3.6784	16.66	.Q	.	.	.	.
3.47	4.2990	16.90	.Q	.	.	.	.
3.92	4.9335	17.41	.Q	.	.	.	.
4.36	5.5825	17.69	.Q	.	.	.	.
4.81	6.2472	18.26	.Q	.	.	.	.
5.26	6.9284	18.57	.Q	.	.	.	.
5.71	7.6274	19.23	.Q	.	.	.	.
6.15	8.3452	19.58	.Q	.	.	.	.
6.60	9.0834	20.34	.Q	.	.	.	.
7.05	9.8433	20.75	.Q	.	.	.	.
7.50	10.6270	21.63	.Q	.	.	.	.
7.94	11.4359	22.11	.Q	.	.	.	.
8.39	12.2731	23.16	.Q	.	.	.	.

```
  8.84     13.1403     23.73  .Q        .         .         .         .
  9.29     14.0414     25.00  .Q        .         .         .         .
  9.73     14.9789     25.70  .Q        .         .         .         .
 10.18     15.9584     27.27  . Q       .         .         .         .
 10.63     16.9831     28.15  . Q       .         .         .         .
 11.08     18.0612     30.15  . Q       .         .         .         .
 11.52     19.1977     31.30  . Q       .         .         .         .
 11.97     20.4050     33.99  . Q       .         .         .         .
 12.42     21.7786     40.30  . Q       .         .         .         .
 12.87     23.4708     51.21  .  Q      .         .         .         .
 13.32     25.4105     53.68  .  Q      .         .         .         .
 13.76     27.5108     59.90  .   Q     .         .         .         .
 14.21     29.8004     63.92  .   Q     .         .         .         .
 14.66     32.3547     74.21  .    Q    .         .         .         .
 15.10     35.2522     82.48  .     Q   .         .         .         .
 15.55     38.8080    109.80  .       Q .         .         .         .
 16.00     43.4845    143.09  .         Q         .         .         .
 16.45     56.0379    535.78  .         .         .         .        Q.
 16.90     67.6872     94.20  .     Q   .         .         .         .
 17.34     70.6907     68.23  .    Q    .         .         .         .
 17.79     72.9980     56.54  .   Q     .         .         .         .
 18.24     74.9505     49.05  .  Q      .         .         .         .
 18.68     76.4597     32.57  . Q       .         .         .         .
 19.13     77.6003     29.11  . Q       .         .         .         .
 19.58     78.6278     26.45  .Q        .         .         .         .
 20.03     79.5671     24.35  .Q        .         .         .         .
 20.48     80.4356     22.62  .Q        .         .         .         .
 20.92     81.2456     21.18  .Q        .         .         .         .
 21.37     82.0062     19.95  .Q        .         .         .         .
 21.82     82.7245     18.89  .Q        .         .         .         .
 22.27     83.4062     17.97  .Q        .         .         .         .
 22.71     84.0556     17.15  .Q        .         .         .         .
 23.16     84.6764     16.42  .Q        .         .         .         .
 23.61     85.2717     15.77  .Q        .         .         .         .
 24.06     85.8440     15.18  .Q        .         .         .         .
 24.50     86.1247      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage B

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                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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                           Analysis prepared by:





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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  135.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.070
    LOW LOSS FRACTION = 0.170
    TIME OF CONCENTRATION(MIN.) = 30.94
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    38.91
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    11.64

****************************************************************************
  TIME     VOLUME       Q    0.       50.0     100.0     150.0     200.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.01      0.0000      0.00  Q        .         .         .         .
  0.53      0.1471      6.90  .Q       .         .         .         .
  1.05      0.4449      7.08  .Q       .         .         .         .
  1.56      0.7487      7.18  .Q       .         .         .         .
  2.08      1.0592      7.40  .Q       .         .         .         .
  2.59      1.3769      7.51  .Q       .         .         .         .
  3.11      1.7023      7.76  .Q       .         .         .         .
  3.62      2.0357      7.89  .Q       .         .         .         .
  4.14      2.3779      8.17  .Q       .         .         .         .
  4.66      2.7292      8.32  .Q       .         .         .         .
  5.17      3.0906      8.64  .Q       .         .         .         .
  5.69      3.4625      8.81  .Q       .         .         .         .
  6.20      3.8461      9.19  .Q       .         .         .         .
  6.72      4.2421      9.39  .Q       .         .         .         .
  7.23      4.6519      9.84  .Q       .         .         .         .
  7.75      5.0763     10.08  . Q      .         .         .         .
  8.27      5.5174     10.62  . Q      .         .         .         .
  8.78      5.9763     10.92  . Q      .         .         .         .
  9.30      6.4558     11.58  . Q      .         .         .         .
```

```
  9.81       6.9573     11.96  . Q       .         .         .         .
 10.33       7.4851     12.81  . Q       .         .         .         .
 10.84       8.0414     13.30  . Q       .         .         .         .
 11.36       8.6323     14.44  . Q       .         .         .         .
 11.87       9.2619     15.11  .  Q      .         .         .         .
 12.39      10.0135     20.16  .   Q     .         .         .         .
 12.91      10.9372     23.19  .   Q     .         .         .         .
 13.42      11.9827     25.87  .    Q    .         .         .         .
 13.94      13.1223     27.61  .    Q    .         .         .         .
 14.45      14.3947     32.10  .     Q   .         .         .         .
 14.97      15.8372     35.60  .      Q  .         .         .         .
 15.48      17.6626     50.07  .         Q         .         .         .
 16.00      19.9858     58.96  .         .Q        .         .         .
 16.52      25.4866    199.19  .         .         .         .        Q.
 17.03      30.5973     40.65  .       Q .         .         .         .
 17.55      32.0972     29.74  .    Q    .         .         .         .
 18.06      33.2513     24.42  .   Q     .         .         .         .
 18.58      34.1098     15.87  .  Q      .         .         .         .
 19.09      34.7427     13.84  . Q       .         .         .         .
 19.61      35.3010     12.36  . Q       .         .         .         .
 20.13      35.8039     11.24  . Q       .         .         .         .
 20.64      36.2637     10.34  . Q       .         .         .         .
 21.16      36.6889      9.61  .Q        .         .         .         .
 21.67      37.0853      9.00  .Q        .         .         .         .
 22.19      37.4576      8.48  .Q        .         .         .         .
 22.70      37.8092      8.03  .Q        .         .         .         .
 23.22      38.1429      7.63  .Q        .         .         .         .
 23.73      38.4608      7.29  .Q        .         .         .         .
 24.25      38.7647      6.98  .Q        .         .         .         .
 24.77      38.9133      0.00  Q         .         .         .         .
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Drainage C

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                      SMALL AREA UNIT HYDROGRAPH MODEL
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                           Analysis prepared by:





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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   63.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.200
    LOW LOSS FRACTION = 0.340
    TIME OF CONCENTRATION(MIN.) = 18.31
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    14.98
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     8.82

****************************************************************************
  TIME     VOLUME       Q    0.       32.5      65.0      97.5     130.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.13      0.0000      0.00  Q         .         .         .         .
  0.44      0.0328      2.60  Q         .         .         .         .
  0.74      0.0986      2.62  Q         .         .         .         .
  1.05      0.1652      2.66  Q         .         .         .         .
  1.35      0.2327      2.69  Q         .         .         .         .
  1.66      0.3011      2.73  Q         .         .         .         .
  1.96      0.3703      2.76  Q         .         .         .         .
  2.27      0.4406      2.81  Q         .         .         .         .
  2.57      0.5118      2.84  Q         .         .         .         .
  2.88      0.5840      2.89  Q         .         .         .         .
  3.18      0.6573      2.92  Q         .         .         .         .
  3.49      0.7317      2.98  Q         .         .         .         .
  3.79      0.8072      3.01  Q         .         .         .         .
  4.10      0.8839      3.07  Q         .         .         .         .
  4.40      0.9619      3.11  Q         .         .         .         .
  4.71      1.0411      3.18  Q         .         .         .         .
  5.01      1.1217      3.21  Q         .         .         .         .
  5.32      1.2037      3.29  .Q        .         .         .         .
  5.62      1.2871      3.33  .Q        .         .         .         .
```

```
  5.93      1.3721      3.41  .Q        .         .         .         .
  6.23      1.4587      3.46  .Q        .         .         .         .
  6.54      1.5470      3.55  .Q        .         .         .         .
  6.85      1.6371      3.60  .Q        .         .         .         .
  7.15      1.7290      3.70  .Q        .         .         .         .
  7.46      1.8230      3.75  .Q        .         .         .         .
  7.76      1.9190      3.87  .Q        .         .         .         .
  8.07      2.0172      3.93  .Q        .         .         .         .
  8.37      2.1179      4.05  .Q        .         .         .         .
  8.68      2.2210      4.12  .Q        .         .         .         .
  8.98      2.3268      4.27  .Q        .         .         .         .
  9.29      2.4354      4.35  .Q        .         .         .         .
  9.59      2.5472      4.52  .Q        .         .         .         .
  9.90      2.6622      4.61  .Q        .         .         .         .
 10.20      2.7808      4.80  .Q        .         .         .         .
 10.51      2.9033      4.91  .Q        .         .         .         .
 10.81      3.0300      5.14  .Q        .         .         .         .
 11.12      3.1612      5.27  .Q        .         .         .         .
 11.42      3.2976      5.55  .Q        .         .         .         .
 11.73      3.4395      5.70  .Q        .         .         .         .
 12.03      3.5878      6.05  .Q        .         .         .         .
 12.34      3.7597      7.58  . Q       .         .         .         .
 12.64      3.9656      8.74  . Q       .         .         .         .
 12.95      4.1895      9.01  . Q       .         .         .         .
 13.25      4.4246      9.64  . Q       .         .         .         .
 13.56      4.6722     10.00  .  Q      .         .         .         .
 13.86      4.9353     10.86  .  Q      .         .         .         .
 14.17      5.2159     11.39  .  Q      .         .         .         .
 14.47      5.5178     12.56  .  Q      .         .         .         .
 14.78      5.8452     13.41  .   Q     .         .         .         .
 15.08      6.2133     15.78  .   Q     .         .         .         .
 15.39      6.6336     17.54  .    Q    .         .         .         .
 15.69      7.1157     20.69  .     Q   .         .         .         .
 16.00      7.8009     33.64  .         Q         .         .         .
 16.31      9.7419    120.28  .         .         .         .      Q  .
 16.61     11.5001     19.14  .    Q    .         .         .         .
 16.92     11.9238     14.45  .   Q     .         .         .         .
 17.22     12.2558     11.87  .  Q      .         .         .         .
 17.53     12.5367     10.41  .  Q      .         .         .         .
 17.83     12.7852      9.31  . Q       .         .         .         .
 18.14     13.0097      8.49  . Q       .         .         .         .
 18.44     13.1909      5.87  .Q        .         .         .         .
 18.75     13.3331      5.40  .Q        .         .         .         .
 19.05     13.4645      5.02  .Q        .         .         .         .
 19.36     13.5871      4.70  .Q        .         .         .         .
 19.66     13.7022      4.43  .Q        .         .         .         .
 19.97     13.8110      4.19  .Q        .         .         .         .
 20.27     13.9141      3.99  .Q        .         .         .         .
 20.58     14.0124      3.81  .Q        .         .         .         .
 20.88     14.1064      3.65  .Q        .         .         .         .
 21.19     14.1965      3.50  .Q        .         .         .         .
 21.49     14.2832      3.37  .Q        .         .         .         .
 21.80     14.3666      3.25  .Q        .         .         .         .
 22.10     14.4472      3.14  Q         .         .         .         .
 22.41     14.5252      3.04  Q         .         .         .         .
 22.71     14.6007      2.95  Q         .         .         .         .
 23.02     14.6740      2.86  Q         .         .         .         .
 23.32     14.7453      2.78  Q         .         .         .         .
 23.63     14.8146      2.71  Q         .         .         .         .
 23.93     14.8821      2.64  Q         .         .         .         .
 24.24     14.9479      2.58  Q         .         .         .         .
 24.54     14.9805      0.00  Q         .         .         .         .
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Drainage D

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   14.29
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.140
    LOW LOSS FRACTION = 0.300
    TIME OF CONCENTRATION(MIN.) = 10.60
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     3.56
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.78

****************************************************************************
  TIME     VOLUME       Q    0.        10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.10      0.0000     0.00  Q         .         .         .         .
  0.28      0.0045     0.62  Q         .         .         .         .
  0.45      0.0135     0.62  Q         .         .         .         .
  0.63      0.0226     0.63  Q         .         .         .         .
  0.81      0.0318     0.63  Q         .         .         .         .
  0.98      0.0410     0.64  Q         .         .         .         .
  1.16      0.0503     0.64  Q         .         .         .         .
  1.34      0.0597     0.65  Q         .         .         .         .
  1.51      0.0692     0.65  Q         .         .         .         .
  1.69      0.0787     0.66  Q         .         .         .         .
  1.87      0.0883     0.66  Q         .         .         .         .
  2.04      0.0979     0.67  Q         .         .         .         .
  2.22      0.1077     0.67  Q         .         .         .         .
  2.40      0.1175     0.68  Q         .         .         .         .
  2.57      0.1274     0.68  Q         .         .         .         .
  2.75      0.1374     0.69  Q         .         .         .         .
  2.93      0.1475     0.69  Q         .         .         .         .
  3.10      0.1576     0.70  Q         .         .         .         .
  3.28      0.1678     0.70  Q         .         .         .         .
  3.46      0.1782     0.71  Q         .         .         .         .
  3.63      0.1886     0.72  Q         .         .         .         .
  3.81      0.1991     0.72  Q         .         .         .         .
  3.99      0.2097     0.73  Q         .         .         .         .
  4.16      0.2205     0.74  Q         .         .         .         .
  4.34      0.2313     0.74  Q         .         .         .         .
  4.52      0.2422     0.75  Q         .         .         .         .
  4.69      0.2532     0.76  Q         .         .         .         .
  4.87      0.2643     0.77  Q         .         .         .         .
  5.05      0.2756     0.77  Q         .         .         .         .
  5.22      0.2869     0.78  Q         .         .         .         .
```

```
 5.40      0.2984      0.79  Q         .         .         .         .
 5.58      0.3100      0.80  Q         .         .         .         .
 5.75      0.3217      0.81  Q         .         .         .         .
 5.93      0.3336      0.82  Q         .         .         .         .
 6.11      0.3456      0.82  Q         .         .         .         .
 6.28      0.3577      0.84  Q         .         .         .         .
 6.46      0.3699      0.84  Q         .         .         .         .
 6.64      0.3823      0.86  Q         .         .         .         .
 6.81      0.3949      0.86  Q         .         .         .         .
 6.99      0.4076      0.88  Q         .         .         .         .
 7.17      0.4204      0.88  Q         .         .         .         .
 7.34      0.4334      0.90  Q         .         .         .         .
 7.52      0.4466      0.91  Q         .         .         .         .
 7.70      0.4599      0.92  Q         .         .         .         .
 7.87      0.4735      0.93  Q         .         .         .         .
 8.05      0.4872      0.95  Q         .         .         .         .
 8.23      0.5011      0.96  Q         .         .         .         .
 8.40      0.5152      0.98  Q         .         .         .         .
 8.58      0.5295      0.99  Q         .         .         .         .
 8.76      0.5440      1.00  .Q        .         .         .         .
 8.93      0.5588      1.02  .Q        .         .         .         .
 9.11      0.5738      1.04  .Q        .         .         .         .
 9.29      0.5890      1.05  .Q        .         .         .         .
 9.46      0.6045      1.07  .Q        .         .         .         .
 9.64      0.6202      1.08  .Q        .         .         .         .
 9.82      0.6362      1.11  .Q        .         .         .         .
 9.99      0.6525      1.12  .Q        .         .         .         .
10.17      0.6691      1.15  .Q        .         .         .         .
10.35      0.6860      1.17  .Q        .         .         .         .
10.52      0.7033      1.20  .Q        .         .         .         .
10.70      0.7209      1.21  .Q        .         .         .         .
10.88      0.7388      1.25  .Q        .         .         .         .
11.05      0.7572      1.27  .Q        .         .         .         .
11.23      0.7759      1.30  .Q        .         .         .         .
11.41      0.7951      1.32  .Q        .         .         .         .
11.58      0.8147      1.37  .Q        .         .         .         .
11.76      0.8349      1.39  .Q        .         .         .         .
11.94      0.8555      1.44  .Q        .         .         .         .
12.11      0.8768      1.47  .Q        .         .         .         .
12.29      0.9021      2.01  . Q       .         .         .         .
12.47      0.9316      2.04  . Q       .         .         .         .
12.64      0.9619      2.11  . Q       .         .         .         .
12.82      0.9930      2.15  . Q       .         .         .         .
13.00      1.0249      2.23  . Q       .         .         .         .
13.17      1.0578      2.27  . Q       .         .         .         .
13.35      1.0918      2.37  . Q       .         .         .         .
13.53      1.1268      2.43  . Q       .         .         .         .
13.70      1.1631      2.55  . Q       .         .         .         .
13.88      1.2008      2.61  . Q       .         .         .         .
14.06      1.2400      2.76  . Q       .         .         .         .
14.23      1.2808      2.81  . Q       .         .         .         .
14.41      1.3233      3.01  .  Q      .         .         .         .
14.59      1.3681      3.13  .  Q      .         .         .         .
14.76      1.4157      3.40  .  Q      .         .         .         .
14.94      1.4666      3.57  .  Q      .         .         .         .
15.12      1.5217      3.98  .  Q      .         .         .         .
15.29      1.5820      4.28  .   Q     .         .         .         .
15.47      1.6471      4.63  .   Q     .         .         .         .
15.65      1.7177      5.04  .    Q    .         .         .         .
15.82      1.8169      8.56  .       Q .         .         .         .
16.00      1.9695     12.34  .         . Q       .         .         .
16.18      2.3409     38.54  .         .         .         .       Q .
16.35      2.6672      6.16  .     Q   .         .         .         .
16.53      2.7469      4.75  .   Q     .         .         .         .
16.71      2.8090      3.76  .  Q      .         .         .         .
16.88      2.8602      3.25  .  Q      .         .         .         .
17.06      2.9052      2.91  . Q       .         .         .         .
17.24      2.9460      2.69  . Q       .         .         .         .
17.41      2.9838      2.48  . Q       .         .         .         .
17.59      3.0189      2.32  . Q       .         .         .         .
17.77      3.0518      2.19  . Q       .         .         .         .
17.94      3.0829      2.07  . Q       .         .         .         .
18.12      3.1123      1.96  .Q        .         .         .         .
18.30      3.1369      1.41  .Q        .         .         .         .
18.47      3.1571      1.35  .Q        .         .         .         .
18.65      3.1763      1.28  .Q        .         .         .         .
18.83      3.1946      1.23  .Q        .         .         .         .
19.00      3.2122      1.18  .Q        .         .         .         .
19.18      3.2292      1.14  .Q        .         .         .         .
```

19.36	3.2455	1.10	.Q	.	.	.	.
19.53	3.2612	1.06	.Q	.	.	.	.
19.71	3.2764	1.03	.Q	.	.	.	.
19.89	3.2912	0.99	Q	.	.	.	.
20.06	3.3055	0.97	Q	.	.	.	.
20.24	3.3194	0.94	Q	.	.	.	.
20.42	3.3329	0.91	Q	.	.	.	.
20.59	3.3461	0.89	Q	.	.	.	.
20.77	3.3590	0.87	Q	.	.	.	.
20.95	3.3715	0.85	Q	.	.	.	.
21.12	3.3838	0.83	Q	.	.	.	.
21.30	3.3957	0.81	Q	.	.	.	.
21.48	3.4075	0.79	Q	.	.	.	.
21.65	3.4189	0.78	Q	.	.	.	.
21.83	3.4302	0.76	Q	.	.	.	.
22.01	3.4412	0.75	Q	.	.	.	.
22.18	3.4520	0.73	Q	.	.	.	.
22.36	3.4626	0.72	Q	.	.	.	.
22.54	3.4731	0.71	Q	.	.	.	.
22.71	3.4833	0.70	Q	.	.	.	.
22.89	3.4934	0.68	Q	.	.	.	.
23.07	3.5033	0.67	Q	.	.	.	.
23.24	3.5130	0.66	Q	.	.	.	.
23.42	3.5226	0.65	Q	.	.	.	.
23.60	3.5321	0.64	Q	.	.	.	.
23.77	3.5414	0.63	Q	.	.	.	.
23.95	3.5505	0.62	Q	.	.	.	.
24.13	3.5596	0.61	Q	.	.	.	.
24.30	3.5641	0.00	Q	.	.	.	.

Drainage E

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   97.20
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.170
    TIME OF CONCENTRATION(MIN.) = 27.94
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    28.13
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     8.23

****************************************************************************
  TIME     VOLUME       Q    0.       40.0      80.0     120.0     160.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.17      0.0000      0.00  Q         .         .         .         .
  0.63      0.0964      5.01  .Q        .         .         .         .
  1.10      0.2906      5.08  .Q        .         .         .         .
  1.56      0.4885      5.21  .Q        .         .         .         .
  2.03      0.6904      5.28  .Q        .         .         .         .
  2.50      0.8966      5.43  .Q        .         .         .         .
  2.96      1.1071      5.51  .Q        .         .         .         .
  3.43      1.3224      5.68  .Q        .         .         .         .
  3.89      1.5427      5.77  .Q        .         .         .         .
  4.36      1.7682      5.96  .Q        .         .         .         .
  4.82      1.9994      6.06  .Q        .         .         .         .
  5.29      2.2366      6.27  .Q        .         .         .         .
  5.76      2.4801      6.39  .Q        .         .         .         .
  6.22      2.7306      6.63  .Q        .         .         .         .
  6.69      2.9885      6.77  .Q        .         .         .         .
  7.15      3.2544      7.05  .Q        .         .         .         .
  7.62      3.5289      7.21  .Q        .         .         .         .
  8.08      3.8130      7.55  .Q        .         .         .         .
  8.55      4.1072      7.74  .Q        .         .         .         .
  9.01      4.4130      8.15  . Q       .         .         .         .
  9.48      4.7311      8.38  . Q       .         .         .         .
  9.95      5.0635      8.89  . Q       .         .         .         .
 10.41      5.4112      9.18  . Q       .         .         .         .
 10.88      5.7770      9.83  . Q       .         .         .         .
 11.34      6.1627     10.21  . Q       .         .         .         .
 11.81      6.5724     11.08  . Q       .         .         .         .
 12.27      7.0088     11.60  . Q       .         .         .         .
 12.74      7.5548     16.78  .   Q     .         .         .         .
 13.21      8.2161     17.59  .   Q     .         .         .         .
 13.67      8.9322     19.62  .   Q     .         .         .         .
```

```
 14.14      9.7127     20.94  .    Q    .         .         .         .
 14.60     10.5834     24.31  .     Q   .         .         .         .
 15.07     11.5765     27.30  .     Q   .         .         .         .
 15.53     12.8353     38.12  .        Q.         .         .         .
 16.00     14.4581     46.22  .         .Q        .         .         .
 16.47     18.2959    153.22  .         .         .         .       Q .
 16.93     21.8586     31.92  .      Q  .         .         .         .
 17.40     22.9044     22.43  .    Q    .         .         .         .
 17.86     23.6924     18.52  .   Q     .         .         .         .
 18.33     24.3494     15.62  .  Q      .         .         .         .
 18.79     24.8545     10.62  . Q       .         .         .         .
 19.26     25.2415      9.49  . Q       .         .         .         .
 19.73     25.5901      8.63  . Q       .         .         .         .
 20.19     25.9089      7.94  .Q        .         .         .         .
 20.66     26.2036      7.38  .Q        .         .         .         .
 21.12     26.4784      6.91  .Q        .         .         .         .
 21.59     26.7365      6.51  .Q        .         .         .         .
 22.05     26.9802      6.16  .Q        .         .         .         .
 22.52     27.2115      5.86  .Q        .         .         .         .
 22.98     27.4319      5.59  .Q        .         .         .         .
 23.45     27.6426      5.36  .Q        .         .         .         .
 23.92     27.8446      5.14  .Q        .         .         .         .
 24.38     28.0390      4.96  .Q        .         .         .         .
 24.85     28.1346      0.00  Q         .         .         .         .
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Drainage F

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******************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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Ver. 9.0 Release Date: 01/01/2003 License ID 1355

Analysis prepared by:

Fuscoe Engineering
16795 Von Karmon #100, Irvine, CA 92606

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Problem Descriptions:

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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    5.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  7.97
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.57
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.60

******************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.06      0.0000      0.00  Q          .         .         .         .
  0.19      0.0015      0.27  Q          .         .         .         .
  0.33      0.0045      0.27  Q          .         .         .         .
  0.46      0.0075      0.27  Q          .         .         .         .
  0.59      0.0105      0.28  Q          .         .         .         .
  0.72      0.0135      0.28  Q          .         .         .         .
  0.86      0.0166      0.28  Q          .         .         .         .
  0.99      0.0196      0.28  Q          .         .         .         .
  1.12      0.0227      0.28  Q          .         .         .         .
  1.26      0.0258      0.28  Q          .         .         .         .
  1.39      0.0290      0.28  Q          .         .         .         .
  1.52      0.0321      0.29  Q          .         .         .         .
  1.65      0.0352      0.29  Q          .         .         .         .
  1.79      0.0384      0.29  Q          .         .         .         .
  1.92      0.0416      0.29  Q          .         .         .         .
  2.05      0.0448      0.29  Q          .         .         .         .
  2.19      0.0481      0.29  Q          .         .         .         .
  2.32      0.0513      0.30  Q          .         .         .         .
  2.45      0.0546      0.30  Q          .         .         .         .
  2.58      0.0579      0.30  Q          .         .         .         .
  2.72      0.0612      0.30  Q          .         .         .         .
  2.85      0.0645      0.30  Q          .         .         .         .
  2.98      0.0679      0.31  Q          .         .         .         .
  3.12      0.0712      0.31  Q          .         .         .         .
  3.25      0.0746      0.31  Q          .         .         .         .
  3.38      0.0781      0.31  Q          .         .         .         .
  3.51      0.0815      0.31  Q          .         .         .         .
  3.65      0.0850      0.32  Q          .         .         .         .
  3.78      0.0885      0.32  Q          .         .         .         .
  3.91      0.0920      0.32  Q          .         .         .         .
```

4.05	0.0955	0.32	Q	.	.	.	.
4.18	0.0991	0.33	Q	.	.	.	.
4.31	0.1027	0.33	Q	.	.	.	.
4.44	0.1063	0.33	Q	.	.	.	.
4.58	0.1099	0.33	Q	.	.	.	.
4.71	0.1136	0.34	Q	.	.	.	.
4.84	0.1173	0.34	Q	.	.	.	.
4.97	0.1210	0.34	Q	.	.	.	.
5.11	0.1248	0.34	Q	.	.	.	.
5.24	0.1285	0.35	Q	.	.	.	.
5.37	0.1324	0.35	Q	.	.	.	.
5.51	0.1362	0.35	Q	.	.	.	.
5.64	0.1401	0.35	Q	.	.	.	.
5.77	0.1440	0.36	Q	.	.	.	.
5.90	0.1479	0.36	Q	.	.	.	.
6.04	0.1519	0.36	Q	.	.	.	.
6.17	0.1559	0.37	Q	.	.	.	.
6.30	0.1599	0.37	Q	.	.	.	.
6.44	0.1640	0.37	Q	.	.	.	.
6.57	0.1681	0.38	Q	.	.	.	.
6.70	0.1722	0.38	Q	.	.	.	.
6.83	0.1764	0.38	Q	.	.	.	.
6.97	0.1806	0.39	Q	.	.	.	.
7.10	0.1849	0.39	Q	.	.	.	.
7.23	0.1892	0.39	Q	.	.	.	.
7.37	0.1935	0.40	Q	.	.	.	.
7.50	0.1979	0.40	Q	.	.	.	.
7.63	0.2023	0.41	Q	.	.	.	.
7.76	0.2068	0.41	Q	.	.	.	.
7.90	0.2113	0.41	Q	.	.	.	.
8.03	0.2158	0.42	Q	.	.	.	.
8.16	0.2204	0.42	Q	.	.	.	.
8.30	0.2251	0.43	Q	.	.	.	.
8.43	0.2298	0.43	Q	.	.	.	.
8.56	0.2345	0.43	Q	.	.	.	.
8.69	0.2394	0.44	Q	.	.	.	.
8.83	0.2442	0.44	Q	.	.	.	.
8.96	0.2491	0.45	Q	.	.	.	.
9.09	0.2541	0.46	Q	.	.	.	.
9.23	0.2592	0.46	Q	.	.	.	.
9.36	0.2643	0.47	Q	.	.	.	.
9.49	0.2694	0.47	Q	.	.	.	.
9.62	0.2747	0.48	Q	.	.	.	.
9.76	0.2800	0.49	Q	.	.	.	.
9.89	0.2854	0.49	Q	.	.	.	.
10.02	0.2908	0.50	.Q	.	.	.	.
10.16	0.2963	0.51	.Q	.	.	.	.
10.29	0.3019	0.52	.Q	.	.	.	.
10.42	0.3076	0.52	.Q	.	.	.	.
10.55	0.3134	0.53	.Q	.	.	.	.
10.69	0.3192	0.54	.Q	.	.	.	.
10.82	0.3252	0.55	.Q	.	.	.	.
10.95	0.3312	0.55	.Q	.	.	.	.
11.09	0.3374	0.57	.Q	.	.	.	.
11.22	0.3436	0.57	.Q	.	.	.	.
11.35	0.3500	0.59	.Q	.	.	.	.
11.48	0.3565	0.59	.Q	.	.	.	.
11.62	0.3631	0.61	.Q	.	.	.	.
11.75	0.3698	0.62	.Q	.	.	.	.
11.88	0.3766	0.63	.Q	.	.	.	.
12.02	0.3836	0.64	.Q	.	.	.	.
12.15	0.3919	0.87	.Q	.	.	.	.
12.28	0.4015	0.88	.Q	.	.	.	.
12.41	0.4113	0.90	.Q	.	.	.	.
12.55	0.4213	0.91	.Q	.	.	.	.
12.68	0.4315	0.94	.Q	.	.	.	.
12.81	0.4418	0.95	.Q	.	.	.	.
12.94	0.4524	0.98	.Q	.	.	.	.
13.08	0.4633	0.99	.Q	.	.	.	.
13.21	0.4743	1.02	. Q	.	.	.	.
13.34	0.4857	1.04	. Q	.	.	.	.
13.48	0.4973	1.08	. Q	.	.	.	.
13.61	0.5092	1.10	. Q	.	.	.	.
13.74	0.5215	1.14	. Q	.	.	.	.
13.87	0.5341	1.16	. Q	.	.	.	.
14.01	0.5472	1.21	. Q	.	.	.	.
14.14	0.5606	1.23	. Q	.	.	.	.
14.27	0.5744	1.28	. Q	.	.	.	.
14.41	0.5887	1.32	. Q	.	.	.	.

```
 14.54      0.6037      1.42  . Q       .         .         .         .
 14.67      0.6196      1.48  . Q       .         .         .         .
 14.80      0.6365      1.61  .  Q      .         .         .         .
 14.94      0.6546      1.69  .  Q      .         .         .         .
 15.07      0.6742      1.87  .  Q      .         .         .         .
 15.20      0.6953      1.98  .  Q      .         .         .         .
 15.34      0.7186      2.26  .   Q     .         .         .         .
 15.47      0.7432      2.21  .   Q     .         .         .         .
 15.60      0.7691      2.50  .    Q    .         .         .         .
 15.73      0.7986      2.88  .    Q    .         .         .         .
 15.87      0.8395      4.58  .        Q.         .         .         .
 16.00      0.8994      6.33  .         . Q       .         .         .
 16.13      1.0375     18.82  .         .         .         .      Q  .
 16.27      1.1607      3.63  .      Q  .         .         .         .
 16.40      1.1929      2.22  .   Q     .         .         .         .
 16.53      1.2167      2.11  .   Q     .         .         .         .
 16.66      1.2380      1.77  .  Q      .         .         .         .
 16.80      1.2562      1.54  .  Q      .         .         .         .
 16.93      1.2721      1.37  . Q       .         .         .         .
 17.06      1.2865      1.25  . Q       .         .         .         .
 17.20      1.2999      1.19  . Q       .         .         .         .
 17.33      1.3126      1.12  . Q       .         .         .         .
 17.46      1.3245      1.06  . Q       .         .         .         .
 17.59      1.3359      1.01  . Q       .         .         .         .
 17.73      1.3467      0.96  .Q        .         .         .         .
 17.86      1.3571      0.93  .Q        .         .         .         .
 17.99      1.3670      0.89  .Q        .         .         .         .
 18.13      1.3757      0.69  .Q        .         .         .         .
 18.26      1.3829      0.62  .Q        .         .         .         .
 18.39      1.3896      0.60  .Q        .         .         .         .
 18.52      1.3961      0.58  .Q        .         .         .         .
 18.66      1.4023      0.56  .Q        .         .         .         .
 18.79      1.4084      0.54  .Q        .         .         .         .
 18.92      1.4142      0.53  .Q        .         .         .         .
 19.06      1.4199      0.51  .Q        .         .         .         .
 19.19      1.4255      0.50  Q         .         .         .         .
 19.32      1.4308      0.48  Q         .         .         .         .
 19.45      1.4361      0.47  Q         .         .         .         .
 19.59      1.4412      0.46  Q         .         .         .         .
 19.72      1.4461      0.45  Q         .         .         .         .
 19.85      1.4510      0.44  Q         .         .         .         .
 19.98      1.4558      0.43  Q         .         .         .         .
 20.12      1.4604      0.42  Q         .         .         .         .
 20.25      1.4650      0.41  Q         .         .         .         .
 20.38      1.4695      0.40  Q         .         .         .         .
 20.52      1.4738      0.39  Q         .         .         .         .
 20.65      1.4781      0.39  Q         .         .         .         .
 20.78      1.4823      0.38  Q         .         .         .         .
 20.91      1.4865      0.37  Q         .         .         .         .
 21.05      1.4906      0.37  Q         .         .         .         .
 21.18      1.4946      0.36  Q         .         .         .         .
 21.31      1.4985      0.36  Q         .         .         .         .
 21.45      1.5024      0.35  Q         .         .         .         .
 21.58      1.5062      0.34  Q         .         .         .         .
 21.71      1.5099      0.34  Q         .         .         .         .
 21.84      1.5136      0.33  Q         .         .         .         .
 21.98      1.5173      0.33  Q         .         .         .         .
 22.11      1.5208      0.32  Q         .         .         .         .
 22.24      1.5244      0.32  Q         .         .         .         .
 22.38      1.5279      0.32  Q         .         .         .         .
 22.51      1.5313      0.31  Q         .         .         .         .
 22.64      1.5347      0.31  Q         .         .         .         .
 22.77      1.5381      0.30  Q         .         .         .         .
 22.91      1.5414      0.30  Q         .         .         .         .
 23.04      1.5447      0.30  Q         .         .         .         .
 23.17      1.5479      0.29  Q         .         .         .         .
 23.31      1.5511      0.29  Q         .         .         .         .
 23.44      1.5542      0.29  Q         .         .         .         .
 23.57      1.5574      0.28  Q         .         .         .         .
 23.70      1.5604      0.28  Q         .         .         .         .
 23.84      1.5635      0.28  Q         .         .         .         .
 23.97      1.5665      0.27  Q         .         .         .         .
 24.10      1.5695      0.27  Q         .         .         .         .
 24.24      1.5710      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage G

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                          Analysis prepared by:

                            Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


**************************************************************************
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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  8.11
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.49
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.19

**************************************************************************
  TIME     VOLUME      Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)     (CFS)
--------------------------------------------------------------------------
  0.05      0.0000     0.00  Q         .         .         .         .
  0.19      0.0005     0.08  Q         .         .         .         .
  0.32      0.0014     0.08  Q         .         .         .         .
  0.46      0.0024     0.09  Q         .         .         .         .
  0.59      0.0033     0.09  Q         .         .         .         .
  0.73      0.0043     0.09  Q         .         .         .         .
  0.86      0.0052     0.09  Q         .         .         .         .
  1.00      0.0062     0.09  Q         .         .         .         .
  1.13      0.0072     0.09  Q         .         .         .         .
  1.27      0.0082     0.09  Q         .         .         .         .
  1.40      0.0091     0.09  Q         .         .         .         .
  1.54      0.0101     0.09  Q         .         .         .         .
  1.67      0.0111     0.09  Q         .         .         .         .
  1.81      0.0121     0.09  Q         .         .         .         .
  1.94      0.0131     0.09  Q         .         .         .         .
  2.08      0.0142     0.09  Q         .         .         .         .
  2.21      0.0152     0.09  Q         .         .         .         .
  2.35      0.0162     0.09  Q         .         .         .         .
  2.48      0.0172     0.09  Q         .         .         .         .
  2.62      0.0183     0.09  Q         .         .         .         .
  2.75      0.0193     0.09  Q         .         .         .         .
  2.89      0.0204     0.09  Q         .         .         .         .
  3.02      0.0214     0.10  Q         .         .         .         .
  3.16      0.0225     0.10  Q         .         .         .         .
  3.29      0.0236     0.10  Q         .         .         .         .
  3.43      0.0247     0.10  Q         .         .         .         .
  3.56      0.0258     0.10  Q         .         .         .         .
  3.70      0.0269     0.10  Q         .         .         .         .
  3.84      0.0280     0.10  Q         .         .         .         .
  3.97      0.0291     0.10  Q         .         .         .         .
```

4.11	0.0302	0.10	Q	.	.	.	.
4.24	0.0313	0.10	Q	.	.	.	.
4.38	0.0325	0.10	Q	.	.	.	.
4.51	0.0336	0.10	Q	.	.	.	.
4.65	0.0348	0.10	Q	.	.	.	.
4.78	0.0359	0.10	Q	.	.	.	.
4.92	0.0371	0.11	Q	.	.	.	.
5.05	0.0383	0.11	Q	.	.	.	.
5.19	0.0395	0.11	Q	.	.	.	.
5.32	0.0407	0.11	Q	.	.	.	.
5.46	0.0419	0.11	Q	.	.	.	.
5.59	0.0431	0.11	Q	.	.	.	.
5.73	0.0443	0.11	Q	.	.	.	.
5.86	0.0456	0.11	Q	.	.	.	.
6.00	0.0468	0.11	Q	.	.	.	.
6.13	0.0481	0.11	Q	.	.	.	.
6.27	0.0493	0.11	Q	.	.	.	.
6.40	0.0506	0.12	Q	.	.	.	.
6.54	0.0519	0.12	Q	.	.	.	.
6.67	0.0532	0.12	Q	.	.	.	.
6.81	0.0545	0.12	Q	.	.	.	.
6.94	0.0559	0.12	Q	.	.	.	.
7.08	0.0572	0.12	Q	.	.	.	.
7.21	0.0586	0.12	Q	.	.	.	.
7.35	0.0599	0.12	Q	.	.	.	.
7.48	0.0613	0.12	Q	.	.	.	.
7.62	0.0627	0.13	Q	.	.	.	.
7.75	0.0641	0.13	Q	.	.	.	.
7.89	0.0655	0.13	Q	.	.	.	.
8.03	0.0670	0.13	Q	.	.	.	.
8.16	0.0684	0.13	Q	.	.	.	.
8.30	0.0699	0.13	Q	.	.	.	.
8.43	0.0714	0.13	Q	.	.	.	.
8.57	0.0729	0.14	Q	.	.	.	.
8.70	0.0744	0.14	Q	.	.	.	.
8.84	0.0759	0.14	Q	.	.	.	.
8.97	0.0775	0.14	Q	.	.	.	.
9.11	0.0791	0.14	Q	.	.	.	.
9.24	0.0807	0.14	Q	.	.	.	.
9.38	0.0823	0.15	Q	.	.	.	.
9.51	0.0839	0.15	Q	.	.	.	.
9.65	0.0856	0.15	Q	.	.	.	.
9.78	0.0873	0.15	Q	.	.	.	.
9.92	0.0890	0.15	Q	.	.	.	.
10.05	0.0907	0.16	Q	.	.	.	.
10.19	0.0924	0.16	Q	.	.	.	.
10.32	0.0942	0.16	Q	.	.	.	.
10.46	0.0960	0.16	Q	.	.	.	.
10.59	0.0978	0.16	Q	.	.	.	.
10.73	0.0997	0.17	Q	.	.	.	.
10.86	0.1016	0.17	Q	.	.	.	.
11.00	0.1035	0.17	Q	.	.	.	.
11.13	0.1055	0.18	Q	.	.	.	.
11.27	0.1074	0.18	Q	.	.	.	.
11.40	0.1095	0.18	Q	.	.	.	.
11.54	0.1115	0.19	Q	.	.	.	.
11.67	0.1136	0.19	Q	.	.	.	.
11.81	0.1158	0.19	Q	.	.	.	.
11.95	0.1179	0.20	Q	.	.	.	.
12.08	0.1203	0.23	Q	.	.	.	.
12.22	0.1231	0.27	.Q	.	.	.	.
12.35	0.1262	0.28	.Q	.	.	.	.
12.49	0.1293	0.28	.Q	.	.	.	.
12.62	0.1325	0.29	.Q	.	.	.	.
12.76	0.1357	0.29	.Q	.	.	.	.
12.89	0.1390	0.30	.Q	.	.	.	.
13.03	0.1424	0.31	.Q	.	.	.	.
13.16	0.1459	0.32	.Q	.	.	.	.
13.30	0.1494	0.32	.Q	.	.	.	.
13.43	0.1531	0.33	.Q	.	.	.	.
13.57	0.1568	0.34	.Q	.	.	.	.
13.70	0.1607	0.35	.Q	.	.	.	.
13.84	0.1646	0.36	.Q	.	.	.	.
13.97	0.1687	0.37	.Q	.	.	.	.
14.11	0.1729	0.38	.Q	.	.	.	.
14.24	0.1772	0.40	.Q	.	.	.	.
14.38	0.1817	0.41	.Q	.	.	.	.
14.51	0.1864	0.44	.Q	.	.	.	.
14.65	0.1914	0.45	.Q	.	.	.	.

```
 14.78      0.1966      0.49  .Q        .         .         .         .
 14.92      0.2023      0.52  . Q       .         .         .         .
 15.05      0.2084      0.57  . Q       .         .         .         .
 15.19      0.2150      0.61  . Q       .         .         .         .
 15.32      0.2223      0.70  . Q       .         .         .         .
 15.46      0.2301      0.70  . Q       .         .         .         .
 15.59      0.2382      0.77  .  Q      .         .         .         .
 15.73      0.2474      0.88  .  Q      .         .         .         .
 15.86      0.2602      1.41  .    Q    .         .         .         .
 16.00      0.2789      1.94  .      Q  .         .         .         .
 16.14      0.3221      5.78  .         .         .  Q      .         .
 16.27      0.3606      1.11  .   Q     .         .         .         .
 16.41      0.3706      0.68  . Q       .         .         .         .
 16.54      0.3780      0.65  . Q       .         .         .         .
 16.68      0.3847      0.54  . Q       .         .         .         .
 16.81      0.3903      0.47  .Q        .         .         .         .
 16.95      0.3953      0.42  .Q        .         .         .         .
 17.08      0.3998      0.39  .Q        .         .         .         .
 17.22      0.4040      0.36  .Q        .         .         .         .
 17.35      0.4080      0.34  .Q        .         .         .         .
 17.49      0.4117      0.33  .Q        .         .         .         .
 17.62      0.4153      0.31  .Q        .         .         .         .
 17.76      0.4186      0.30  .Q        .         .         .         .
 17.89      0.4219      0.28  .Q        .         .         .         .
 18.03      0.4250      0.27  .Q        .         .         .         .
 18.16      0.4277      0.20  Q         .         .         .         .
 18.30      0.4298      0.19  Q         .         .         .         .
 18.43      0.4319      0.18  Q         .         .         .         .
 18.57      0.4340      0.18  Q         .         .         .         .
 18.70      0.4359      0.17  Q         .         .         .         .
 18.84      0.4378      0.17  Q         .         .         .         .
 18.97      0.4396      0.16  Q         .         .         .         .
 19.11      0.4414      0.16  Q         .         .         .         .
 19.24      0.4431      0.15  Q         .         .         .         .
 19.38      0.4448      0.15  Q         .         .         .         .
 19.51      0.4465      0.14  Q         .         .         .         .
 19.65      0.4480      0.14  Q         .         .         .         .
 19.78      0.4496      0.14  Q         .         .         .         .
 19.92      0.4511      0.13  Q         .         .         .         .
 20.06      0.4526      0.13  Q         .         .         .         .
 20.19      0.4541      0.13  Q         .         .         .         .
 20.33      0.4555      0.13  Q         .         .         .         .
 20.46      0.4569      0.12  Q         .         .         .         .
 20.60      0.4583      0.12  Q         .         .         .         .
 20.73      0.4596      0.12  Q         .         .         .         .
 20.87      0.4609      0.12  Q         .         .         .         .
 21.00      0.4622      0.11  Q         .         .         .         .
 21.14      0.4635      0.11  Q         .         .         .         .
 21.27      0.4647      0.11  Q         .         .         .         .
 21.41      0.4660      0.11  Q         .         .         .         .
 21.54      0.4672      0.11  Q         .         .         .         .
 21.68      0.4684      0.11  Q         .         .         .         .
 21.81      0.4695      0.10  Q         .         .         .         .
 21.95      0.4707      0.10  Q         .         .         .         .
 22.08      0.4718      0.10  Q         .         .         .         .
 22.22      0.4729      0.10  Q         .         .         .         .
 22.35      0.4740      0.10  Q         .         .         .         .
 22.49      0.4751      0.10  Q         .         .         .         .
 22.62      0.4762      0.10  Q         .         .         .         .
 22.76      0.4773      0.09  Q         .         .         .         .
 22.89      0.4783      0.09  Q         .         .         .         .
 23.03      0.4793      0.09  Q         .         .         .         .
 23.16      0.4804      0.09  Q         .         .         .         .
 23.30      0.4814      0.09  Q         .         .         .         .
 23.43      0.4824      0.09  Q         .         .         .         .
 23.57      0.4834      0.09  Q         .         .         .         .
 23.70      0.4843      0.09  Q         .         .         .         .
 23.84      0.4853      0.09  Q         .         .         .         .
 23.97      0.4863      0.08  Q         .         .         .         .
 24.11      0.4872      0.08  Q         .         .         .         .
 24.25      0.4877      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
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Drainage H

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          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                         Analysis prepared by:

                           Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


****************************************************************************
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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    7.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  8.31
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.90
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.72

****************************************************************************
  TIME     VOLUME       Q    0.         7.5      15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.07      0.0010      0.33  Q         .         .         .         .
  0.21      0.0047      0.33  Q         .         .         .         .
  0.35      0.0085      0.33  Q         .         .         .         .
  0.49      0.0123      0.33  Q         .         .         .         .
  0.63      0.0161      0.33  Q         .         .         .         .
  0.76      0.0199      0.33  Q         .         .         .         .
  0.90      0.0237      0.34  Q         .         .         .         .
  1.04      0.0276      0.34  Q         .         .         .         .
  1.18      0.0315      0.34  Q         .         .         .         .
  1.32      0.0354      0.34  Q         .         .         .         .
  1.46      0.0393      0.35  Q         .         .         .         .
  1.60      0.0433      0.35  Q         .         .         .         .
  1.73      0.0473      0.35  Q         .         .         .         .
  1.87      0.0513      0.35  Q         .         .         .         .
  2.01      0.0553      0.35  Q         .         .         .         .
  2.15      0.0594      0.36  Q         .         .         .         .
  2.29      0.0635      0.36  Q         .         .         .         .
  2.43      0.0676      0.36  Q         .         .         .         .
  2.57      0.0717      0.36  Q         .         .         .         .
  2.70      0.0759      0.36  Q         .         .         .         .
  2.84      0.0801      0.37  Q         .         .         .         .
  2.98      0.0843      0.37  Q         .         .         .         .
  3.12      0.0885      0.37  Q         .         .         .         .
  3.26      0.0928      0.37  Q         .         .         .         .
  3.40      0.0971      0.38  Q         .         .         .         .
  3.53      0.1015      0.38  Q         .         .         .         .
  3.67      0.1058      0.38  Q         .         .         .         .
  3.81      0.1102      0.39  Q         .         .         .         .
  3.95      0.1146      0.39  Q         .         .         .         .
  4.09      0.1191      0.39  Q         .         .         .         .
```

4.23	0.1236	0.39	Q	.	.	.	.
4.37	0.1281	0.40	Q	.	.	.	.
4.50	0.1327	0.40	Q	.	.	.	.
4.64	0.1373	0.40	Q	.	.	.	.
4.78	0.1419	0.41	Q	.	.	.	.
4.92	0.1466	0.41	Q	.	.	.	.
5.06	0.1513	0.41	Q	.	.	.	.
5.20	0.1560	0.42	Q	.	.	.	.
5.34	0.1608	0.42	Q	.	.	.	.
5.47	0.1656	0.42	Q	.	.	.	.
5.61	0.1705	0.43	Q	.	.	.	.
5.75	0.1754	0.43	Q	.	.	.	.
5.89	0.1803	0.43	Q	.	.	.	.
6.03	0.1853	0.44	Q	.	.	.	.
6.17	0.1904	0.44	Q	.	.	.	.
6.30	0.1954	0.44	Q	.	.	.	.
6.44	0.2005	0.45	Q	.	.	.	.
6.58	0.2057	0.45	Q	.	.	.	.
6.72	0.2109	0.46	Q	.	.	.	.
6.86	0.2162	0.46	Q	.	.	.	.
7.00	0.2215	0.47	Q	.	.	.	.
7.14	0.2269	0.47	Q	.	.	.	.
7.27	0.2323	0.48	Q	.	.	.	.
7.41	0.2378	0.48	Q	.	.	.	.
7.55	0.2433	0.49	Q	.	.	.	.
7.69	0.2489	0.49	Q	.	.	.	.
7.83	0.2545	0.50	Q	.	.	.	.
7.97	0.2602	0.50	Q	.	.	.	.
8.11	0.2660	0.51	Q	.	.	.	.
8.24	0.2718	0.51	Q	.	.	.	.
8.38	0.2777	0.52	Q	.	.	.	.
8.52	0.2837	0.52	Q	.	.	.	.
8.66	0.2897	0.53	Q	.	.	.	.
8.80	0.2958	0.54	Q	.	.	.	.
8.94	0.3020	0.54	Q	.	.	.	.
9.07	0.3082	0.55	Q	.	.	.	.
9.21	0.3146	0.56	Q	.	.	.	.
9.35	0.3210	0.56	Q	.	.	.	.
9.49	0.3275	0.57	Q	.	.	.	.
9.63	0.3341	0.58	Q	.	.	.	.
9.77	0.3408	0.59	Q	.	.	.	.
9.91	0.3475	0.59	Q	.	.	.	.
10.04	0.3544	0.61	Q	.	.	.	.
10.18	0.3614	0.61	Q	.	.	.	.
10.32	0.3684	0.62	Q	.	.	.	.
10.46	0.3756	0.63	Q	.	.	.	.
10.60	0.3829	0.64	Q	.	.	.	.
10.74	0.3903	0.65	Q	.	.	.	.
10.88	0.3978	0.67	Q	.	.	.	.
11.01	0.4055	0.67	Q	.	.	.	.
11.15	0.4133	0.69	Q	.	.	.	.
11.29	0.4212	0.70	Q	.	.	.	.
11.43	0.4293	0.71	Q	.	.	.	.
11.57	0.4375	0.72	Q	.	.	.	.
11.71	0.4459	0.74	Q	.	.	.	.
11.85	0.4545	0.75	.Q	.	.	.	.
11.98	0.4632	0.77	.Q	.	.	.	.
12.12	0.4726	0.87	.Q	.	.	.	.
12.26	0.4837	1.07	.Q	.	.	.	.
12.40	0.4960	1.08	.Q	.	.	.	.
12.54	0.5085	1.11	.Q	.	.	.	.
12.68	0.5213	1.12	.Q	.	.	.	.
12.81	0.5343	1.16	.Q	.	.	.	.
12.95	0.5477	1.17	.Q	.	.	.	.
13.09	0.5613	1.21	.Q	.	.	.	.
13.23	0.5753	1.23	.Q	.	.	.	.
13.37	0.5896	1.27	.Q	.	.	.	.
13.51	0.6043	1.30	.Q	.	.	.	.
13.65	0.6194	1.35	.Q	.	.	.	.
13.78	0.6349	1.37	.Q	.	.	.	.
13.92	0.6510	1.43	.Q	.	.	.	.
14.06	0.6676	1.46	.Q	.	.	.	.
14.20	0.6846	1.52	. Q	.	.	.	.
14.34	0.7022	1.56	. Q	.	.	.	.
14.48	0.7207	1.66	. Q	.	.	.	.
14.62	0.7401	1.73	. Q	.	.	.	.
14.75	0.7608	1.89	. Q	.	.	.	.
14.89	0.7830	1.98	. Q	.	.	.	.
15.03	0.8069	2.20	. Q	.	.	.	.

```
                                                X025_H
 15.17      0.8328       2.33 .  Q      .         .         .         .
 15.31      0.8614       2.66 .  Q      .         .         .         .
 15.45      0.8925       2.76 .  Q      .         .         .         .
 15.58      0.9250       2.93 .  Q      .         .         .         .
 15.72      0.9611       3.37 .   Q     .         .         .         .
 15.86      1.0112       5.38 .      Q  .         .         .         .
 16.00      1.0847       7.45 .        Q.         .         .         .
 16.14      1.2542      22.18 .         .         .        Q.         .
 16.28      1.4053       4.22 .    Q    .         .         .         .
 16.42      1.4443       2.60 .  Q      .         .         .         .
 16.55      1.4734       2.48 .  Q      .         .         .         .
 16.69      1.4996       2.08 . Q       .         .         .         .
 16.83      1.5218       1.81 . Q       .         .         .         .
 16.97      1.5414       1.60 . Q       .         .         .         .
 17.11      1.5590       1.49 .Q        .         .         .         .
 17.25      1.5756       1.40 .Q        .         .         .         .
 17.39      1.5911       1.32 .Q        .         .         .         .
 17.52      1.6058       1.25 .Q        .         .         .         .
 17.66      1.6198       1.19 .Q        .         .         .         .
 17.80      1.6331       1.14 .Q        .         .         .         .
 17.94      1.6459       1.09 .Q        .         .         .         .
 18.08      1.6582       1.05 .Q        .         .         .         .
 18.22      1.6686       0.76 .Q        .         .         .         .
 18.35      1.6772       0.73 Q         .         .         .         .
 18.49      1.6854       0.71 Q         .         .         .         .
 18.63      1.6934       0.68 Q         .         .         .         .
 18.77      1.7010       0.66 Q         .         .         .         .
 18.91      1.7084       0.64 Q         .         .         .         .
 19.05      1.7156       0.62 Q         .         .         .         .
 19.19      1.7226       0.60 Q         .         .         .         .
 19.32      1.7293       0.58 Q         .         .         .         .
 19.46      1.7359       0.57 Q         .         .         .         .
 19.60      1.7423       0.55 Q         .         .         .         .
 19.74      1.7486       0.54 Q         .         .         .         .
 19.88      1.7547       0.53 Q         .         .         .         .
 20.02      1.7607       0.52 Q         .         .         .         .
 20.16      1.7665       0.50 Q         .         .         .         .
 20.29      1.7722       0.49 Q         .         .         .         .
 20.43      1.7778       0.48 Q         .         .         .         .
 20.57      1.7833       0.47 Q         .         .         .         .
 20.71      1.7886       0.46 Q         .         .         .         .
 20.85      1.7939       0.46 Q         .         .         .         .
 20.99      1.7991       0.45 Q         .         .         .         .
 21.12      1.8041       0.44 Q         .         .         .         .
 21.26      1.8091       0.43 Q         .         .         .         .
 21.40      1.8140       0.42 Q         .         .         .         .
 21.54      1.8188       0.42 Q         .         .         .         .
 21.68      1.8236       0.41 Q         .         .         .         .
 21.82      1.8283       0.40 Q         .         .         .         .
 21.96      1.8328       0.40 Q         .         .         .         .
 22.09      1.8374       0.39 Q         .         .         .         .
 22.23      1.8418       0.39 Q         .         .         .         .
 22.37      1.8462       0.38 Q         .         .         .         .
 22.51      1.8506       0.38 Q         .         .         .         .
 22.65      1.8548       0.37 Q         .         .         .         .
 22.79      1.8591       0.37 Q         .         .         .         .
 22.92      1.8632       0.36 Q         .         .         .         .
 23.06      1.8673       0.36 Q         .         .         .         .
 23.20      1.8714       0.35 Q         .         .         .         .
 23.34      1.8754       0.35 Q         .         .         .         .
 23.48      1.8794       0.34 Q         .         .         .         .
 23.62      1.8833       0.34 Q         .         .         .         .
 23.76      1.8872       0.34 Q         .         .         .         .
 23.89      1.8910       0.33 Q         .         .         .         .
 24.03      1.8948       0.33 Q         .         .         .         .
 24.17      1.8966       0.00 Q         .         .         .         .
----------------------------------------------------------------------------
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Drainage I

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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Analysis prepared by:

Fuscoe Engineering
16795 Von Karmon #100, Irvine, CA 92606

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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  9.62
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.30
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.11

****************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.13      0.0003      0.05  Q         .         .         .         .
  0.29      0.0010      0.05  Q         .         .         .         .
  0.45      0.0016      0.05  Q         .         .         .         .
  0.61      0.0023      0.05  Q         .         .         .         .
  0.77      0.0030      0.05  Q         .         .         .         .
  0.93      0.0037      0.05  Q         .         .         .         .
  1.09      0.0044      0.05  Q         .         .         .         .
  1.25      0.0051      0.05  Q         .         .         .         .
  1.41      0.0058      0.05  Q         .         .         .         .
  1.57      0.0066      0.05  Q         .         .         .         .
  1.73      0.0073      0.05  Q         .         .         .         .
  1.89      0.0080      0.06  Q         .         .         .         .
  2.05      0.0088      0.06  Q         .         .         .         .
  2.21      0.0095      0.06  Q         .         .         .         .
  2.37      0.0102      0.06  Q         .         .         .         .
  2.53      0.0110      0.06  Q         .         .         .         .
  2.69      0.0117      0.06  Q         .         .         .         .
  2.85      0.0125      0.06  Q         .         .         .         .
  3.01      0.0133      0.06  Q         .         .         .         .
  3.17      0.0140      0.06  Q         .         .         .         .
  3.33      0.0148      0.06  Q         .         .         .         .
  3.49      0.0156      0.06  Q         .         .         .         .
  3.65      0.0164      0.06  Q         .         .         .         .
  3.81      0.0172      0.06  Q         .         .         .         .
  3.98      0.0180      0.06  Q         .         .         .         .
  4.14      0.0188      0.06  Q         .         .         .         .
  4.30      0.0196      0.06  Q         .         .         .         .
  4.46      0.0205      0.06  Q         .         .         .         .
  4.62      0.0213      0.06  Q         .         .         .         .
  4.78      0.0221      0.06  Q         .         .         .         .
```

```
  4.94      0.0230      0.06  Q         .         .         .         .
  5.10      0.0238      0.06  Q         .         .         .         .
  5.26      0.0247      0.07  Q         .         .         .         .
  5.42      0.0256      0.07  Q         .         .         .         .
  5.58      0.0265      0.07  Q         .         .         .         .
  5.74      0.0274      0.07  Q         .         .         .         .
  5.90      0.0283      0.07  Q         .         .         .         .
  6.06      0.0292      0.07  Q         .         .         .         .
  6.22      0.0301      0.07  Q         .         .         .         .
  6.38      0.0310      0.07  Q         .         .         .         .
  6.54      0.0319      0.07  Q         .         .         .         .
  6.70      0.0329      0.07  Q         .         .         .         .
  6.86      0.0338      0.07  Q         .         .         .         .
  7.02      0.0348      0.07  Q         .         .         .         .
  7.18      0.0358      0.07  Q         .         .         .         .
  7.34      0.0368      0.07  Q         .         .         .         .
  7.50      0.0378      0.08  Q         .         .         .         .
  7.66      0.0388      0.08  Q         .         .         .         .
  7.82      0.0398      0.08  Q         .         .         .         .
  7.98      0.0408      0.08  Q         .         .         .         .
  8.14      0.0419      0.08  Q         .         .         .         .
  8.30      0.0430      0.08  Q         .         .         .         .
  8.46      0.0440      0.08  Q         .         .         .         .
  8.62      0.0451      0.08  Q         .         .         .         .
  8.78      0.0462      0.08  Q         .         .         .         .
  8.95      0.0474      0.09  Q         .         .         .         .
  9.11      0.0485      0.09  Q         .         .         .         .
  9.27      0.0496      0.09  Q         .         .         .         .
  9.43      0.0508      0.09  Q         .         .         .         .
  9.59      0.0520      0.09  Q         .         .         .         .
  9.75      0.0532      0.09  Q         .         .         .         .
  9.91      0.0544      0.09  Q         .         .         .         .
 10.07      0.0557      0.10  Q         .         .         .         .
 10.23      0.0570      0.10  Q         .         .         .         .
 10.39      0.0583      0.10  Q         .         .         .         .
 10.55      0.0596      0.10  Q         .         .         .         .
 10.71      0.0609      0.10  Q         .         .         .         .
 10.87      0.0623      0.10  Q         .         .         .         .
 11.03      0.0637      0.11  Q         .         .         .         .
 11.19      0.0651      0.11  Q         .         .         .         .
 11.35      0.0665      0.11  Q         .         .         .         .
 11.51      0.0680      0.11  Q         .         .         .         .
 11.67      0.0695      0.12  Q         .         .         .         .
 11.83      0.0711      0.12  Q         .         .         .         .
 11.99      0.0727      0.12  Q         .         .         .         .
 12.15      0.0744      0.14  Q         .         .         .         .
 12.31      0.0764      0.17  Q         .         .         .         .
 12.47      0.0787      0.17  Q         .         .         .         .
 12.63      0.0810      0.18  Q         .         .         .         .
 12.79      0.0833      0.18  Q         .         .         .         .
 12.95      0.0858      0.19  Q         .         .         .         .
 13.11      0.0882      0.19  Q         .         .         .         .
 13.27      0.0908      0.20  Q         .         .         .         .
 13.43      0.0934      0.20  Q         .         .         .         .
 13.60      0.0961      0.21  Q         .         .         .         .
 13.76      0.0989      0.21  Q         .         .         .         .
 13.92      0.1018      0.22  Q         .         .         .         .
 14.08      0.1048      0.23  Q         .         .         .         .
 14.24      0.1079      0.24  Q         .         .         .         .
 14.40      0.1111      0.25  Q         .         .         .         .
 14.56      0.1146      0.27  .Q        .         .         .         .
 14.72      0.1182      0.28  .Q        .         .         .         .
 14.88      0.1222      0.31  .Q        .         .         .         .
 15.04      0.1265      0.33  .Q        .         .         .         .
 15.20      0.1312      0.38  .Q        .         .         .         .
 15.36      0.1365      0.41  .Q        .         .         .         .
 15.52      0.1420      0.42  .Q        .         .         .         .
 15.68      0.1479      0.48  .Q        .         .         .         .
 15.84      0.1562      0.77  .  Q      .         .         .         .
 16.00      0.1684      1.07  .   Q     .         .         .         .
 16.16      0.1967      3.20  .         . Q       .         .         .
 16.32      0.2217      0.58  . Q       .         .         .         .
 16.48      0.2284      0.43  .Q        .         .         .         .
 16.64      0.2336      0.36  .Q        .         .         .         .
 16.80      0.2379      0.30  .Q        .         .         .         .
 16.96      0.2416      0.26  .Q        .         .         .         .
 17.12      0.2449      0.23  Q         .         .         .         .
 17.28      0.2479      0.22  Q         .         .         .         .
 17.44      0.2507      0.20  Q         .         .         .         .
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17.60	0.2533	0.19	Q	.	.	.	.
17.76	0.2558	0.18	Q	.	.	.	.
17.92	0.2581	0.17	Q	.	.	.	.
18.08	0.2604	0.17	Q	.	.	.	.
18.24	0.2623	0.12	Q	.	.	.	.
18.41	0.2638	0.11	Q	.	.	.	.
18.57	0.2653	0.11	Q	.	.	.	.
18.73	0.2667	0.10	Q	.	.	.	.
18.89	0.2681	0.10	Q	.	.	.	.
19.05	0.2694	0.10	Q	.	.	.	.
19.21	0.2707	0.09	Q	.	.	.	.
19.37	0.2719	0.09	Q	.	.	.	.
19.53	0.2731	0.09	Q	.	.	.	.
19.69	0.2742	0.09	Q	.	.	.	.
19.85	0.2754	0.08	Q	.	.	.	.
20.01	0.2765	0.08	Q	.	.	.	.
20.17	0.2775	0.08	Q	.	.	.	.
20.33	0.2786	0.08	Q	.	.	.	.
20.49	0.2796	0.08	Q	.	.	.	.
20.65	0.2806	0.07	Q	.	.	.	.
20.81	0.2815	0.07	Q	.	.	.	.
20.97	0.2825	0.07	Q	.	.	.	.
21.13	0.2834	0.07	Q	.	.	.	.
21.29	0.2843	0.07	Q	.	.	.	.
21.45	0.2852	0.07	Q	.	.	.	.
21.61	0.2861	0.07	Q	.	.	.	.
21.77	0.2869	0.06	Q	.	.	.	.
21.93	0.2878	0.06	Q	.	.	.	.
22.09	0.2886	0.06	Q	.	.	.	.
22.25	0.2894	0.06	Q	.	.	.	.
22.41	0.2902	0.06	Q	.	.	.	.
22.57	0.2910	0.06	Q	.	.	.	.
22.73	0.2918	0.06	Q	.	.	.	.
22.89	0.2925	0.06	Q	.	.	.	.
23.05	0.2933	0.06	Q	.	.	.	.
23.22	0.2940	0.06	Q	.	.	.	.
23.38	0.2947	0.05	Q	.	.	.	.
23.54	0.2955	0.05	Q	.	.	.	.
23.70	0.2962	0.05	Q	.	.	.	.
23.86	0.2969	0.05	Q	.	.	.	.
24.02	0.2976	0.05	Q	.	.	.	.
24.18	0.2979	0.00	Q	.	.	.	.

Drainage J

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          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                          Analysis prepared by:

                            Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   11.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) = 13.68
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.98
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.13

****************************************************************************
  TIME     VOLUME      Q    0.        7.5      15.0      22.5      30.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.04     0.0000     0.00  Q          .         .         .         .
  0.27     0.0049     0.52  Q          .         .         .         .
  0.50     0.0146     0.52  Q          .         .         .         .
  0.72     0.0244     0.52  Q          .         .         .         .
  0.95     0.0343     0.53  Q          .         .         .         .
  1.18     0.0443     0.53  Q          .         .         .         .
  1.41     0.0545     0.54  Q          .         .         .         .
  1.64     0.0647     0.55  Q          .         .         .         .
  1.86     0.0750     0.55  Q          .         .         .         .
  2.09     0.0854     0.56  Q          .         .         .         .
  2.32     0.0959     0.56  Q          .         .         .         .
  2.55     0.1065     0.57  Q          .         .         .         .
  2.78     0.1173     0.57  Q          .         .         .         .
  3.00     0.1282     0.58  Q          .         .         .         .
  3.23     0.1391     0.59  Q          .         .         .         .
  3.46     0.1503     0.59  Q          .         .         .         .
  3.69     0.1615     0.60  Q          .         .         .         .
  3.92     0.1729     0.61  Q          .         .         .         .
  4.14     0.1844     0.61  Q          .         .         .         .
  4.37     0.1960     0.62  Q          .         .         .         .
  4.60     0.2078     0.63  Q          .         .         .         .
  4.83     0.2197     0.64  Q          .         .         .         .
  5.06     0.2318     0.64  Q          .         .         .         .
  5.28     0.2441     0.66  Q          .         .         .         .
  5.51     0.2565     0.66  Q          .         .         .         .
  5.74     0.2690     0.67  Q          .         .         .         .
  5.97     0.2818     0.68  Q          .         .         .         .
  6.20     0.2947     0.69  Q          .         .         .         .
  6.42     0.3079     0.70  Q          .         .         .         .
  6.65     0.3212     0.71  Q          .         .         .         .
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  6.88      0.3347      0.72  Q         .         .         .         .
  7.11      0.3485      0.74  Q         .         .         .         .
  7.34      0.3624      0.74  Q         .         .         .         .
  7.56      0.3766      0.76  .Q        .         .         .         .
  7.79      0.3910      0.77  .Q        .         .         .         .
  8.02      0.4057      0.79  .Q        .         .         .         .
  8.25      0.4207      0.80  .Q        .         .         .         .
  8.48      0.4359      0.82  .Q        .         .         .         .
  8.70      0.4514      0.83  .Q        .         .         .         .
  8.93      0.4672      0.85  .Q        .         .         .         .
  9.16      0.4833      0.86  .Q        .         .         .         .
  9.39      0.4998      0.89  .Q        .         .         .         .
  9.62      0.5166      0.90  .Q        .         .         .         .
  9.84      0.5338      0.93  .Q        .         .         .         .
 10.07      0.5514      0.94  .Q        .         .         .         .
 10.30      0.5694      0.97  .Q        .         .         .         .
 10.53      0.5879      0.99  .Q        .         .         .         .
 10.76      0.6069      1.02  .Q        .         .         .         .
 10.98      0.6263      1.04  .Q        .         .         .         .
 11.21      0.6463      1.08  .Q        .         .         .         .
 11.44      0.6669      1.10  .Q        .         .         .         .
 11.67      0.6882      1.15  .Q        .         .         .         .
 11.90      0.7101      1.18  .Q        .         .         .         .
 12.12      0.7340      1.36  .Q        .         .         .         .
 12.35      0.7625      1.67  . Q       .         .         .         .
 12.58      0.7946      1.74  . Q       .         .         .         .
 12.81      0.8277      1.78  . Q       .         .         .         .
 13.04      0.8620      1.87  . Q       .         .         .         .
 13.26      0.8976      1.91  . Q       .         .         .         .
 13.49      0.9347      2.02  . Q       .         .         .         .
 13.72      0.9735      2.09  . Q       .         .         .         .
 13.95      1.0141      2.23  . Q       .         .         .         .
 14.18      1.0569      2.31  .  Q      .         .         .         .
 14.40      1.1021      2.49  .  Q      .         .         .         .
 14.63      1.1504      2.64  .  Q      .         .         .         .
 14.86      1.2039      3.04  .   Q     .         .         .         .
 15.09      1.2637      3.30  .   Q     .         .         .         .
 15.32      1.3327      4.03  .    Q    .         .         .         .
 15.54      1.4106      4.24  .    Q    .         .         .         .
 15.77      1.5049      5.77  .      Q  .         .         .         .
 16.00      1.6405      8.63  .         .Q        .         .         .
 16.23      1.9676     26.08  .         .         .         .   Q     .
 16.46      2.2554      4.47  .    Q    .         .         .         .
 16.68      2.3316      3.62  .   Q     .         .         .         .
 16.91      2.3923      2.82  .  Q      .         .         .         .
 17.14      2.4414      2.38  .  Q      .         .         .         .
 17.37      2.4841      2.16  . Q       .         .         .         .
 17.60      2.5229      1.97  . Q       .         .         .         .
 17.82      2.5586      1.82  . Q       .         .         .         .
 18.05      2.5918      1.70  . Q       .         .         .         .
 18.28      2.6191      1.20  .Q        .         .         .         .
 18.51      2.6411      1.13  .Q        .         .         .         .
 18.74      2.6617      1.06  .Q        .         .         .         .
 18.96      2.6812      1.01  .Q        .         .         .         .
 19.19      2.6997      0.96  .Q        .         .         .         .
 19.42      2.7173      0.91  .Q        .         .         .         .
 19.65      2.7341      0.87  .Q        .         .         .         .
 19.88      2.7502      0.84  .Q        .         .         .         .
 20.10      2.7658      0.81  .Q        .         .         .         .
 20.33      2.7807      0.78  .Q        .         .         .         .
 20.56      2.7951      0.75  .Q        .         .         .         .
 20.79      2.8091      0.73  Q         .         .         .         .
 21.02      2.8226      0.71  Q         .         .         .         .
 21.24      2.8358      0.69  Q         .         .         .         .
 21.47      2.8485      0.67  Q         .         .         .         .
 21.70      2.8609      0.65  Q         .         .         .         .
 21.93      2.8730      0.63  Q         .         .         .         .
 22.16      2.8848      0.62  Q         .         .         .         .
 22.38      2.8963      0.60  Q         .         .         .         .
 22.61      2.9076      0.59  Q         .         .         .         .
 22.84      2.9185      0.58  Q         .         .         .         .
 23.07      2.9293      0.56  Q         .         .         .         .
 23.30      2.9398      0.55  Q         .         .         .         .
 23.52      2.9501      0.54  Q         .         .         .         .
 23.75      2.9602      0.53  Q         .         .         .         .
 23.98      2.9702      0.52  Q         .         .         .         .
 24.21      2.9799      0.51  Q         .         .         .         .
 24.44      2.9847      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
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Drainage K

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****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                      AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    6.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) = 11.30
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.71
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.65

****************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.18      0.0023      0.29  Q         .         .         .         .
  0.37      0.0069      0.30  Q         .         .         .         .
  0.56      0.0115      0.30  Q         .         .         .         .
  0.74      0.0162      0.30  Q         .         .         .         .
  0.93      0.0209      0.30  Q         .         .         .         .
  1.12      0.0256      0.31  Q         .         .         .         .
  1.31      0.0304      0.31  Q         .         .         .         .
  1.50      0.0352      0.31  Q         .         .         .         .
  1.69      0.0400      0.31  Q         .         .         .         .
  1.87      0.0449      0.32  Q         .         .         .         .
  2.06      0.0499      0.32  Q         .         .         .         .
  2.25      0.0548      0.32  Q         .         .         .         .
  2.44      0.0599      0.32  Q         .         .         .         .
  2.63      0.0649      0.33  Q         .         .         .         .
  2.82      0.0700      0.33  Q         .         .         .         .
  3.00      0.0752      0.33  Q         .         .         .         .
  3.19      0.0804      0.34  Q         .         .         .         .
  3.38      0.0856      0.34  Q         .         .         .         .
  3.57      0.0909      0.34  Q         .         .         .         .
  3.76      0.0963      0.35  Q         .         .         .         .
  3.95      0.1017      0.35  Q         .         .         .         .
  4.13      0.1071      0.35  Q         .         .         .         .
  4.32      0.1126      0.36  Q         .         .         .         .
  4.51      0.1182      0.36  Q         .         .         .         .
  4.70      0.1238      0.36  Q         .         .         .         .
  4.89      0.1295      0.37  Q         .         .         .         .
  5.08      0.1353      0.37  Q         .         .         .         .
  5.26      0.1411      0.38  Q         .         .         .         .
  5.45      0.1469      0.38  Q         .         .         .         .
  5.64      0.1529      0.38  Q         .         .         .         .
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```
  5.83      0.1589       0.39  Q         .         .         .         .
  6.02      0.1649       0.39  Q         .         .         .         .
  6.21      0.1711       0.40  Q         .         .         .         .
  6.39      0.1773       0.40  Q         .         .         .         .
  6.58      0.1836       0.41  Q         .         .         .         .
  6.77      0.1900       0.41  Q         .         .         .         .
  6.96      0.1964       0.42  Q         .         .         .         .
  7.15      0.2030       0.42  Q         .         .         .         .
  7.34      0.2096       0.43  Q         .         .         .         .
  7.53      0.2163       0.44  Q         .         .         .         .
  7.71      0.2231       0.44  Q         .         .         .         .
  7.90      0.2300       0.45  Q         .         .         .         .
  8.09      0.2371       0.45  Q         .         .         .         .
  8.28      0.2442       0.46  Q         .         .         .         .
  8.47      0.2514       0.47  Q         .         .         .         .
  8.65      0.2587       0.48  Q         .         .         .         .
  8.84      0.2662       0.48  Q         .         .         .         .
  9.03      0.2738       0.49  Q         .         .         .         .
  9.22      0.2815       0.50  Q         .         .         .         .
  9.41      0.2893       0.51  .Q        .         .         .         .
  9.60      0.2973       0.52  .Q        .         .         .         .
  9.78      0.3054       0.53  .Q        .         .         .         .
  9.97      0.3137       0.54  .Q        .         .         .         .
 10.16      0.3222       0.55  .Q        .         .         .         .
 10.35      0.3308       0.56  .Q        .         .         .         .
 10.54      0.3396       0.57  .Q        .         .         .         .
 10.73      0.3486       0.58  .Q        .         .         .         .
 10.91      0.3578       0.60  .Q        .         .         .         .
 11.10      0.3672       0.61  .Q        .         .         .         .
 11.29      0.3768       0.63  .Q        .         .         .         .
 11.48      0.3867       0.64  .Q        .         .         .         .
 11.67      0.3968       0.66  .Q        .         .         .         .
 11.86      0.4072       0.67  .Q        .         .         .         .
 12.05      0.4179       0.70  .Q        .         .         .         .
 12.23      0.4304       0.91  .Q        .         .         .         .
 12.42      0.4451       0.98  .Q        .         .         .         .
 12.61      0.4605       0.99  .Q        .         .         .         .
 12.80      0.4762       1.03  . Q       .         .         .         .
 12.99      0.4925       1.05  . Q       .         .         .         .
 13.18      0.5092       1.10  . Q       .         .         .         .
 13.36      0.5265       1.12  . Q       .         .         .         .
 13.55      0.5444       1.18  . Q       .         .         .         .
 13.74      0.5630       1.21  . Q       .         .         .         .
 13.93      0.5824       1.28  . Q       .         .         .         .
 14.12      0.6026       1.32  . Q       .         .         .         .
 14.30      0.6238       1.39  . Q       .         .         .         .
 14.49      0.6459       1.45  . Q       .         .         .         .
 14.68      0.6698       1.62  .  Q      .         .         .         .
 14.87      0.6957       1.72  .  Q      .         .         .         .
 15.06      0.7244       1.97  .  Q      .         .         .         .
 15.25      0.7564       2.14  .   Q     .         .         .         .
 15.43      0.7921       2.45  .   Q     .         .         .         .
 15.62      0.8302       2.45  .   Q     .         .         .         .
 15.81      0.8796       3.89  .      Q  .         .         .         .
 16.00      0.9532       5.56  .         .Q        .         .         .
 16.19      1.1264      16.70  .         .         .         .  Q      .
 16.38      1.2791       2.92  .    Q    .         .         .         .
 16.57      1.3201       2.34  .   Q     .         .         .         .
 16.75      1.3526       1.84  .  Q      .         .         .         .
 16.94      1.3788       1.53  .  Q      .         .         .         .
 17.13      1.4011       1.35  . Q       .         .         .         .
 17.32      1.4213       1.24  . Q       .         .         .         .
 17.51      1.4399       1.15  . Q       .         .         .         .
 17.69      1.4573       1.08  . Q       .         .         .         .
 17.88      1.4735       1.01  . Q       .         .         .         .
 18.07      1.4889       0.96  .Q        .         .         .         .
 18.26      1.5017       0.69  .Q        .         .         .         .
 18.45      1.5121       0.65  .Q        .         .         .         .
 18.64      1.5220       0.62  .Q        .         .         .         .
 18.83      1.5314       0.59  .Q        .         .         .         .
 19.01      1.5403       0.57  .Q        .         .         .         .
 19.20      1.5490       0.54  .Q        .         .         .         .
 19.39      1.5573       0.52  .Q        .         .         .         .
 19.58      1.5652       0.50  .Q        .         .         .         .
 19.77      1.5730       0.49  Q         .         .         .         .
 19.95      1.5804       0.47  Q         .         .         .         .
 20.14      1.5876       0.46  Q         .         .         .         .
 20.33      1.5947       0.44  Q         .         .         .         .
 20.52      1.6015       0.43  Q         .         .         .         .
```

20.71	1.6081	0.42	Q	.	.	.	.
20.90	1.6146	0.41	Q	.	.	.	.
21.08	1.6209	0.40	Q	.	.	.	.
21.27	1.6270	0.39	Q	.	.	.	.
21.46	1.6330	0.38	Q	.	.	.	.
21.65	1.6389	0.37	Q	.	.	.	.
21.84	1.6446	0.37	Q	.	.	.	.
22.03	1.6502	0.36	Q	.	.	.	.
22.22	1.6557	0.35	Q	.	.	.	.
22.40	1.6611	0.34	Q	.	.	.	.
22.59	1.6664	0.34	Q	.	.	.	.
22.78	1.6716	0.33	Q	.	.	.	.
22.97	1.6768	0.33	Q	.	.	.	.
23.16	1.6818	0.32	Q	.	.	.	.
23.34	1.6867	0.31	Q	.	.	.	.
23.53	1.6916	0.31	Q	.	.	.	.
23.72	1.6963	0.30	Q	.	.	.	.
23.91	1.7010	0.30	Q	.	.	.	.
24.10	1.7057	0.29	Q	.	.	.	.
24.29	1.7080	0.00	Q	.	.	.	.

iv. HC 10-Year Storm Event

Drainage A

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                          Analysis prepared by:





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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  349.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.150
    LOW LOSS FRACTION = 0.350
    TIME OF CONCENTRATION(MIN.) = 28.15
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    67.35
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    39.86

****************************************************************************
  TIME     VOLUME       Q    0.      107.5     215.0     322.5     430.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.05      0.0000      0.00  Q         .         .         .         .
  0.52      0.2275     11.73  .Q        .         .         .         .
  0.99      0.6852     11.88  .Q        .         .         .         .
  1.46      1.1520     12.19  .Q        .         .         .         .
  1.93      1.6279     12.36  .Q        .         .         .         .
  2.39      2.1138     12.70  .Q        .         .         .         .
  2.86      2.6099     12.89  .Q        .         .         .         .
  3.33      3.1171     13.27  .Q        .         .         .         .
  3.80      3.6357     13.48  .Q        .         .         .         .
  4.27      4.1668     13.92  .Q        .         .         .         .
  4.74      4.7109     14.15  .Q        .         .         .         .
  5.21      5.2690     14.64  .Q        .         .         .         .
  5.68      5.8420     14.91  .Q        .         .         .         .
  6.15      6.4311     15.48  .Q        .         .         .         .
  6.62      7.0373     15.79  .Q        .         .         .         .
  7.09      7.6623     16.45  .Q        .         .         .         .
  7.56      8.3072     16.81  .Q        .         .         .         .
  8.02      8.9744     17.60  .Q        .         .         .         .
  8.49      9.6652     18.03  .Q        .         .         .         .
```

```
  8.96     10.3828     18.98  .Q        .         .         .         .
  9.43     11.1290     19.51  .Q        .         .         .         .
  9.90     11.9082     20.68  .Q        .         .         .         .
 10.37     12.7231     21.35  .Q        .         .         .         .
 10.84     13.5799     22.85  . Q       .         .         .         .
 11.31     14.4826     23.71  . Q       .         .         .         .
 11.78     15.4410     25.72  . Q       .         .         .         .
 12.25     16.4612     26.90  . Q       .         .         .         .
 12.72     17.7036     37.18  .  Q      .         .         .         .
 13.18     19.1810     39.02  .  Q      .         .         .         .
 13.65     20.7842     43.67  .   Q     .         .         .         .
 14.12     22.5358     46.68  .   Q     .         .         .         .
 14.59     24.5093     55.11  .    Q    .         .         .         .
 15.06     26.7670     61.34  .    Q    .         .         .         .
 15.53     29.5533     82.38  .      Q  .         .         .         .
 16.00     33.1616    103.74  .        Q.         .         .         .
 16.47     43.3728    422.96  .         .         .         .        Q.
 16.94     52.9334     70.18  .     Q   .         .         .         .
 17.41     55.2710     50.39  .   Q     .         .         .         .
 17.88     57.0459     41.16  .  Q      .         .         .         .
 18.35     58.5035     34.03  .  Q      .         .         .         .
 18.82     59.6414     24.66  . Q       .         .         .         .
 19.28     60.5473     22.06  . Q       .         .         .         .
 19.75     61.3642     20.07  .Q        .         .         .         .
 20.22     62.1119     18.49  .Q        .         .         .         .
 20.69     62.8037     17.19  .Q        .         .         .         .
 21.16     63.4495     16.11  .Q        .         .         .         .
 21.63     64.0562     15.19  .Q        .         .         .         .
 22.10     64.6297     14.39  .Q        .         .         .         .
 22.57     65.1741     13.69  .Q        .         .         .         .
 23.04     65.6931     13.08  .Q        .         .         .         .
 23.51     66.1895     12.53  .Q        .         .         .         .
 23.98     66.6656     12.03  .Q        .         .         .         .
 24.44     67.1248     11.65  .Q        .         .         .         .
 24.91     67.3506      0.00  Q         .         .         .         .
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Drainage B

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                          Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  135.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.070
    LOW LOSS FRACTION = 0.200
    TIME OF CONCENTRATION(MIN.) = 32.10
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    30.86
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    10.57

****************************************************************************
  TIME     VOLUME       Q    0.       40.0      80.0     120.0     160.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.49      0.1116      5.57  .Q        .         .         .         .
  1.02      0.3595      5.64  .Q        .         .         .         .
  1.56      0.6127      5.81  .Q        .         .         .         .
  2.09      0.8717      5.90  .Q        .         .         .         .
  2.63      1.1370      6.09  .Q        .         .         .         .
  3.16      1.4086      6.20  .Q        .         .         .         .
  3.70      1.6874      6.41  .Q        .         .         .         .
  4.23      1.9735      6.53  .Q        .         .         .         .
  4.77      2.2677      6.78  .Q        .         .         .         .
  5.30      2.5704      6.91  .Q        .         .         .         .
  5.84      2.8825      7.20  .Q        .         .         .         .
  6.37      3.2046      7.36  .Q        .         .         .         .
  6.91      3.5377      7.71  .Q        .         .         .         .
  7.44      3.8827      7.90  .Q        .         .         .         .
  7.98      4.2410      8.31  . Q       .         .         .         .
  8.51      4.6137      8.54  . Q       .         .         .         .
  9.05      5.0028      9.06  . Q       .         .         .         .
  9.58      5.4097      9.35  . Q       .         .         .         .
 10.12      5.8376     10.01  . Q       .         .         .         .
```

```
  10.65      6.2884     10.38  . Q       .         .         .         .
  11.19      6.7669     11.26  . Q       .         .         .         .
  11.72      7.2764     11.78  . Q       .         .         .         .
  12.26      7.8415     13.78  .  Q      .         .         .         .
  12.79      8.5289     17.31  .   Q     .         .         .         .
  13.32      9.3397     19.37  .   Q     .         .         .         .
  13.86     10.2257     20.71  .    Q    .         .         .         .
  14.40     11.2238     24.44  .     Q   .         .         .         .
  14.93     12.3656     27.21  .     Q   .         .         .         .
  15.47     13.8104     38.15  .        Q.         .         .         .
  16.00     15.6758     46.23  .         .Q        .         .         .
  16.53     20.2264    159.61  .         .         .         .        Q.
  17.07     24.4433     31.13  .      Q  .         .         .         .
  17.61     25.6255     22.35  .    Q    .         .         .         .
  18.14     26.5232     18.26  .   Q     .         .         .         .
  18.67     27.2002     12.37  .  Q      .         .         .         .
  19.21     27.7123     10.80  . Q       .         .         .         .
  19.74     28.1647      9.66  . Q       .         .         .         .
  20.28     28.5727      8.79  . Q       .         .         .         .
  20.82     28.9460      8.10  . Q       .         .         .         .
  21.35     29.2915      7.53  .Q        .         .         .         .
  21.89     29.6140      7.06  .Q        .         .         .         .
  22.42     29.9170      6.65  .Q        .         .         .         .
  22.95     30.2033      6.30  .Q        .         .         .         .
  23.49     30.4752      6.00  .Q        .         .         .         .
  24.02     30.7344      5.73  .Q        .         .         .         .
  24.56     30.8610      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
```

Drainage C

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:





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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   63.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.200
    LOW LOSS FRACTION = 0.390
    TIME OF CONCENTRATION(MIN.) = 18.57
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    11.50
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     8.01

****************************************************************************
  TIME     VOLUME       Q    0.        25.0      50.0      75.0     100.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.22      0.0177      1.99  Q         .         .         .         .
  0.53      0.0688      2.00  Q         .         .         .         .
  0.83      0.1205      2.04  Q         .         .         .         .
  1.14      0.1728      2.05  Q         .         .         .         .
  1.45      0.2259      2.09  Q         .         .         .         .
  1.76      0.2796      2.11  Q         .         .         .         .
  2.07      0.3340      2.15  Q         .         .         .         .
  2.38      0.3892      2.17  Q         .         .         .         .
  2.69      0.4452      2.21  Q         .         .         .         .
  3.00      0.5020      2.23  Q         .         .         .         .
  3.31      0.5596      2.28  Q         .         .         .         .
  3.62      0.6181      2.30  Q         .         .         .         .
  3.93      0.6776      2.35  Q         .         .         .         .
  4.24      0.7379      2.37  Q         .         .         .         .
  4.55      0.7993      2.42  Q         .         .         .         .
  4.86      0.8616      2.45  Q         .         .         .         .
  5.17      0.9251      2.51  .Q        .         .         .         .
  5.48      0.9896      2.54  .Q        .         .         .         .
  5.79      1.0554      2.60  .Q        .         .         .         .
```

```
 6.10      1.1224      2.63  .Q        .         .         .         .
 6.41      1.1906      2.70  .Q        .         .         .         .
 6.72      1.2603      2.74  .Q        .         .         .         .
 7.02      1.3314      2.82  .Q        .         .         .         .
 7.33      1.4040      2.86  .Q        .         .         .         .
 7.64      1.4782      2.94  .Q        .         .         .         .
 7.95      1.5540      2.99  .Q        .         .         .         .
 8.26      1.6317      3.09  .Q        .         .         .         .
 8.57      1.7113      3.14  .Q        .         .         .         .
 8.88      1.7930      3.25  .Q        .         .         .         .
 9.19      1.8768      3.31  .Q        .         .         .         .
 9.50      1.9630      3.43  .Q        .         .         .         .
 9.81      2.0517      3.50  .Q        .         .         .         .
10.12      2.1431      3.65  .Q        .         .         .         .
10.43      2.2375      3.73  .Q        .         .         .         .
10.74      2.3351      3.90  .Q        .         .         .         .
11.05      2.4362      4.00  .Q        .         .         .         .
11.36      2.5412      4.21  .Q        .         .         .         .
11.67      2.6503      4.33  .Q        .         .         .         .
11.98      2.7643      4.59  .Q        .         .         .         .
12.29      2.8897      5.22  . Q       .         .         .         .
12.60      3.0374      6.33  . Q       .         .         .         .
12.90      3.2020      6.54  . Q       .         .         .         .
13.21      3.3751      7.00  . Q       .         .         .         .
13.52      3.5576      7.27  . Q       .         .         .         .
13.83      3.7519      7.92  .  Q      .         .         .         .
14.14      3.9595      8.31  .  Q      .         .         .         .
14.45      4.1848      9.31  .  Q      .         .         .         .
14.76      4.4310      9.95  .  Q      .         .         .         .
15.07      4.7084     11.74  .   Q     .         .         .         .
15.38      5.0255     13.06  .    Q    .         .         .         .
15.69      5.3918     15.57  .     Q   .         .         .         .
16.00      5.9062     24.65  .        Q.         .         .         .
16.31      7.4682     97.48  .         .         .         .       Q .
16.62      8.8993     14.42  .    Q    .         .         .         .
16.93      9.2209     10.74  .   Q     .         .         .         .
17.24      9.4704      8.77  .  Q      .         .         .         .
17.55      9.6794      7.57  .  Q      .         .         .         .
17.86      9.8627      6.76  . Q       .         .         .         .
18.17     10.0278      6.15  . Q       .         .         .         .
18.48     10.1634      4.45  .Q        .         .         .         .
18.79     10.2727      4.10  .Q        .         .         .         .
19.09     10.3740      3.81  .Q        .         .         .         .
19.40     10.4684      3.57  .Q        .         .         .         .
19.71     10.5572      3.37  .Q        .         .         .         .
20.02     10.6411      3.19  .Q        .         .         .         .
20.33     10.7208      3.04  .Q        .         .         .         .
20.64     10.7967      2.90  .Q        .         .         .         .
20.95     10.8693      2.78  .Q        .         .         .         .
21.26     10.9390      2.67  .Q        .         .         .         .
21.57     11.0060      2.57  .Q        .         .         .         .
21.88     11.0706      2.48  Q         .         .         .         .
22.19     11.1330      2.40  Q         .         .         .         .
22.50     11.1933      2.32  Q         .         .         .         .
22.81     11.2518      2.25  Q         .         .         .         .
23.12     11.3086      2.19  Q         .         .         .         .
23.43     11.3639      2.13  Q         .         .         .         .
23.74     11.4176      2.07  Q         .         .         .         .
24.05     11.4699      2.02  Q         .         .         .         .
24.36     11.4958      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
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Drainage D

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****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   14.29
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.140
    LOW LOSS FRACTION = 0.340
    TIME OF CONCENTRATION(MIN.) = 10.86
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.78
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.60

****************************************************************************
  TIME     VOLUME      Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.07      0.0000      0.00  Q         .         .         .         .
  0.25      0.0036      0.49  Q         .         .         .         .
  0.43      0.0109      0.49  Q         .         .         .         .
  0.62      0.0182      0.49  Q         .         .         .         .
  0.80      0.0256      0.50  Q         .         .         .         .
  0.98      0.0331      0.50  Q         .         .         .         .
  1.16      0.0406      0.50  Q         .         .         .         .
  1.34      0.0481      0.51  Q         .         .         .         .
  1.52      0.0557      0.51  Q         .         .         .         .
  1.70      0.0634      0.52  Q         .         .         .         .
  1.88      0.0711      0.52  Q         .         .         .         .
  2.06      0.0789      0.52  Q         .         .         .         .
  2.24      0.0868      0.53  Q         .         .         .         .
  2.43      0.0947      0.53  Q         .         .         .         .
  2.61      0.1027      0.54  Q         .         .         .         .
  2.79      0.1108      0.54  Q         .         .         .         .
  2.97      0.1189      0.54  Q         .         .         .         .
  3.15      0.1271      0.55  Q         .         .         .         .
  3.33      0.1354      0.55  Q         .         .         .         .
  3.51      0.1437      0.56  Q         .         .         .         .
  3.69      0.1521      0.56  Q         .         .         .         .
  3.87      0.1606      0.57  Q         .         .         .         .
  4.05      0.1692      0.57  Q         .         .         .         .
  4.24      0.1779      0.58  Q         .         .         .         .
  4.42      0.1866      0.59  Q         .         .         .         .
  4.60      0.1954      0.59  Q         .         .         .         .
  4.78      0.2043      0.60  Q         .         .         .         .
  4.96      0.2133      0.61  Q         .         .         .         .
  5.14      0.2224      0.61  Q         .         .         .         .
  5.32      0.2316      0.62  Q         .         .         .         .
```

```
  5.50      0.2409      0.62  Q         .         .         .         .
  5.68      0.2503      0.63  Q         .         .         .         .
  5.86      0.2598      0.64  Q         .         .         .         .
  6.05      0.2694      0.65  Q         .         .         .         .
  6.23      0.2791      0.65  Q         .         .         .         .
  6.41      0.2889      0.66  Q         .         .         .         .
  6.59      0.2988      0.67  Q         .         .         .         .
  6.77      0.3088      0.68  Q         .         .         .         .
  6.95      0.3190      0.68  Q         .         .         .         .
  7.13      0.3293      0.69  Q         .         .         .         .
  7.31      0.3397      0.70  Q         .         .         .         .
  7.49      0.3503      0.71  Q         .         .         .         .
  7.67      0.3610      0.72  Q         .         .         .         .
  7.86      0.3718      0.73  Q         .         .         .         .
  8.04      0.3828      0.74  Q         .         .         .         .
  8.22      0.3940      0.75  Q         .         .         .         .
  8.40      0.4053      0.76  Q         .         .         .         .
  8.58      0.4168      0.78  Q         .         .         .         .
  8.76      0.4284      0.78  Q         .         .         .         .
  8.94      0.4403      0.80  Q         .         .         .         .
  9.12      0.4523      0.81  Q         .         .         .         .
  9.30      0.4645      0.83  Q         .         .         .         .
  9.48      0.4770      0.84  Q         .         .         .         .
  9.66      0.4896      0.85  Q         .         .         .         .
  9.85      0.5025      0.86  Q         .         .         .         .
 10.03      0.5156      0.89  Q         .         .         .         .
 10.21      0.5289      0.90  Q         .         .         .         .
 10.39      0.5425      0.92  Q         .         .         .         .
 10.57      0.5564      0.93  Q         .         .         .         .
 10.75      0.5705      0.96  Q         .         .         .         .
 10.93      0.5850      0.97  Q         .         .         .         .
 11.11      0.5998      1.00  .Q        .         .         .         .
 11.29      0.6149      1.02  .Q        .         .         .         .
 11.48      0.6304      1.05  .Q        .         .         .         .
 11.66      0.6462      1.07  .Q        .         .         .         .
 11.84      0.6625      1.11  .Q        .         .         .         .
 12.02      0.6792      1.13  .Q        .         .         .         .
 12.20      0.6986      1.47  .Q        .         .         .         .
 12.38      0.7209      1.50  .Q        .         .         .         .
 12.56      0.7437      1.55  .Q        .         .         .         .
 12.74      0.7671      1.58  .Q        .         .         .         .
 12.92      0.7912      1.64  .Q        .         .         .         .
 13.10      0.8160      1.68  .Q        .         .         .         .
 13.28      0.8417      1.75  .Q        .         .         .         .
 13.47      0.8681      1.79  .Q        .         .         .         .
 13.65      0.8956      1.88  .Q        .         .         .         .
 13.83      0.9242      1.93  .Q        .         .         .         .
 14.01      0.9539      2.05  . Q       .         .         .         .
 14.19      0.9851      2.11  . Q       .         .         .         .
 14.37      1.0178      2.26  . Q       .         .         .         .
 14.55      1.0524      2.35  . Q       .         .         .         .
 14.73      1.0891      2.56  . Q       .         .         .         .
 14.91      1.1284      2.69  . Q       .         .         .         .
 15.10      1.1710      3.01  .  Q      .         .         .         .
 15.28      1.2175      3.22  .  Q      .         .         .         .
 15.46      1.2678      3.50  .  Q      .         .         .         .
 15.64      1.3219      3.74  .  Q      .         .         .         .
 15.82      1.3977      6.39  .     Q   .         .         .         .
 16.00      1.5162      9.46  .        Q.         .         .         .
 16.18      1.8235     31.63  .         .         .         .Q        .
 16.36      2.0948      4.65  .   Q     .         .         .         .
 16.54      2.1555      3.47  .  Q      .         .         .         .
 16.72      2.2027      2.84  . Q       .         .         .         .
 16.91      2.2422      2.45  . Q       .         .         .         .
 17.09      2.2769      2.19  . Q       .         .         .         .
 17.27      2.3081      1.99  .Q        .         .         .         .
 17.45      2.3367      1.84  .Q        .         .         .         .
 17.63      2.3632      1.71  .Q        .         .         .         .
 17.81      2.3881      1.61  .Q        .         .         .         .
 17.99      2.4115      1.52  .Q        .         .         .         .
 18.17      2.4319      1.19  .Q        .         .         .         .
 18.35      2.4489      1.09  .Q        .         .         .         .
 18.53      2.4648      1.03  .Q        .         .         .         .
 18.72      2.4799      0.99  Q         .         .         .         .
 18.90      2.4944      0.95  Q         .         .         .         .
 19.08      2.5082      0.91  Q         .         .         .         .
 19.26      2.5216      0.88  Q         .         .         .         .
 19.44      2.5345      0.84  Q         .         .         .         .
 19.62      2.5469      0.82  Q         .         .         .         .
```

19.80	2.5589	0.79	Q	.	.	.	.
19.98	2.5706	0.77	Q	.	.	.	.
20.16	2.5819	0.75	Q	.	.	.	.
20.34	2.5929	0.73	Q	.	.	.	.
20.52	2.6036	0.71	Q	.	.	.	.
20.71	2.6140	0.69	Q	.	.	.	.
20.89	2.6242	0.67	Q	.	.	.	.
21.07	2.6341	0.66	Q	.	.	.	.
21.25	2.6438	0.64	Q	.	.	.	.
21.43	2.6533	0.63	Q	.	.	.	.
21.61	2.6626	0.61	Q	.	.	.	.
21.79	2.6717	0.60	Q	.	.	.	.
21.97	2.6806	0.59	Q	.	.	.	.
22.15	2.6893	0.58	Q	.	.	.	.
22.33	2.6979	0.57	Q	.	.	.	.
22.52	2.7063	0.56	Q	.	.	.	.
22.70	2.7146	0.55	Q	.	.	.	.
22.88	2.7227	0.54	Q	.	.	.	.
23.06	2.7307	0.53	Q	.	.	.	.
23.24	2.7386	0.52	Q	.	.	.	.
23.42	2.7463	0.51	Q	.	.	.	.
23.60	2.7539	0.51	Q	.	.	.	.
23.78	2.7614	0.50	Q	.	.	.	.
23.96	2.7688	0.49	Q	.	.	.	.
24.14	2.7761	0.48	Q	.	.	.	.
24.33	2.7797	0.00	Q	.	.	.	.

Drainage E

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   97.20
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.200
    TIME OF CONCENTRATION(MIN.) = 29.02
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    22.38
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     7.43

****************************************************************************
  TIME     VOLUME       Q    0.        32.5      65.0      97.5     130.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.04      0.0000      0.00  Q         .         .         .         .
  0.52      0.0799      4.00  .Q        .         .         .         .
  1.01      0.2416      4.09  .Q        .         .         .         .
  1.49      0.4063      4.15  .Q        .         .         .         .
  1.97      0.5745      4.26  .Q        .         .         .         .
  2.46      0.7462      4.33  .Q        .         .         .         .
  2.94      0.9217      4.46  .Q        .         .         .         .
  3.42      1.1012      4.53  .Q        .         .         .         .
  3.91      1.2850      4.67  .Q        .         .         .         .
  4.39      1.4733      4.75  .Q        .         .         .         .
  4.88      1.6665      4.92  .Q        .         .         .         .
  5.36      1.8647      5.01  .Q        .         .         .         .
  5.84      2.0686      5.20  .Q        .         .         .         .
  6.33      2.2784      5.30  .Q        .         .         .         .
  6.81      2.4947      5.52  .Q        .         .         .         .
  7.29      2.7179      5.64  .Q        .         .         .         .
  7.78      2.9488      5.91  .Q        .         .         .         .
  8.26      3.1879      6.05  .Q        .         .         .         .
  8.74      3.4362      6.37  .Q        .         .         .         .
  9.23      3.6945      6.55  . Q       .         .         .         .
  9.71      3.9642      6.94  . Q       .         .         .         .
 10.20      4.2462      7.17  . Q       .         .         .         .
 10.68      4.5427      7.67  . Q       .         .         .         .
 11.16      4.8551      7.96  . Q       .         .         .         .
 11.65      5.1868      8.63  . Q       .         .         .         .
 12.13      5.5398      9.03  . Q       .         .         .         .
 12.61      5.9706     12.52  .  Q      .         .         .         .
 13.10      6.4834     13.14  .   Q     .         .         .         .
 13.58      7.0399     14.70  .   Q     .         .         .         .
 14.07      7.6479     15.72  .   Q     .         .         .         .
```

```
 14.55      8.3329     18.56  .    Q    .         .         .         .
 15.03      9.1165     20.65  .     Q   .         .         .         .
 15.52     10.1245     29.78  .        Q.         .         .         .
 16.00     11.4368     35.88  .         .Q        .         .         .
 16.48     14.6159    123.18  .         .         .         .      Q  .
 16.97     17.5632     24.29  .      Q  .         .         .         .
 17.45     18.3877     16.97  .    Q    .         .         .         .
 17.93     19.0038     13.86  .   Q     .         .         .         .
 18.42     19.4905     10.50  .  Q      .         .         .         .
 18.90     19.8657      8.28  . Q       .         .         .         .
 19.39     20.1793      7.41  . Q       .         .         .         .
 19.87     20.4620      6.74  . Q       .         .         .         .
 20.35     20.7207      6.21  .Q        .         .         .         .
 20.84     20.9602      5.77  .Q        .         .         .         .
 21.32     21.1836      5.41  .Q        .         .         .         .
 21.80     21.3936      5.10  .Q        .         .         .         .
 22.29     21.5921      4.83  .Q        .         .         .         .
 22.77     21.7805      4.60  .Q        .         .         .         .
 23.26     21.9601      4.39  .Q        .         .         .         .
 23.74     22.1319      4.21  .Q        .         .         .         .
 24.22     22.2967      4.04  .Q        .         .         .         .
 24.71     22.3774      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage F

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****************************************************************************
         NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                   AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                         Analysis prepared by:

                           Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    5.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) =  7.97
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.26
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.51

****************************************************************************
  TIME     VOLUME      Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.06      0.0000     0.00  Q         .         .         .         .
  0.19      0.0012     0.22  Q         .         .         .         .
  0.33      0.0037     0.22  Q         .         .         .         .
  0.46      0.0062     0.23  Q         .         .         .         .
  0.59      0.0086     0.23  Q         .         .         .         .
  0.72      0.0111     0.23  Q         .         .         .         .
  0.86      0.0137     0.23  Q         .         .         .         .
  0.99      0.0162     0.23  Q         .         .         .         .
  1.12      0.0187     0.23  Q         .         .         .         .
  1.26      0.0213     0.23  Q         .         .         .         .
  1.39      0.0239     0.23  Q         .         .         .         .
  1.52      0.0264     0.24  Q         .         .         .         .
  1.65      0.0290     0.24  Q         .         .         .         .
  1.79      0.0317     0.24  Q         .         .         .         .
  1.92      0.0343     0.24  Q         .         .         .         .
  2.05      0.0369     0.24  Q         .         .         .         .
  2.19      0.0396     0.24  Q         .         .         .         .
  2.32      0.0423     0.24  Q         .         .         .         .
  2.45      0.0450     0.25  Q         .         .         .         .
  2.58      0.0477     0.25  Q         .         .         .         .
  2.72      0.0504     0.25  Q         .         .         .         .
  2.85      0.0531     0.25  Q         .         .         .         .
  2.98      0.0559     0.25  Q         .         .         .         .
  3.12      0.0587     0.25  Q         .         .         .         .
  3.25      0.0615     0.26  Q         .         .         .         .
  3.38      0.0643     0.26  Q         .         .         .         .
  3.51      0.0671     0.26  Q         .         .         .         .
  3.65      0.0700     0.26  Q         .         .         .         .
  3.78      0.0728     0.26  Q         .         .         .         .
  3.91      0.0757     0.26  Q         .         .         .         .
```

4.05	0.0786	0.27	Q	.	.	.	.
4.18	0.0816	0.27	Q	.	.	.	.
4.31	0.0845	0.27	Q	.	.	.	.
4.44	0.0875	0.27	Q	.	.	.	.
4.58	0.0905	0.27	Q	.	.	.	.
4.71	0.0935	0.28	Q	.	.	.	.
4.84	0.0965	0.28	Q	.	.	.	.
4.97	0.0996	0.28	Q	.	.	.	.
5.11	0.1027	0.28	Q	.	.	.	.
5.24	0.1058	0.28	Q	.	.	.	.
5.37	0.1089	0.29	Q	.	.	.	.
5.51	0.1121	0.29	Q	.	.	.	.
5.64	0.1153	0.29	Q	.	.	.	.
5.77	0.1185	0.29	Q	.	.	.	.
5.90	0.1217	0.30	Q	.	.	.	.
6.04	0.1250	0.30	Q	.	.	.	.
6.17	0.1282	0.30	Q	.	.	.	.
6.30	0.1316	0.30	Q	.	.	.	.
6.44	0.1349	0.31	Q	.	.	.	.
6.57	0.1383	0.31	Q	.	.	.	.
6.70	0.1417	0.31	Q	.	.	.	.
6.83	0.1451	0.31	Q	.	.	.	.
6.97	0.1486	0.32	Q	.	.	.	.
7.10	0.1521	0.32	Q	.	.	.	.
7.23	0.1556	0.32	Q	.	.	.	.
7.37	0.1591	0.33	Q	.	.	.	.
7.50	0.1627	0.33	Q	.	.	.	.
7.63	0.1664	0.33	Q	.	.	.	.
7.76	0.1700	0.33	Q	.	.	.	.
7.90	0.1737	0.34	Q	.	.	.	.
8.03	0.1775	0.34	Q	.	.	.	.
8.16	0.1812	0.35	Q	.	.	.	.
8.30	0.1851	0.35	Q	.	.	.	.
8.43	0.1889	0.35	Q	.	.	.	.
8.56	0.1928	0.36	Q	.	.	.	.
8.69	0.1968	0.36	Q	.	.	.	.
8.83	0.2008	0.36	Q	.	.	.	.
8.96	0.2048	0.37	Q	.	.	.	.
9.09	0.2089	0.37	Q	.	.	.	.
9.23	0.2130	0.38	Q	.	.	.	.
9.36	0.2172	0.38	Q	.	.	.	.
9.49	0.2214	0.39	Q	.	.	.	.
9.62	0.2257	0.39	Q	.	.	.	.
9.76	0.2300	0.40	Q	.	.	.	.
9.89	0.2344	0.40	Q	.	.	.	.
10.02	0.2389	0.41	Q	.	.	.	.
10.16	0.2434	0.41	Q	.	.	.	.
10.29	0.2480	0.42	Q	.	.	.	.
10.42	0.2527	0.43	Q	.	.	.	.
10.55	0.2574	0.43	Q	.	.	.	.
10.69	0.2622	0.44	Q	.	.	.	.
10.82	0.2670	0.45	Q	.	.	.	.
10.95	0.2720	0.45	Q	.	.	.	.
11.09	0.2770	0.46	Q	.	.	.	.
11.22	0.2821	0.47	Q	.	.	.	.
11.35	0.2873	0.48	Q	.	.	.	.
11.48	0.2926	0.48	Q	.	.	.	.
11.62	0.2980	0.50	Q	.	.	.	.
11.75	0.3035	0.50	.Q	.	.	.	.
11.88	0.3091	0.52	.Q	.	.	.	.
12.02	0.3148	0.52	.Q	.	.	.	.
12.15	0.3214	0.68	.Q	.	.	.	.
12.28	0.3289	0.69	.Q	.	.	.	.
12.41	0.3365	0.70	.Q	.	.	.	.
12.55	0.3443	0.71	.Q	.	.	.	.
12.68	0.3522	0.73	.Q	.	.	.	.
12.81	0.3603	0.74	.Q	.	.	.	.
12.94	0.3686	0.76	.Q	.	.	.	.
13.08	0.3770	0.78	.Q	.	.	.	.
13.21	0.3857	0.80	.Q	.	.	.	.
13.34	0.3945	0.81	.Q	.	.	.	.
13.48	0.4036	0.84	.Q	.	.	.	.
13.61	0.4130	0.86	.Q	.	.	.	.
13.74	0.4226	0.89	.Q	.	.	.	.
13.87	0.4325	0.91	.Q	.	.	.	.
14.01	0.4427	0.95	.Q	.	.	.	.
14.14	0.4533	0.97	.Q	.	.	.	.
14.27	0.4643	1.02	. Q	.	.	.	.
14.41	0.4757	1.05	. Q	.	.	.	.

```
 14.54      0.4876      1.11  . Q       .         .         .         .
 14.67      0.5000      1.15  . Q       .         .         .         .
 14.80      0.5130      1.23  . Q       .         .         .         .
 14.94      0.5269      1.29  . Q       .         .         .         .
 15.07      0.5418      1.44  . Q       .         .         .         .
 15.20      0.5581      1.53  .  Q      .         .         .         .
 15.34      0.5762      1.76  .  Q      .         .         .         .
 15.47      0.5954      1.73  .  Q      .         .         .         .
 15.60      0.6158      1.98  .  Q      .         .         .         .
 15.73      0.6392      2.29  .   Q     .         .         .         .
 15.87      0.6715      3.60  .      Q  .         .         .         .
 16.00      0.7190      5.05  .         Q         .         .         .
 16.13      0.8336     15.82  .         .         .         .Q        .
 16.27      0.9361      2.84  .    Q    .         .         .         .
 16.40      0.9613      1.75  .  Q      .         .         .         .
 16.53      0.9799      1.64  .  Q      .         .         .         .
 16.66      0.9963      1.36  . Q       .         .         .         .
 16.80      1.0103      1.19  . Q       .         .         .         .
 16.93      1.0228      1.08  . Q       .         .         .         .
 17.06      1.0342      1.00  .Q        .         .         .         .
 17.20      1.0448      0.93  .Q        .         .         .         .
 17.33      1.0547      0.88  .Q        .         .         .         .
 17.46      1.0641      0.83  .Q        .         .         .         .
 17.59      1.0729      0.79  .Q        .         .         .         .
 17.73      1.0814      0.75  .Q        .         .         .         .
 17.86      1.0895      0.72  .Q        .         .         .         .
 17.99      1.0973      0.69  .Q        .         .         .         .
 18.13      1.1041      0.55  .Q        .         .         .         .
 18.26      1.1100      0.51  .Q        .         .         .         .
 18.39      1.1154      0.49  Q         .         .         .         .
 18.52      1.1207      0.47  Q         .         .         .         .
 18.66      1.1258      0.46  Q         .         .         .         .
 18.79      1.1308      0.44  Q         .         .         .         .
 18.92      1.1356      0.43  Q         .         .         .         .
 19.06      1.1402      0.42  Q         .         .         .         .
 19.19      1.1448      0.41  Q         .         .         .         .
 19.32      1.1492      0.40  Q         .         .         .         .
 19.45      1.1535      0.39  Q         .         .         .         .
 19.59      1.1576      0.38  Q         .         .         .         .
 19.72      1.1617      0.37  Q         .         .         .         .
 19.85      1.1657      0.36  Q         .         .         .         .
 19.98      1.1696      0.35  Q         .         .         .         .
 20.12      1.1734      0.34  Q         .         .         .         .
 20.25      1.1772      0.34  Q         .         .         .         .
 20.38      1.1808      0.33  Q         .         .         .         .
 20.52      1.1844      0.32  Q         .         .         .         .
 20.65      1.1880      0.32  Q         .         .         .         .
 20.78      1.1914      0.31  Q         .         .         .         .
 20.91      1.1948      0.31  Q         .         .         .         .
 21.05      1.1982      0.30  Q         .         .         .         .
 21.18      1.2014      0.30  Q         .         .         .         .
 21.31      1.2047      0.29  Q         .         .         .         .
 21.45      1.2079      0.29  Q         .         .         .         .
 21.58      1.2110      0.28  Q         .         .         .         .
 21.71      1.2141      0.28  Q         .         .         .         .
 21.84      1.2171      0.27  Q         .         .         .         .
 21.98      1.2201      0.27  Q         .         .         .         .
 22.11      1.2231      0.27  Q         .         .         .         .
 22.24      1.2260      0.26  Q         .         .         .         .
 22.38      1.2288      0.26  Q         .         .         .         .
 22.51      1.2317      0.26  Q         .         .         .         .
 22.64      1.2345      0.25  Q         .         .         .         .
 22.77      1.2372      0.25  Q         .         .         .         .
 22.91      1.2399      0.25  Q         .         .         .         .
 23.04      1.2426      0.24  Q         .         .         .         .
 23.17      1.2453      0.24  Q         .         .         .         .
 23.31      1.2479      0.24  Q         .         .         .         .
 23.44      1.2505      0.24  Q         .         .         .         .
 23.57      1.2531      0.23  Q         .         .         .         .
 23.70      1.2556      0.23  Q         .         .         .         .
 23.84      1.2582      0.23  Q         .         .         .         .
 23.97      1.2606      0.23  Q         .         .         .         .
 24.10      1.2631      0.22  Q         .         .         .         .
 24.24      1.2643      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
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Drainage G

```
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          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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            Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                 16795 Von Karmon #100, Irvine, CA 92606


****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) =  8.11
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.39
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.16

****************************************************************************
  TIME     VOLUME      Q    0.         2.5       5.0       7.5      10.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.05      0.0000     0.00  Q          .         .         .         .
  0.19      0.0004     0.07  Q          .         .         .         .
  0.32      0.0012     0.07  Q          .         .         .         .
  0.46      0.0019     0.07  Q          .         .         .         .
  0.59      0.0027     0.07  Q          .         .         .         .
  0.73      0.0035     0.07  Q          .         .         .         .
  0.86      0.0043     0.07  Q          .         .         .         .
  1.00      0.0051     0.07  Q          .         .         .         .
  1.13      0.0059     0.07  Q          .         .         .         .
  1.27      0.0067     0.07  Q          .         .         .         .
  1.40      0.0075     0.07  Q          .         .         .         .
  1.54      0.0083     0.07  Q          .         .         .         .
  1.67      0.0092     0.07  Q          .         .         .         .
  1.81      0.0100     0.07  Q          .         .         .         .
  1.94      0.0108     0.07  Q          .         .         .         .
  2.08      0.0117     0.08  Q          .         .         .         .
  2.21      0.0125     0.08  Q          .         .         .         .
  2.35      0.0134     0.08  Q          .         .         .         .
  2.48      0.0142     0.08  Q          .         .         .         .
  2.62      0.0151     0.08  Q          .         .         .         .
  2.75      0.0159     0.08  Q          .         .         .         .
  2.89      0.0168     0.08  Q          .         .         .         .
  3.02      0.0177     0.08  Q          .         .         .         .
  3.16      0.0185     0.08  Q          .         .         .         .
  3.29      0.0194     0.08  Q          .         .         .         .
  3.43      0.0203     0.08  Q          .         .         .         .
  3.56      0.0212     0.08  Q          .         .         .         .
  3.70      0.0221     0.08  Q          .         .         .         .
  3.84      0.0230     0.08  Q          .         .         .         .
  3.97      0.0239     0.08  Q          .         .         .         .
```

```
 14.78      0.1585      0.38  .Q        .         .         .         .
 14.92      0.1628      0.39  .Q        .         .         .         .
 15.05      0.1675      0.44  .Q        .         .         .         .
 15.19      0.1726      0.47  .Q        .         .         .         .
 15.32      0.1782      0.54  . Q       .         .         .         .
 15.46      0.1843      0.54  . Q       .         .         .         .
 15.59      0.1907      0.61  . Q       .         .         .         .
 15.73      0.1980      0.70  . Q       .         .         .         .
 15.86      0.2081      1.10  .   Q     .         .         .         .
 16.00      0.2230      1.55  .     Q   .         .         .         .
 16.14      0.2588      4.86  .         .        Q.         .         .
 16.27      0.2908      0.87  .  Q      .         .         .         .
 16.41      0.2986      0.54  . Q       .         .         .         .
 16.54      0.3044      0.50  . Q       .         .         .         .
 16.68      0.3096      0.42  .Q        .         .         .         .
 16.81      0.3139      0.37  .Q        .         .         .         .
 16.95      0.3178      0.33  .Q        .         .         .         .
 17.08      0.3214      0.31  .Q        .         .         .         .
 17.22      0.3247      0.29  .Q        .         .         .         .
 17.35      0.3278      0.27  .Q        .         .         .         .
 17.49      0.3307      0.25  .Q        .         .         .         .
 17.62      0.3335      0.24  Q         .         .         .         .
 17.76      0.3362      0.23  Q         .         .         .         .
 17.89      0.3387      0.22  Q         .         .         .         .
 18.03      0.3411      0.21  Q         .         .         .         .
 18.16      0.3432      0.16  Q         .         .         .         .
 18.30      0.3450      0.16  Q         .         .         .         .
 18.43      0.3467      0.15  Q         .         .         .         .
 18.57      0.3484      0.15  Q         .         .         .         .
 18.70      0.3500      0.14  Q         .         .         .         .
 18.84      0.3515      0.14  Q         .         .         .         .
 18.97      0.3530      0.13  Q         .         .         .         .
 19.11      0.3545      0.13  Q         .         .         .         .
 19.24      0.3559      0.12  Q         .         .         .         .
 19.38      0.3573      0.12  Q         .         .         .         .
 19.51      0.3586      0.12  Q         .         .         .         .
 19.65      0.3599      0.12  Q         .         .         .         .
 19.78      0.3612      0.11  Q         .         .         .         .
 19.92      0.3624      0.11  Q         .         .         .         .
 20.06      0.3637      0.11  Q         .         .         .         .
 20.19      0.3648      0.11  Q         .         .         .         .
 20.33      0.3660      0.10  Q         .         .         .         .
 20.46      0.3672      0.10  Q         .         .         .         .
 20.60      0.3683      0.10  Q         .         .         .         .
 20.73      0.3694      0.10  Q         .         .         .         .
 20.87      0.3705      0.10  Q         .         .         .         .
 21.00      0.3715      0.09  Q         .         .         .         .
 21.14      0.3726      0.09  Q         .         .         .         .
 21.27      0.3736      0.09  Q         .         .         .         .
 21.41      0.3746      0.09  Q         .         .         .         .
 21.54      0.3756      0.09  Q         .         .         .         .
 21.68      0.3766      0.09  Q         .         .         .         .
 21.81      0.3775      0.09  Q         .         .         .         .
 21.95      0.3785      0.08  Q         .         .         .         .
 22.08      0.3794      0.08  Q         .         .         .         .
 22.22      0.3803      0.08  Q         .         .         .         .
 22.35      0.3813      0.08  Q         .         .         .         .
 22.49      0.3821      0.08  Q         .         .         .         .
 22.62      0.3830      0.08  Q         .         .         .         .
 22.76      0.3839      0.08  Q         .         .         .         .
 22.89      0.3848      0.08  Q         .         .         .         .
 23.03      0.3856      0.08  Q         .         .         .         .
 23.16      0.3865      0.07  Q         .         .         .         .
 23.30      0.3873      0.07  Q         .         .         .         .
 23.43      0.3881      0.07  Q         .         .         .         .
 23.57      0.3889      0.07  Q         .         .         .         .
 23.70      0.3897      0.07  Q         .         .         .         .
 23.84      0.3905      0.07  Q         .         .         .         .
 23.97      0.3913      0.07  Q         .         .         .         .
 24.11      0.3921      0.07  Q         .         .         .         .
 24.25      0.3925      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage H

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****************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                         Analysis prepared by:

                           Fuscoe Engineering
                 16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    7.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) =  8.42
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.53
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.62

****************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.00     0.0000      0.00  Q         .         .         .         .
  0.14     0.0016      0.27  Q         .         .         .         .
  0.28     0.0047      0.27  Q         .         .         .         .
  0.42     0.0078      0.27  Q         .         .         .         .
  0.56     0.0110      0.27  Q         .         .         .         .
  0.70     0.0142      0.28  Q         .         .         .         .
  0.84     0.0174      0.28  Q         .         .         .         .
  0.98     0.0206      0.28  Q         .         .         .         .
  1.12     0.0238      0.28  Q         .         .         .         .
  1.26     0.0271      0.28  Q         .         .         .         .
  1.41     0.0304      0.28  Q         .         .         .         .
  1.55     0.0337      0.29  Q         .         .         .         .
  1.69     0.0370      0.29  Q         .         .         .         .
  1.83     0.0403      0.29  Q         .         .         .         .
  1.97     0.0437      0.29  Q         .         .         .         .
  2.11     0.0471      0.29  Q         .         .         .         .
  2.25     0.0505      0.29  Q         .         .         .         .
  2.39     0.0539      0.30  Q         .         .         .         .
  2.53     0.0573      0.30  Q         .         .         .         .
  2.67     0.0608      0.30  Q         .         .         .         .
  2.81     0.0643      0.30  Q         .         .         .         .
  2.95     0.0678      0.30  Q         .         .         .         .
  3.09     0.0713      0.31  Q         .         .         .         .
  3.23     0.0749      0.31  Q         .         .         .         .
  3.37     0.0785      0.31  Q         .         .         .         .
  3.51     0.0821      0.31  Q         .         .         .         .
  3.65     0.0857      0.31  Q         .         .         .         .
  3.79     0.0894      0.32  Q         .         .         .         .
  3.93     0.0931      0.32  Q         .         .         .         .
  4.07     0.0968      0.32  Q         .         .         .         .
```

```
  4.21      0.1005      0.32  Q         .         .         .         .
  4.35      0.1043      0.33  Q         .         .         .         .
  4.49      0.1081      0.33  Q         .         .         .         .
  4.63      0.1119      0.33  Q         .         .         .         .
  4.77      0.1158      0.33  Q         .         .         .         .
  4.91      0.1197      0.34  Q         .         .         .         .
  5.05      0.1236      0.34  Q         .         .         .         .
  5.19      0.1275      0.34  Q         .         .         .         .
  5.33      0.1315      0.34  Q         .         .         .         .
  5.47      0.1355      0.35  Q         .         .         .         .
  5.62      0.1396      0.35  Q         .         .         .         .
  5.76      0.1437      0.35  Q         .         .         .         .
  5.90      0.1478      0.36  Q         .         .         .         .
  6.04      0.1519      0.36  Q         .         .         .         .
  6.18      0.1561      0.36  Q         .         .         .         .
  6.32      0.1603      0.37  Q         .         .         .         .
  6.46      0.1646      0.37  Q         .         .         .         .
  6.60      0.1689      0.37  Q         .         .         .         .
  6.74      0.1733      0.38  Q         .         .         .         .
  6.88      0.1776      0.38  Q         .         .         .         .
  7.02      0.1821      0.38  Q         .         .         .         .
  7.16      0.1865      0.39  Q         .         .         .         .
  7.30      0.1910      0.39  Q         .         .         .         .
  7.44      0.1956      0.40  Q         .         .         .         .
  7.58      0.2002      0.40  Q         .         .         .         .
  7.72      0.2049      0.40  Q         .         .         .         .
  7.86      0.2096      0.41  Q         .         .         .         .
  8.00      0.2143      0.41  Q         .         .         .         .
  8.14      0.2191      0.42  Q         .         .         .         .
  8.28      0.2240      0.42  Q         .         .         .         .
  8.42      0.2289      0.43  Q         .         .         .         .
  8.56      0.2339      0.43  Q         .         .         .         .
  8.70      0.2389      0.44  Q         .         .         .         .
  8.84      0.2440      0.44  Q         .         .         .         .
  8.98      0.2491      0.45  Q         .         .         .         .
  9.12      0.2544      0.45  Q         .         .         .         .
  9.26      0.2596      0.46  Q         .         .         .         .
  9.40      0.2650      0.47  Q         .         .         .         .
  9.54      0.2704      0.47  Q         .         .         .         .
  9.68      0.2759      0.48  Q         .         .         .         .
  9.83      0.2815      0.48  Q         .         .         .         .
  9.97      0.2871      0.49  Q         .         .         .         .
 10.11      0.2928      0.50  Q         .         .         .         .
 10.25      0.2987      0.51  .Q        .         .         .         .
 10.39      0.3046      0.51  .Q        .         .         .         .
 10.53      0.3106      0.52  .Q        .         .         .         .
 10.67      0.3166      0.53  .Q        .         .         .         .
 10.81      0.3228      0.54  .Q        .         .         .         .
 10.95      0.3291      0.55  .Q        .         .         .         .
 11.09      0.3355      0.56  .Q        .         .         .         .
 11.23      0.3420      0.57  .Q        .         .         .         .
 11.37      0.3487      0.58  .Q        .         .         .         .
 11.51      0.3554      0.59  .Q        .         .         .         .
 11.65      0.3623      0.60  .Q        .         .         .         .
 11.79      0.3694      0.61  .Q        .         .         .         .
 11.93      0.3765      0.63  .Q        .         .         .         .
 12.07      0.3839      0.64  .Q        .         .         .         .
 12.21      0.3923      0.82  .Q        .         .         .         .
 12.35      0.4020      0.84  .Q        .         .         .         .
 12.49      0.4118      0.86  .Q        .         .         .         .
 12.63      0.4218      0.87  .Q        .         .         .         .
 12.77      0.4320      0.90  .Q        .         .         .         .
 12.91      0.4425      0.91  .Q        .         .         .         .
 13.05      0.4532      0.94  .Q        .         .         .         .
 13.19      0.4642      0.95  .Q        .         .         .         .
 13.33      0.4755      0.99  .Q        .         .         .         .
 13.47      0.4871      1.01  . Q       .         .         .         .
 13.61      0.4990      1.05  . Q       .         .         .         .
 13.75      0.5112      1.07  . Q       .         .         .         .
 13.90      0.5239      1.12  . Q       .         .         .         .
 14.04      0.5370      1.14  . Q       .         .         .         .
 14.18      0.5506      1.20  . Q       .         .         .         .
 14.32      0.5647      1.23  . Q       .         .         .         .
 14.46      0.5794      1.31  . Q       .         .         .         .
 14.60      0.5948      1.35  . Q       .         .         .         .
 14.74      0.6110      1.44  . Q       .         .         .         .
 14.88      0.6280      1.50  . Q       .         .         .         .
 15.02      0.6464      1.67  .  Q      .         .         .         .
 15.16      0.6664      1.78  .  Q      .         .         .         .
```

```
 15.30      0.6887      2.05  .   Q     .         .         .         .
 15.44      0.7132      2.18  .   Q     .         .         .         .
 15.58      0.7391      2.30  .   Q     .         .         .         .
 15.72      0.7678      2.66  .    Q    .         .         .         .
 15.86      0.8075      4.19  .       Q .         .         .         .
 16.00      0.8660      5.89  .         .Q        .         .         .
 16.14      1.0073     18.48  .         .         .         .     Q   .
 16.28      1.1335      3.27  .     Q   .         .         .         .
 16.42      1.1642      2.03  .   Q     .         .         .         .
 16.56      1.1870      1.91  .  Q      .         .         .         .
 16.70      1.2072      1.58  .  Q      .         .         .         .
 16.84      1.2245      1.39  . Q       .         .         .         .
 16.98      1.2399      1.27  . Q       .         .         .         .
 17.12      1.2540      1.17  . Q       .         .         .         .
 17.26      1.2671      1.09  . Q       .         .         .         .
 17.40      1.2794      1.03  . Q       .         .         .         .
 17.54      1.2910      0.97  .Q        .         .         .         .
 17.68      1.3020      0.92  .Q        .         .         .         .
 17.82      1.3125      0.88  .Q        .         .         .         .
 17.96      1.3225      0.85  .Q        .         .         .         .
 18.11      1.3319      0.77  .Q        .         .         .         .
 18.25      1.3400      0.62  .Q        .         .         .         .
 18.39      1.3470      0.59  .Q        .         .         .         .
 18.53      1.3538      0.57  .Q        .         .         .         .
 18.67      1.3603      0.55  .Q        .         .         .         .
 18.81      1.3666      0.53  .Q        .         .         .         .
 18.95      1.3727      0.52  .Q        .         .         .         .
 19.09      1.3786      0.50  .Q        .         .         .         .
 19.23      1.3843      0.49  Q         .         .         .         .
 19.37      1.3899      0.47  Q         .         .         .         .
 19.51      1.3953      0.46  Q         .         .         .         .
 19.65      1.4006      0.45  Q         .         .         .         .
 19.79      1.4057      0.44  Q         .         .         .         .
 19.93      1.4108      0.43  Q         .         .         .         .
 20.07      1.4157      0.42  Q         .         .         .         .
 20.21      1.4205      0.41  Q         .         .         .         .
 20.35      1.4252      0.40  Q         .         .         .         .
 20.49      1.4298      0.39  Q         .         .         .         .
 20.63      1.4343      0.39  Q         .         .         .         .
 20.77      1.4387      0.38  Q         .         .         .         .
 20.91      1.4431      0.37  Q         .         .         .         .
 21.05      1.4473      0.36  Q         .         .         .         .
 21.19      1.4515      0.36  Q         .         .         .         .
 21.33      1.4556      0.35  Q         .         .         .         .
 21.47      1.4597      0.35  Q         .         .         .         .
 21.61      1.4637      0.34  Q         .         .         .         .
 21.75      1.4676      0.34  Q         .         .         .         .
 21.89      1.4714      0.33  Q         .         .         .         .
 22.03      1.4752      0.33  Q         .         .         .         .
 22.17      1.4790      0.32  Q         .         .         .         .
 22.32      1.4827      0.32  Q         .         .         .         .
 22.46      1.4863      0.31  Q         .         .         .         .
 22.60      1.4899      0.31  Q         .         .         .         .
 22.74      1.4934      0.30  Q         .         .         .         .
 22.88      1.4969      0.30  Q         .         .         .         .
 23.02      1.5004      0.30  Q         .         .         .         .
 23.16      1.5038      0.29  Q         .         .         .         .
 23.30      1.5071      0.29  Q         .         .         .         .
 23.44      1.5104      0.28  Q         .         .         .         .
 23.58      1.5137      0.28  Q         .         .         .         .
 23.72      1.5169      0.28  Q         .         .         .         .
 23.86      1.5201      0.27  Q         .         .         .         .
 24.00      1.5233      0.27  Q         .         .         .         .
 24.14      1.5264      0.27  Q         .         .         .         .
 24.28      1.5280      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
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Drainage I

```
****************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) =  9.63
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.24
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.10

****************************************************************************
  TIME     VOLUME       Q    0.         2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.11      0.0002      0.04  Q         .         .         .         .
  0.27      0.0008      0.04  Q         .         .         .         .
  0.43      0.0013      0.04  Q         .         .         .         .
  0.59      0.0019      0.04  Q         .         .         .         .
  0.75      0.0025      0.04  Q         .         .         .         .
  0.91      0.0030      0.04  Q         .         .         .         .
  1.07      0.0036      0.04  Q         .         .         .         .
  1.23      0.0042      0.04  Q         .         .         .         .
  1.39      0.0048      0.04  Q         .         .         .         .
  1.55      0.0054      0.04  Q         .         .         .         .
  1.72      0.0060      0.05  Q         .         .         .         .
  1.88      0.0066      0.05  Q         .         .         .         .
  2.04      0.0072      0.05  Q         .         .         .         .
  2.20      0.0078      0.05  Q         .         .         .         .
  2.36      0.0084      0.05  Q         .         .         .         .
  2.52      0.0090      0.05  Q         .         .         .         .
  2.68      0.0096      0.05  Q         .         .         .         .
  2.84      0.0103      0.05  Q         .         .         .         .
  3.00      0.0109      0.05  Q         .         .         .         .
  3.16      0.0115      0.05  Q         .         .         .         .
  3.32      0.0122      0.05  Q         .         .         .         .
  3.48      0.0128      0.05  Q         .         .         .         .
  3.64      0.0135      0.05  Q         .         .         .         .
  3.80      0.0141      0.05  Q         .         .         .         .
  3.96      0.0148      0.05  Q         .         .         .         .
  4.12      0.0155      0.05  Q         .         .         .         .
  4.28      0.0161      0.05  Q         .         .         .         .
  4.44      0.0168      0.05  Q         .         .         .         .
  4.60      0.0175      0.05  Q         .         .         .         .
  4.76      0.0182      0.05  Q         .         .         .         .
```

```
  4.93       0.0189      0.05  Q          .          .          .          .
  5.09       0.0196      0.05  Q          .          .          .          .
  5.25       0.0203      0.05  Q          .          .          .          .
  5.41       0.0210      0.05  Q          .          .          .          .
  5.57       0.0218      0.05  Q          .          .          .          .
  5.73       0.0225      0.06  Q          .          .          .          .
  5.89       0.0232      0.06  Q          .          .          .          .
  6.05       0.0240      0.06  Q          .          .          .          .
  6.21       0.0247      0.06  Q          .          .          .          .
  6.37       0.0255      0.06  Q          .          .          .          .
  6.53       0.0263      0.06  Q          .          .          .          .
  6.69       0.0270      0.06  Q          .          .          .          .
  6.85       0.0278      0.06  Q          .          .          .          .
  7.01       0.0286      0.06  Q          .          .          .          .
  7.17       0.0294      0.06  Q          .          .          .          .
  7.33       0.0302      0.06  Q          .          .          .          .
  7.49       0.0310      0.06  Q          .          .          .          .
  7.65       0.0319      0.06  Q          .          .          .          .
  7.81       0.0327      0.06  Q          .          .          .          .
  7.97       0.0336      0.06  Q          .          .          .          .
  8.14       0.0344      0.07  Q          .          .          .          .
  8.30       0.0353      0.07  Q          .          .          .          .
  8.46       0.0362      0.07  Q          .          .          .          .
  8.62       0.0371      0.07  Q          .          .          .          .
  8.78       0.0380      0.07  Q          .          .          .          .
  8.94       0.0389      0.07  Q          .          .          .          .
  9.10       0.0398      0.07  Q          .          .          .          .
  9.26       0.0408      0.07  Q          .          .          .          .
  9.42       0.0417      0.07  Q          .          .          .          .
  9.58       0.0427      0.07  Q          .          .          .          .
  9.74       0.0437      0.08  Q          .          .          .          .
  9.90       0.0447      0.08  Q          .          .          .          .
 10.06       0.0457      0.08  Q          .          .          .          .
 10.22       0.0468      0.08  Q          .          .          .          .
 10.38       0.0478      0.08  Q          .          .          .          .
 10.54       0.0489      0.08  Q          .          .          .          .
 10.70       0.0500      0.08  Q          .          .          .          .
 10.86       0.0511      0.08  Q          .          .          .          .
 11.02       0.0523      0.09  Q          .          .          .          .
 11.18       0.0534      0.09  Q          .          .          .          .
 11.35       0.0546      0.09  Q          .          .          .          .
 11.51       0.0558      0.09  Q          .          .          .          .
 11.67       0.0571      0.09  Q          .          .          .          .
 11.83       0.0583      0.10  Q          .          .          .          .
 11.99       0.0596      0.10  Q          .          .          .          .
 12.15       0.0610      0.11  Q          .          .          .          .
 12.31       0.0626      0.13  Q          .          .          .          .
 12.47       0.0644      0.13  Q          .          .          .          .
 12.63       0.0662      0.14  Q          .          .          .          .
 12.79       0.0680      0.14  Q          .          .          .          .
 12.95       0.0699      0.14  Q          .          .          .          .
 13.11       0.0718      0.15  Q          .          .          .          .
 13.27       0.0738      0.15  Q          .          .          .          .
 13.43       0.0759      0.16  Q          .          .          .          .
 13.59       0.0780      0.16  Q          .          .          .          .
 13.75       0.0802      0.17  Q          .          .          .          .
 13.91       0.0824      0.18  Q          .          .          .          .
 14.07       0.0848      0.18  Q          .          .          .          .
 14.23       0.0873      0.19  Q          .          .          .          .
 14.40       0.0898      0.20  Q          .          .          .          .
 14.56       0.0926      0.21  Q          .          .          .          .
 14.72       0.0954      0.22  Q          .          .          .          .
 14.88       0.0985      0.24  Q          .          .          .          .
 15.04       0.1017      0.26  .Q         .          .          .          .
 15.20       0.1054      0.29  .Q         .          .          .          .
 15.36       0.1095      0.32  .Q         .          .          .          .
 15.52       0.1138      0.33  .Q         .          .          .          .
 15.68       0.1184      0.38  .Q         .          .          .          .
 15.84       0.1249      0.60  . Q        .          .          .          .
 16.00       0.1346      0.85  .  Q       .          .          .          .
 16.16       0.1580      2.68  .          Q          .          .          .
 16.32       0.1788      0.46  .Q         .          .          .          .
 16.48       0.1841      0.34  .Q         .          .          .          .
 16.64       0.1881      0.27  .Q         .          .          .          .
 16.80       0.1915      0.23  Q          .          .          .          .
 16.96       0.1943      0.20  Q          .          .          .          .
 17.12       0.1969      0.19  Q          .          .          .          .
 17.28       0.1993      0.17  Q          .          .          .          .
 17.44       0.2015      0.16  Q          .          .          .          .
```

17.61	0.2035	0.15	Q	.	.	.	.
17.77	0.2055	0.14	Q	.	.	.	.
17.93	0.2073	0.14	Q	.	.	.	.
18.09	0.2091	0.13	Q	.	.	.	.
18.25	0.2106	0.10	Q	.	.	.	.
18.41	0.2118	0.09	Q	.	.	.	.
18.57	0.2130	0.09	Q	.	.	.	.
18.73	0.2142	0.09	Q	.	.	.	.
18.89	0.2153	0.08	Q	.	.	.	.
19.05	0.2164	0.08	Q	.	.	.	.
19.21	0.2174	0.08	Q	.	.	.	.
19.37	0.2184	0.07	Q	.	.	.	.
19.53	0.2194	0.07	Q	.	.	.	.
19.69	0.2204	0.07	Q	.	.	.	.
19.85	0.2213	0.07	Q	.	.	.	.
20.01	0.2222	0.07	Q	.	.	.	.
20.17	0.2230	0.06	Q	.	.	.	.
20.33	0.2239	0.06	Q	.	.	.	.
20.49	0.2247	0.06	Q	.	.	.	.
20.65	0.2255	0.06	Q	.	.	.	.
20.82	0.2263	0.06	Q	.	.	.	.
20.98	0.2271	0.06	Q	.	.	.	.
21.14	0.2279	0.06	Q	.	.	.	.
21.30	0.2286	0.06	Q	.	.	.	.
21.46	0.2293	0.05	Q	.	.	.	.
21.62	0.2301	0.05	Q	.	.	.	.
21.78	0.2308	0.05	Q	.	.	.	.
21.94	0.2315	0.05	Q	.	.	.	.
22.10	0.2321	0.05	Q	.	.	.	.
22.26	0.2328	0.05	Q	.	.	.	.
22.42	0.2335	0.05	Q	.	.	.	.
22.58	0.2341	0.05	Q	.	.	.	.
22.74	0.2347	0.05	Q	.	.	.	.
22.90	0.2354	0.05	Q	.	.	.	.
23.06	0.2360	0.05	Q	.	.	.	.
23.22	0.2366	0.05	Q	.	.	.	.
23.38	0.2372	0.04	Q	.	.	.	.
23.54	0.2378	0.04	Q	.	.	.	.
23.70	0.2384	0.04	Q	.	.	.	.
23.86	0.2390	0.04	Q	.	.	.	.
24.02	0.2395	0.04	Q	.	.	.	.
24.19	0.2398	0.00	Q	.	.	.	.

Drainage J

4.11	0.0249	0.08	Q	.	.	.	.
4.24	0.0258	0.08	Q	.	.	.	.
4.38	0.0267	0.08	Q	.	.	.	.
4.51	0.0277	0.08	Q	.	.	.	.
4.65	0.0286	0.09	Q	.	.	.	.
4.78	0.0296	0.09	Q	.	.	.	.
4.92	0.0305	0.09	Q	.	.	.	.
5.05	0.0315	0.09	Q	.	.	.	.
5.19	0.0325	0.09	Q	.	.	.	.
5.32	0.0335	0.09	Q	.	.	.	.
5.46	0.0345	0.09	Q	.	.	.	.
5.59	0.0355	0.09	Q	.	.	.	.
5.73	0.0365	0.09	Q	.	.	.	.
5.86	0.0375	0.09	Q	.	.	.	.
6.00	0.0385	0.09	Q	.	.	.	.
6.13	0.0396	0.09	Q	.	.	.	.
6.27	0.0406	0.09	Q	.	.	.	.
6.40	0.0417	0.09	Q	.	.	.	.
6.54	0.0427	0.10	Q	.	.	.	.
6.67	0.0438	0.10	Q	.	.	.	.
6.81	0.0449	0.10	Q	.	.	.	.
6.94	0.0460	0.10	Q	.	.	.	.
7.08	0.0471	0.10	Q	.	.	.	.
7.21	0.0482	0.10	Q	.	.	.	.
7.35	0.0493	0.10	Q	.	.	.	.
7.48	0.0504	0.10	Q	.	.	.	.
7.62	0.0516	0.10	Q	.	.	.	.
7.75	0.0527	0.10	Q	.	.	.	.
7.89	0.0539	0.10	Q	.	.	.	.
8.03	0.0551	0.11	Q	.	.	.	.
8.16	0.0563	0.11	Q	.	.	.	.
8.30	0.0575	0.11	Q	.	.	.	.
8.43	0.0587	0.11	Q	.	.	.	.
8.57	0.0599	0.11	Q	.	.	.	.
8.70	0.0612	0.11	Q	.	.	.	.
8.84	0.0624	0.11	Q	.	.	.	.
8.97	0.0637	0.11	Q	.	.	.	.
9.11	0.0650	0.12	Q	.	.	.	.
9.24	0.0663	0.12	Q	.	.	.	.
9.38	0.0676	0.12	Q	.	.	.	.
9.51	0.0690	0.12	Q	.	.	.	.
9.65	0.0703	0.12	Q	.	.	.	.
9.78	0.0717	0.12	Q	.	.	.	.
9.92	0.0731	0.13	Q	.	.	.	.
10.05	0.0745	0.13	Q	.	.	.	.
10.19	0.0759	0.13	Q	.	.	.	.
10.32	0.0774	0.13	Q	.	.	.	.
10.46	0.0789	0.13	Q	.	.	.	.
10.59	0.0804	0.13	Q	.	.	.	.
10.73	0.0819	0.14	Q	.	.	.	.
10.86	0.0834	0.14	Q	.	.	.	.
11.00	0.0850	0.14	Q	.	.	.	.
11.13	0.0866	0.14	Q	.	.	.	.
11.27	0.0882	0.15	Q	.	.	.	.
11.40	0.0899	0.15	Q	.	.	.	.
11.54	0.0915	0.15	Q	.	.	.	.
11.67	0.0933	0.15	Q	.	.	.	.
11.81	0.0950	0.16	Q	.	.	.	.
11.95	0.0968	0.16	Q	.	.	.	.
12.08	0.0987	0.18	Q	.	.	.	.
12.22	0.1009	0.21	Q	.	.	.	.
12.35	0.1033	0.22	Q	.	.	.	.
12.49	0.1057	0.22	Q	.	.	.	.
12.62	0.1082	0.23	Q	.	.	.	.
12.76	0.1107	0.23	Q	.	.	.	.
12.89	0.1133	0.24	Q	.	.	.	.
13.03	0.1160	0.24	Q	.	.	.	.
13.16	0.1187	0.25	Q	.	.	.	.
13.30	0.1214	0.25	.Q	.	.	.	.
13.43	0.1243	0.26	.Q	.	.	.	.
13.57	0.1272	0.26	.Q	.	.	.	.
13.70	0.1302	0.27	.Q	.	.	.	.
13.84	0.1333	0.28	.Q	.	.	.	.
13.97	0.1365	0.29	.Q	.	.	.	.
14.11	0.1398	0.30	.Q	.	.	.	.
14.24	0.1433	0.31	.Q	.	.	.	.
14.38	0.1468	0.32	.Q	.	.	.	.
14.51	0.1505	0.34	.Q	.	.	.	.
14.65	0.1544	0.35	.Q	.	.	.	.

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          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                          Analysis prepared by:

                            Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   11.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) = 13.89
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.40
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.97

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  TIME     VOLUME       Q    0.         7.5       15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.03      0.0000     0.00  Q          .         .         .         .
  0.26      0.0040     0.42  Q          .         .         .         .
  0.49      0.0122     0.43  Q          .         .         .         .
  0.72      0.0204     0.43  Q          .         .         .         .
  0.95      0.0287     0.44  Q          .         .         .         .
  1.18      0.0371     0.44  Q          .         .         .         .
  1.42      0.0455     0.44  Q          .         .         .         .
  1.65      0.0541     0.45  Q          .         .         .         .
  1.88      0.0627     0.45  Q          .         .         .         .
  2.11      0.0714     0.46  Q          .         .         .         .
  2.34      0.0802     0.46  Q          .         .         .         .
  2.57      0.0891     0.47  Q          .         .         .         .
  2.80      0.0981     0.47  Q          .         .         .         .
  3.04      0.1072     0.48  Q          .         .         .         .
  3.27      0.1164     0.48  Q          .         .         .         .
  3.50      0.1257     0.49  Q          .         .         .         .
  3.73      0.1351     0.50  Q          .         .         .         .
  3.96      0.1446     0.50  Q          .         .         .         .
  4.19      0.1542     0.51  Q          .         .         .         .
  4.42      0.1640     0.51  Q          .         .         .         .
  4.66      0.1739     0.52  Q          .         .         .         .
  4.89      0.1839     0.52  Q          .         .         .         .
  5.12      0.1940     0.53  Q          .         .         .         .
  5.35      0.2042     0.54  Q          .         .         .         .
  5.58      0.2146     0.55  Q          .         .         .         .
  5.81      0.2252     0.55  Q          .         .         .         .
  6.05      0.2359     0.56  Q          .         .         .         .
  6.28      0.2467     0.57  Q          .         .         .         .
  6.51      0.2577     0.58  Q          .         .         .         .
  6.74      0.2689     0.59  Q          .         .         .         .
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  6.97      0.2802     0.60  Q         .         .         .         .
  7.20      0.2917     0.61  Q         .         .         .         .
  7.43      0.3035     0.62  Q         .         .         .         .
  7.67      0.3154     0.63  Q         .         .         .         .
  7.90      0.3275     0.64  Q         .         .         .         .
  8.13      0.3398     0.65  Q         .         .         .         .
  8.36      0.3524     0.66  Q         .         .         .         .
  8.59      0.3651     0.67  Q         .         .         .         .
  8.82      0.3782     0.69  Q         .         .         .         .
  9.05      0.3915     0.70  Q         .         .         .         .
  9.29      0.4050     0.72  Q         .         .         .         .
  9.52      0.4189     0.73  Q         .         .         .         .
  9.75      0.4331     0.75  .Q        .         .         .         .
  9.98      0.4476     0.76  .Q        .         .         .         .
 10.21      0.4624     0.79  .Q        .         .         .         .
 10.44      0.4776     0.80  .Q        .         .         .         .
 10.68      0.4932     0.83  .Q        .         .         .         .
 10.91      0.5092     0.84  .Q        .         .         .         .
 11.14      0.5256     0.88  .Q        .         .         .         .
 11.37      0.5426     0.89  .Q        .         .         .         .
 11.60      0.5600     0.93  .Q        .         .         .         .
 11.83      0.5781     0.95  .Q        .         .         .         .
 12.06      0.5967     1.00  .Q        .         .         .         .
 12.30      0.6183     1.26  .Q        .         .         .         .
 12.53      0.6433     1.34  .Q        .         .         .         .
 12.76      0.6693     1.38  .Q        .         .         .         .
 12.99      0.6963     1.44  .Q        .         .         .         .
 13.22      0.7243     1.48  .Q        .         .         .         .
 13.45      0.7535     1.57  . Q       .         .         .         .
 13.68      0.7840     1.62  . Q       .         .         .         .
 13.92      0.8162     1.74  . Q       .         .         .         .
 14.15      0.8501     1.80  . Q       .         .         .         .
 14.38      0.8861     1.97  . Q       .         .         .         .
 14.61      0.9247     2.06  . Q       .         .         .         .
 14.84      0.9665     2.31  .  Q      .         .         .         .
 15.07      1.0125     2.50  .  Q      .         .         .         .
 15.31      1.0660     3.09  .   Q     .         .         .         .
 15.54      1.1273     3.32  .   Q     .         .         .         .
 15.77      1.2022     4.51  .     Q   .         .         .         .
 16.00      1.3096     6.72  .       Q .         .         .         .
 16.23      1.5797    21.51  .         .         .       Q .         .
 16.46      1.8188     3.49  .   Q     .         .         .         .
 16.69      1.8786     2.76  .  Q      .         .         .         .
 16.93      1.9258     2.18  . Q       .         .         .         .
 17.16      1.9646     1.88  . Q       .         .         .         .
 17.39      1.9987     1.68  . Q       .         .         .         .
 17.62      2.0293     1.53  . Q       .         .         .         .
 17.85      2.0574     1.41  .Q        .         .         .         .
 18.08      2.0834     1.31  .Q        .         .         .         .
 18.32      2.1053     0.97  .Q        .         .         .         .
 18.55      2.1233     0.91  .Q        .         .         .         .
 18.78      2.1403     0.86  .Q        .         .         .         .
 19.01      2.1563     0.81  .Q        .         .         .         .
 19.24      2.1715     0.78  .Q        .         .         .         .
 19.47      2.1860     0.74  Q         .         .         .         .
 19.70      2.1999     0.71  Q         .         .         .         .
 19.94      2.2132     0.68  Q         .         .         .         .
 20.17      2.2260     0.66  Q         .         .         .         .
 20.40      2.2383     0.63  Q         .         .         .         .
 20.63      2.2502     0.61  Q         .         .         .         .
 20.86      2.2617     0.59  Q         .         .         .         .
 21.09      2.2729     0.58  Q         .         .         .         .
 21.32      2.2838     0.56  Q         .         .         .         .
 21.56      2.2943     0.54  Q         .         .         .         .
 21.79      2.3046     0.53  Q         .         .         .         .
 22.02      2.3146     0.52  Q         .         .         .         .
 22.25      2.3243     0.50  Q         .         .         .         .
 22.48      2.3338     0.49  Q         .         .         .         .
 22.71      2.3431     0.48  Q         .         .         .         .
 22.94      2.3522     0.47  Q         .         .         .         .
 23.18      2.3611     0.46  Q         .         .         .         .
 23.41      2.3698     0.45  Q         .         .         .         .
 23.64      2.3784     0.44  Q         .         .         .         .
 23.87      2.3867     0.43  Q         .         .         .         .
 24.10      2.3950     0.43  Q         .         .         .         .
 24.33      2.3990     0.00  Q         .         .         .         .
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Drainage K

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          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                          Analysis prepared by:

                            Fuscoe Engineering
                 16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    6.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.080
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) = 11.39
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.37
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.56

****************************************************************************
  TIME     VOLUME      Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.05      0.0000     0.00  Q         .         .         .         .
  0.24      0.0019     0.24  Q         .         .         .         .
  0.43      0.0057     0.24  Q         .         .         .         .
  0.62      0.0096     0.25  Q         .         .         .         .
  0.81      0.0135     0.25  Q         .         .         .         .
  1.00      0.0174     0.25  Q         .         .         .         .
  1.19      0.0213     0.25  Q         .         .         .         .
  1.38      0.0253     0.25  Q         .         .         .         .
  1.57      0.0293     0.26  Q         .         .         .         .
  1.76      0.0333     0.26  Q         .         .         .         .
  1.95      0.0374     0.26  Q         .         .         .         .
  2.14      0.0415     0.26  Q         .         .         .         .
  2.33      0.0457     0.26  Q         .         .         .         .
  2.52      0.0499     0.27  Q         .         .         .         .
  2.71      0.0541     0.27  Q         .         .         .         .
  2.90      0.0583     0.27  Q         .         .         .         .
  3.09      0.0626     0.27  Q         .         .         .         .
  3.28      0.0669     0.28  Q         .         .         .         .
  3.47      0.0713     0.28  Q         .         .         .         .
  3.66      0.0757     0.28  Q         .         .         .         .
  3.85      0.0802     0.28  Q         .         .         .         .
  4.04      0.0847     0.29  Q         .         .         .         .
  4.23      0.0892     0.29  Q         .         .         .         .
  4.42      0.0938     0.29  Q         .         .         .         .
  4.61      0.0985     0.30  Q         .         .         .         .
  4.80      0.1031     0.30  Q         .         .         .         .
  4.99      0.1079     0.30  Q         .         .         .         .
  5.18      0.1127     0.31  Q         .         .         .         .
  5.37      0.1175     0.31  Q         .         .         .         .
  5.56      0.1224     0.31  Q         .         .         .         .
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```
  5.75      0.1273      0.32  Q         .         .         .         .
  5.94      0.1323      0.32  Q         .         .         .         .
  6.13      0.1374      0.32  Q         .         .         .         .
  6.32      0.1425      0.33  Q         .         .         .         .
  6.51      0.1477      0.33  Q         .         .         .         .
  6.70      0.1530      0.34  Q         .         .         .         .
  6.89      0.1583      0.34  Q         .         .         .         .
  7.08      0.1637      0.35  Q         .         .         .         .
  7.27      0.1691      0.35  Q         .         .         .         .
  7.46      0.1747      0.36  Q         .         .         .         .
  7.65      0.1803      0.36  Q         .         .         .         .
  7.84      0.1859      0.37  Q         .         .         .         .
  8.03      0.1917      0.37  Q         .         .         .         .
  8.22      0.1976      0.38  Q         .         .         .         .
  8.41      0.2035      0.38  Q         .         .         .         .
  8.60      0.2096      0.39  Q         .         .         .         .
  8.79      0.2157      0.39  Q         .         .         .         .
  8.98      0.2219      0.40  Q         .         .         .         .
  9.17      0.2283      0.41  Q         .         .         .         .
  9.36      0.2347      0.42  Q         .         .         .         .
  9.55      0.2413      0.42  Q         .         .         .         .
  9.74      0.2479      0.43  Q         .         .         .         .
  9.93      0.2547      0.44  Q         .         .         .         .
 10.12      0.2617      0.45  Q         .         .         .         .
 10.30      0.2687      0.45  Q         .         .         .         .
 10.49      0.2760      0.47  Q         .         .         .         .
 10.68      0.2833      0.47  Q         .         .         .         .
 10.87      0.2909      0.49  Q         .         .         .         .
 11.06      0.2986      0.50  Q         .         .         .         .
 11.25      0.3065      0.51  .Q        .         .         .         .
 11.44      0.3146      0.52  .Q        .         .         .         .
 11.63      0.3229      0.54  .Q        .         .         .         .
 11.82      0.3314      0.55  .Q        .         .         .         .
 12.01      0.3401      0.57  .Q        .         .         .         .
 12.20      0.3499      0.67  .Q        .         .         .         .
 12.39      0.3611      0.76  .Q        .         .         .         .
 12.58      0.3731      0.77  .Q        .         .         .         .
 12.77      0.3854      0.80  .Q        .         .         .         .
 12.96      0.3981      0.82  .Q        .         .         .         .
 13.15      0.4113      0.86  .Q        .         .         .         .
 13.34      0.4249      0.88  .Q        .         .         .         .
 13.53      0.4389      0.92  .Q        .         .         .         .
 13.72      0.4536      0.94  .Q        .         .         .         .
 13.91      0.4688      1.00  . Q       .         .         .         .
 14.10      0.4847      1.03  . Q       .         .         .         .
 14.29      0.5015      1.11  . Q       .         .         .         .
 14.48      0.5192      1.15  . Q       .         .         .         .
 14.67      0.5380      1.25  . Q       .         .         .         .
 14.86      0.5582      1.31  . Q       .         .         .         .
 15.05      0.5803      1.51  .  Q      .         .         .         .
 15.24      0.6050      1.64  .  Q      .         .         .         .
 15.43      0.6329      1.92  .  Q      .         .         .         .
 15.62      0.6630      1.92  .  Q      .         .         .         .
 15.81      0.7018      3.04  .     Q   .         .         .         .
 16.00      0.7600      4.37  .       Q .         .         .         .
 16.19      0.9032     13.88  .         .         .      Q  .         .
 16.38      1.0302      2.31  .   Q     .         .         .         .
 16.57      1.0625      1.81  .  Q      .         .         .         .
 16.76      1.0876      1.39  . Q       .         .         .         .
 16.95      1.1079      1.20  . Q       .         .         .         .
 17.14      1.1257      1.07  . Q       .         .         .         .
 17.33      1.1416      0.97  .Q        .         .         .         .
 17.52      1.1563      0.90  .Q        .         .         .         .
 17.71      1.1699      0.84  .Q        .         .         .         .
 17.90      1.1826      0.79  .Q        .         .         .         .
 18.09      1.1946      0.74  .Q        .         .         .         .
 18.28      1.2048      0.56  .Q        .         .         .         .
 18.47      1.2134      0.53  .Q        .         .         .         .
 18.66      1.2215      0.50  .Q        .         .         .         .
 18.85      1.2292      0.48  Q         .         .         .         .
 19.04      1.2366      0.46  Q         .         .         .         .
 19.23      1.2436      0.44  Q         .         .         .         .
 19.42      1.2504      0.43  Q         .         .         .         .
 19.61      1.2570      0.41  Q         .         .         .         .
 19.80      1.2633      0.40  Q         .         .         .         .
 19.99      1.2695      0.38  Q         .         .         .         .
 20.18      1.2754      0.37  Q         .         .         .         .
 20.37      1.2812      0.36  Q         .         .         .         .
 20.56      1.2868      0.35  Q         .         .         .         .
```

20.75	1.2923	0.34	Q	.	.	.	.
20.94	1.2976	0.33	Q	.	.	.	.
21.13	1.3028	0.33	Q	.	.	.	.
21.32	1.3078	0.32	Q	.	.	.	.
21.51	1.3128	0.31	Q	.	.	.	.
21.69	1.3176	0.30	Q	.	.	.	.
21.88	1.3223	0.30	Q	.	.	.	.
22.07	1.3270	0.29	Q	.	.	.	.
22.26	1.3315	0.29	Q	.	.	.	.
22.45	1.3360	0.28	Q	.	.	.	.
22.64	1.3403	0.28	Q	.	.	.	.
22.83	1.3446	0.27	Q	.	.	.	.
23.02	1.3489	0.27	Q	.	.	.	.
23.21	1.3530	0.26	Q	.	.	.	.
23.40	1.3571	0.26	Q	.	.	.	.
23.59	1.3611	0.25	Q	.	.	.	.
23.78	1.3650	0.25	Q	.	.	.	.
23.97	1.3689	0.25	Q	.	.	.	.
24.16	1.3727	0.24	Q	.	.	.	.
24.35	1.3746	0.00	Q	.	.	.	.

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b) Expected Value (50% Confidence) Events

i. Infiltration Analysis

INFILTRATION RATE CALCULATION SUMMARY

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION
100-YEAR EXPECTED VALUE EVENT

Existing Condition											
Node	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Total Area (ac)	349.56	135.09	63.61	14.29	97.15	5.80	1.75	6.99	1.06	11.00	6.30
Y	0.69	0.83	0.66	0.70	0.83	0.76	0.76	0.76	0.76	0.76	0.76
Ybar	0.31	0.17	0.34	0.30	0.17	0.24	0.24	0.24	0.24	0.24	0.24
Average a_p	0.64	0.37	1.00	0.68	0.30	0.20	0.20	0.20	0.20	0.20	0.20
Total Fm (in/hr)	0.19	0.11	0.30	0.20	0.09	0.06	0.06	0.06	0.06	0.06	0.06

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m} \qquad Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}} \qquad Y = \frac{Y_1A_1 + Y_2A_2 + \ldots + Y_mA_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_jA_j \qquad F_m = a_pF_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 349.56

Y = 0.69

Ybar = 1 - Y = **0.31**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.64

Total Fm (in/hr) = **0.19**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.00	0.000	0.10	0.30	0.03	0.001
					Impervious	6.81	0.019	98	0.20	0.04	0.95	0.018				
2	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.45	0.000	0.10	0.30	0.03	0.000
					Impervious	2.39	0.007	98	0.20	0.04	0.95	0.006				
3	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.026	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.008
					Impervious	36.22	0.104	98	0.20	0.04	0.95	0.098				
4	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.018	56	7.86	1.57	0.18	0.003	0.20	0.30	0.06	0.005
					Impervious	25.47	0.073	98	0.20	0.04	0.95	0.069				
5	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.015	75	3.33	0.67	0.45	0.007	0.20	0.30	0.06	0.005
					Impervious	21.21	0.061	98	0.20	0.04	0.95	0.057				
6	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.009	75	3.33	0.67	0.45	0.004	0.10	0.30	0.03	0.003
					Impervious	28.72	0.082	98	0.20	0.04	0.95	0.078				
7	Oil Operations	100%	11.89	D	Pervious	11.89	0.034	93	0.75	0.15	0.82	0.028	1.00	0.30	0.30	0.010
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
8	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.048	46	11.74	2.35	0.07	0.004	1.00	0.30	0.30	0.014
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
9	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.51	0.001	0.10	0.30	0.03	0.001
					Impervious	5.90	0.017	98	0.20	0.04	0.95	0.016				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	4.78	A	Pervious	4.78	0.014	78	2.82	0.56	0.51	0.007	1.00	0.30	0.30	0.004
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
2	Oil Operations / Barren Area	100%	10.98	D	Pervious	10.98	0.031	93	0.75	0.15	0.82	0.026	1.00	0.30	0.30	0.009
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
3	Open Space / Habitat Area	100%	152.97	D	Pervious	152.97	0.438	83	2.05	0.41	0.61	0.265	1.00	0.30	0.30	0.131
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				

Total Area = **349.56**

Y = **0.69**

Ybar = 1 - Y = **0.31**

Total F_m = **0.19**

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + ... + Y_mA_m}{A_1 + A_2 + ... + A_m} = \sum Y_jA_j$$

$$F_m = a_pF_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 135.09

Y = 0.83

Ybar = 1 - Y = **0.17**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.37

Total Fm (in/hr) = **0.11**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.45	0.002	0.10	0.30	0.03	0.001
					Impervious	4.82	0.036	98	0.20	0.04	0.95	0.034				
2	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.45	0.004	0.20	0.30	0.06	0.003
					Impervious	4.75	0.035	98	0.20	0.04	0.95	0.033				
3	Commercial / Industrial	10%	80.09	D	Pervious	8.01	0.059	75	3.33	0.67	0.45	0.027	0.10	0.30	0.03	0.018
					Impervious	72.08	0.534	98	0.20	0.04	0.95	0.506				
4	School	60%	9.91	D	Pervious	5.95	0.044	75	3.33	0.67	0.45	0.020	0.60	0.30	0.18	0.013
					Impervious	3.96	0.029	98	0.20	0.04	0.95	0.028				

Onsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	12.82	D	Pervious	12.82	0.095	93	0.75	0.15	0.82	0.078	1.00	0.30	0.30	0.028
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
2	Open Space / Habitat Area	100%	20.98	D	Pervious	20.98	0.155	83	2.05	0.41	0.61	0.094	1.00	0.30	0.30	0.047
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
		Total Area =	**135.09**								Y =	**0.83**			Total F_m =	**0.11**
											Ybar = 1 - Y =	**0.17**				

INFILTRATION RATE CALCULATION SPREADSHEET
NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION
100-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \dots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \dots + Y_m A_m}{A_1 + A_2 + \dots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49
P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 63.61
Y = 0.66
Ybar = 1 - Y = **0.34**

ap - See Figure C-4
Fp - See Table C-2
Average a_p = 1.00
Total Fm (in/hr) = **0.30**

Onsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	17.24	D	Pervious	17.24	0.271	93	0.75	0.15	0.82	0.223	1.00	0.30	0.30	0.081
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
2	Open Space / Habitat Area	100%	46.37	D	Pervious	46.37	0.729	83	2.05	0.41	0.61	0.441	1.00	0.30	0.30	0.219
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
		Total Area =	**63.61**							Y =		**0.66**			Total F_m =	**0.30**
										Ybar = 1 - Y =		**0.34**				

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA D

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 14.29

Y = 0.70

Ybar = 1 - Y = **0.30**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.68

Total Fm (in/hr) = **0.20**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.68	D	Pervious	1.14	0.079	75	3.33	0.67	0.45	0.036	0.20	0.30	0.06	0.024
					Impervious	4.54	0.318	98	0.20	0.04	0.95	0.301				

Onsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Open Space / Habitat Area	100%	8.61	D	Pervious	8.61	0.603	83	2.05	0.41	0.61	0.365	1.00	0.30	0.30	0.181
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
		Total Area =	**14.29**								Y =	**0.70**			Total F_m =	**0.20**
											Ybar = 1 - Y =	**0.30**				

<u>INFILTRATION RATE CALCULATION SPREADSHEET</u>

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA E

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \dots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \dots + Y_m A_m}{A_1 + A_2 + \dots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 97.15

Y = 0.83

Ybar = 1 - Y = <u>**0.17**</u>

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.30

Total Fm (in/hr) = <u>**0.09**</u>

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	44.48	D	Pervious	8.90	0.092	75	3.33	0.67	0.45	0.042	0.20	0.30	0.06	0.027
					Impervious	35.58	0.366	98	0.20	0.04	0.95	0.347				
2	Commercial / Industrial	10%	36.05	D	Pervious	3.61	0.037	75	3.33	0.67	0.45	0.017	0.10	0.30	0.03	0.011
					Impervious	32.45	0.334	98	0.20	0.04	0.95	0.316				
3	Open Space / Habitat Area	100%	16.62	D	Pervious	16.62	0.171	83	2.05	0.41	0.61	0.104	1.00	0.30	0.30	0.051
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
		Total Area =	**97.15**								Y =	**0.83**			Total F_m =	**0.09**
											Ybar = 1 - Y =	**0.17**				

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \dots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \dots + Y_m A_m}{A_1 + A_2 + \dots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 5.80

Y = 0.76

Ybar = 1 - Y = **0.24**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.20

Total Fm (in/hr) = **0.06**

Offsite Area -F

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.80	A	Pervious	1.16	0.200	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.060
					Impervious	4.64	0.800	98	0.20	0.04	0.95	0.758				

Total Area = **5.80** Y = **0.76** Total F_m = **0.06**

Ybar = 1 - Y = **0.24**

Offsite Area -G

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.75	A	Pervious	0.35	0.200	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.060
					Impervious	1.40	0.800	98	0.20	0.04	0.95	0.758				

Total Area = **1.75** Y = **0.76** Total F_m = **0.06**

Ybar = 1 - Y = **0.24**

Offsite Area -H

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.99	A	Pervious	1.40	0.200	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.060
					Impervious	5.59	0.800	98	0.20	0.04	0.95	0.758				

Total Area = **6.99** Y = **0.76** Total F_m = **0.06**

Ybar = 1 - Y = **0.24**

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

Offsite Area -I

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.06	A	Pervious	0.21	0.200	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.060
					Impervious	0.85	0.800	98	0.20	0.04	0.95	0.758				
		Total Area =	**1.06**								Y =	**0.76**			Total F_m =	**0.06**
											Ybar = 1 - Y =	**0.24**				

Offsite Area -J

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	11.00	A	Pervious	2.20	0.200	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.060
					Impervious	8.80	0.800	98	0.20	0.04	0.95	0.758				
		Total Area =	**11.00**								Y =	**0.76**			Total F_m =	**0.06**
											Ybar = 1 - Y =	**0.24**				

Offsite Area -K

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.30	A	Pervious	1.26	0.200	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.060
					Impervious	5.04	0.800	98	0.20	0.04	0.95	0.758				
		Total Area =	**6.30**								Y =	**0.76**			Total F_m =	**0.06**
											Ybar = 1 - Y =	**0.24**				

INFILTRATION RATE CALCULATION SUMMARY
NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION
2-YEAR EXPEXTED VALUE EVENT

Existing Condition											
Node	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Total Area (ac)	349.56	135.09	63.61	14.29	97.15	5.80	1.75	6.99	1.06	11.00	6.30
Y	0.46	0.64	0.33	0.42	0.65	0.74	0.74	0.74	0.74	0.74	0.74
Ybar	0.54	0.36	0.67	0.58	0.35	0.26	0.26	0.26	0.26	0.26	0.26
Average a_p	0.64	0.37	1.00	0.68	0.30	0.20	0.20	0.20	0.20	0.20	0.20
Total Fm (in/hr)	0.38	0.22	0.60	0.41	0.18	0.12	0.12	0.12	0.12	0.12	0.12

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

2-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + ... + Y_mA_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 349.56

Y = 0.46

Ybar = 1 - Y = **0.54**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.64

Total Fm (in/hr) = **0.38**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.30	0.001	0.10	0.60	0.06	0.001
					Impervious	6.81	0.019	98	0.20	0.04	0.85	0.017				
2	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.10	0.000	0.10	0.60	0.06	0.000
					Impervious	2.39	0.007	98	0.20	0.04	0.85	0.006				
3	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.026	32	21.25	4.25	0.30	0.008	0.20	0.60	0.12	0.016
					Impervious	36.22	0.104	98	0.20	0.04	0.85	0.088				
4	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.018	56	7.86	1.57	0.00	0.000	0.20	0.60	0.12	0.011
					Impervious	25.47	0.073	98	0.20	0.04	0.85	0.062				
5	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.015	75	3.33	0.67	0.10	0.002	0.20	0.60	0.12	0.009
					Impervious	21.21	0.061	98	0.20	0.04	0.85	0.051				
6	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.009	75	3.33	0.67	0.10	0.001	0.10	0.60	0.06	0.005
					Impervious	28.72	0.082	98	0.20	0.04	0.85	0.070				
7	Oil Operations	100%	11.89	D	Pervious	11.89	0.034	93	0.75	0.15	0.56	0.019	1.00	0.60	0.60	0.020
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
8	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.048	46	11.74	2.35	0.05	0.003	1.00	0.60	0.60	0.029
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
9	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.14	0.000	0.10	0.60	0.06	0.001
					Impervious	5.90	0.017	98	0.20	0.04	0.85	0.014				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	4.78	A	Pervious	4.78	0.014	78	2.82	0.56	0.14	0.002	1.00	0.60	0.60	0.008
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
2	Oil Operations / Barren Area	100%	10.98	D	Pervious	10.98	0.031	93	0.75	0.15	0.56	0.018	1.00	0.60	0.60	0.019
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
3	Open Space / Habitat Area	100%	152.97	D	Pervious	152.97	0.438	83	2.05	0.41	0.24	0.104	1.00	0.60	0.60	0.263
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
		Total Area =	**349.56**								Y =	**0.46**			Total F_m =	**0.38**
											Ybar = 1 - Y =	**0.54**				

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

2-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 135.09

Y = 0.64

Ybar = 1 - Y = **0.36**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.37

Total Fm (in/hr) = **0.22**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.10	0.000	0.10	0.60	0.06	0.002
					Impervious	4.82	0.036	98	0.20	0.04	0.85	0.030				
2	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.10	0.001	0.20	0.60	0.12	0.005
					Impervious	4.75	0.035	98	0.20	0.04	0.85	0.030				
3	Commercial / Industrial	10%	80.09	D	Pervious	8.01	0.059	75	3.33	0.67	0.10	0.006	0.10	0.60	0.06	0.036
					Impervious	72.08	0.534	98	0.20	0.04	0.85	0.452				
4	School	60%	9.91	D	Pervious	5.95	0.044	75	3.33	0.67	0.10	0.004	0.60	0.60	0.36	0.026
					Impervious	3.96	0.029	98	0.20	0.04	0.85	0.025				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	12.82	D	Pervious	12.82	0.095	93	0.75	0.15	0.56	0.054	1.00	0.60	0.60	0.057
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
2	Open Space / Habitat Area	100%	20.98	D	Pervious	20.98	0.155	83	2.05	0.41	0.24	0.037	1.00	0.60	0.60	0.093
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
		Total Area =	**135.09**								Y =	**0.64**		Total F_m =	**0.22**	
											Ybar = 1 - Y =	**0.36**				

INFILTRATION RATE CALCULATION SPREADSHEET

NEWPORT BANNING RANCH PROJECT - EXISTING CONDITION

2-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \dots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \dots + Y_m A_m}{A_1 + A_2 + \dots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 63.61

Y = 0.33

Ybar = 1 - Y = **0.67**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 1.00

Total Fm (in/hr) = **0.60**

Onsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Oil Operations / Barren Area	100%	17.24	D	Pervious	17.24	0.271	93	0.75	0.15	0.56	0.153	1.00	0.60	0.60	0.163
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
2	Open Space / Habitat Area	100%	46.37	D	Pervious	46.37	0.729	83	2.05	0.41	0.24	0.174	1.00	0.60	0.60	0.437
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
		Total Area =	**63.61**								Y =	**0.33**			Total F_m =	**0.60**
											Ybar = 1 - Y =	**0.67**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
2-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA D

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 14.29

Y = 0.42

Ybar = 1 - Y = **0.58**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.68

Total Fm (in/hr) = **0.41**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.68	D	Pervious	1.14	0.079	75	3.33	0.67	0.10	0.008	0.20	0.60	0.12	0.048
					Impervious	4.54	0.318	98	0.20	0.04	0.85	0.269				

Onsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Open Space / Habitat Area	100%	8.61	D	Pervious	8.61	0.603	83	2.05	0.41	0.24	0.144	1.00	0.60	0.60	0.362
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				

Total Area = **14.29**

Y = **0.42**

Ybar = 1 - Y = **0.58**

Total F_m = **0.41**

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

2-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA E

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 97.15

Y = 0.65

Ybar = 1 - Y = **0.35**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.30

Total Fm (in/hr) = **0.18**

Offsite Area																	
									Low Loss Rate, Ybar				Max. Loss Rate, F_m				
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	44.48	D	Pervious	8.90	0.092	75	3.33	0.67	0.10	0.009	0.20	0.60	0.12	0.055
					Impervious	35.58	0.366	98	0.20	0.04	0.85	0.310				
2	Commercial / Industrial	10%	36.05	D	Pervious	3.61	0.037	75	3.33	0.67	0.10	0.004	0.10	0.60	0.06	0.022
					Impervious	32.45	0.334	98	0.20	0.04	0.85	0.283				
3	Open Space / Habitat Area	100%	16.62	D	Pervious	16.62	0.171	83	2.05	0.41	0.24	0.041	1.00	0.60	0.60	0.103
					Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000				
		Total Area =	**97.15**								Y =	**0.65**			Total F_m =	**0.18**
											Ybar = 1 - Y =	**0.35**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
2-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 5.80

Y = 0.74

Ybar = 1 - Y = **0.26**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.20

Total Fm (in/hr) = **0.12**

Offsite Area -F

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	5.80	A	Pervious	1.16	0.200	32	21.25	4.25	0.30	0.060	0.20	0.60	0.12	0.120
					Impervious	4.64	0.800	98	0.20	0.04	0.85	0.678				

Total Area = **5.80** Y = **0.74** Total F_m = **0.12**

Ybar = 1 - Y = **0.26**

Offsite Area -G

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.75	A	Pervious	0.35	0.200	32	21.25	4.25	0.30	0.060	0.20	0.60	0.12	0.120
					Impervious	1.40	0.800	98	0.20	0.04	0.85	0.678				

Total Area = **1.75** Y = **0.74** Total F_m = **0.12**

Ybar = 1 - Y = **0.26**

Offsite Area -H

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.99	A	Pervious	1.40	0.200	32	21.25	4.25	0.30	0.060	0.20	0.60	0.12	0.120
					Impervious	5.59	0.800	98	0.20	0.04	0.85	0.678				

Total Area = **6.99** Y = **0.74** Total F_m = **0.12**

Ybar = 1 - Y = **0.26**

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
2-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA F to K

Offsite Area -I

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	1.06	A	Pervious	0.21	0.200	32	21.25	4.25	0.30	0.060	0.20	0.60	0.12	0.120
					Impervious	0.85	0.800	98	0.20	0.04	0.85	0.678				
	Total Area =		**1.06**								Y =	**0.74**			Total F_m =	**0.12**
											Ybar = 1 - Y =	**0.26**				

Offsite Area -J

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	11.00	A	Pervious	2.20	0.200	32	21.25	4.25	0.30	0.060	0.20	0.60	0.12	0.120
					Impervious	8.80	0.800	98	0.20	0.04	0.85	0.678				
	Total Area =		**11.00**								Y =	**0.74**			Total F_m =	**0.12**
											Ybar = 1 - Y =	**0.26**				

Offsite Area -K

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (>10 dwellings/acre)	20%	6.30	A	Pervious	1.26	0.200	32	21.25	4.25	0.30	0.060	0.20	0.60	0.12	0.120
					Impervious	5.04	0.800	98	0.20	0.04	0.85	0.678				
	Total Area =		**6.30**								Y =	**0.74**			Total F_m =	**0.12**
											Ybar = 1 - Y =	**0.26**				

ii. EV 100-Year Storm Event

Drainage A

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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  349.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.190
    LOW LOSS FRACTION = 0.310
    TIME OF CONCENTRATION(MIN.) = 26.83
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    85.15
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    45.66

****************************************************************************
  TIME     VOLUME       Q    0.      132.5     265.0     397.5     530.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.35      0.2143     14.85  .Q        .         .         .         .
  0.80      0.7659     15.00  .Q        .         .         .         .
  1.24      1.3273     15.38  .Q        .         .         .         .
  1.69      1.8992     15.57  .Q        .         .         .         .
  2.14      2.4824     15.99  .Q        .         .         .         .
  2.59      3.0772     16.21  .Q        .         .         .         .
  3.03      3.6846     16.66  .Q        .         .         .         .
  3.48      4.3050     16.91  .Q        .         .         .         .
  3.93      4.9393     17.42  .Q        .         .         .         .
  4.37      5.5881     17.69  .Q        .         .         .         .
  4.82      6.2527     18.27  .Q        .         .         .         .
  5.27      6.9337     18.58  .Q        .         .         .         .
  5.72      7.6325     19.24  .Q        .         .         .         .
  6.16      8.3501     19.59  .Q        .         .         .         .
  6.61      9.0881     20.35  .Q        .         .         .         .
  7.06      9.8478     20.76  .Q        .         .         .         .
  7.50     10.6313     21.64  .Q        .         .         .         .
  7.95     11.4400     22.12  .Q        .         .         .         .
  8.40     12.2770     23.17  .Q        .         .         .         .
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  8.85     13.1439     23.74  .Q        .         .         .         .
  9.29     14.0448     25.01  .Q        .         .         .         .
  9.74     14.9820     25.71  .Q        .         .         .         .
 10.19     15.9612     27.28  . Q       .         .         .         .
 10.63     16.9857     28.16  . Q       .         .         .         .
 11.08     18.0635     30.17  . Q       .         .         .         .
 11.53     19.1997     31.32  . Q       .         .         .         .
 11.98     20.4067     34.00  . Q       .         .         .         .
 12.42     21.7820     40.43  .  Q      .         .         .         .
 12.87     23.4758     51.23  .  Q      .         .         .         .
 13.32     25.4148     53.70  .   Q     .         .         .         .
 13.76     27.5143     59.92  .   Q     .         .         .         .
 14.21     29.8031     63.94  .   Q     .         .         .         .
 14.66     32.3565     74.24  .    Q    .         .         .         .
 15.11     35.2530     82.52  .     Q   .         .         .         .
 15.55     38.7797    108.34  .       Q .         .         .         .
 16.00     43.2090    131.37  .        Q.         .         .         .
 16.45     55.3085    523.44  .         .         .         .        Q.
 16.89     66.7217     94.23  .      Q  .         .         .         .
 17.34     69.7241     68.25  .    Q    .         .         .         .
 17.79     72.0304     56.56  .   Q     .         .         .         .
 18.24     73.9822     49.06  .  Q      .         .         .         .
 18.68     75.4910     32.59  . Q       .         .         .         .
 19.13     76.6313     29.12  . Q       .         .         .         .
 19.58     77.6584     26.47  .Q        .         .         .         .
 20.02     78.5975     24.36  .Q        .         .         .         .
 20.47     79.4658     22.63  .Q        .         .         .         .
 20.92     80.2755     21.19  .Q        .         .         .         .
 21.37     81.0359     19.96  .Q        .         .         .         .
 21.81     81.7540     18.90  .Q        .         .         .         .
 22.26     82.4355     17.98  .Q        .         .         .         .
 22.71     83.0847     17.16  .Q        .         .         .         .
 23.15     83.7054     16.43  .Q        .         .         .         .
 23.60     84.3006     15.78  .Q        .         .         .         .
 24.05     84.8727     15.19  .Q        .         .         .         .
 24.50     85.1534      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage B

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****************************************************************************
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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  135.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.110
    LOW LOSS FRACTION = 0.170
    TIME OF CONCENTRATION(MIN.) = 30.93
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    38.51
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    12.04

****************************************************************************
  TIME     VOLUME       Q    0.       50.0     100.0     150.0     200.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.02     0.0000      0.00  Q         .         .         .         .
  0.53     0.1470      6.90  .Q        .         .         .         .
  1.05     0.4448      7.08  .Q        .         .         .         .
  1.57     0.7485      7.18  .Q        .         .         .         .
  2.08     1.0591      7.40  .Q        .         .         .         .
  2.60     1.3767      7.51  .Q        .         .         .         .
  3.11     1.7021      7.76  .Q        .         .         .         .
  3.63     2.0355      7.89  .Q        .         .         .         .
  4.14     2.3776      8.17  .Q        .         .         .         .
  4.66     2.7289      8.32  .Q        .         .         .         .
  5.17     3.0902      8.64  .Q        .         .         .         .
  5.69     3.4621      8.82  .Q        .         .         .         .
  6.21     3.8456      9.19  .Q        .         .         .         .
  6.72     4.2416      9.39  .Q        .         .         .         .
  7.24     4.6513      9.84  .Q        .         .         .         .
  7.75     5.0757     10.08  . Q       .         .         .         .
  8.27     5.5168     10.62  . Q       .         .         .         .
  8.78     5.9756     10.92  . Q       .         .         .         .
  9.30     6.4550     11.58  . Q       .         .         .         .
```

```
  9.81      6.9565     11.96  . Q       .         .         .         .
 10.33      7.4842     12.81  . Q       .         .         .         .
 10.85      8.0404     13.30  . Q       .         .         .         .
 11.36      8.6313     14.44  . Q       .         .         .         .
 11.88      9.2608     15.11  .  Q      .         .         .         .
 12.39     10.0127     20.19  .   Q     .         .         .         .
 12.91     10.9368     23.19  .   Q     .         .         .         .
 13.42     11.9820     25.88  .    Q    .         .         .         .
 13.94     13.1215     27.61  .    Q    .         .         .         .
 14.45     14.3936     32.11  .     Q   .         .         .         .
 14.97     15.8359     35.60  .      Q  .         .         .         .
 15.48     17.6302     48.63  .        Q.         .         .         .
 16.00     19.8591     56.01  .         .Q        .         .         .
 16.52     25.1924    194.37  .         .         .         .       Q .
 17.03     30.1989     40.66  .       Q .         .         .         .
 17.55     31.6986     29.74  .    Q    .         .         .         .
 18.06     32.8525     24.43  .   Q     .         .         .         .
 18.58     33.7109     15.87  .  Q      .         .         .         .
 19.09     34.3437     13.84  . Q       .         .         .         .
 19.61     34.9020     12.37  . Q       .         .         .         .
 20.12     35.4048     11.24  . Q       .         .         .         .
 20.64     35.8646     10.34  . Q       .         .         .         .
 21.16     36.2896      9.61  .Q        .         .         .         .
 21.67     36.6860      9.00  .Q        .         .         .         .
 22.19     37.0583      8.48  .Q        .         .         .         .
 22.70     37.4099      8.03  .Q        .         .         .         .
 23.22     37.7435      7.63  .Q        .         .         .         .
 23.73     38.0613      7.29  .Q        .         .         .         .
 24.25     38.3652      6.98  .Q        .         .         .         .
 24.76     38.5138      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage C

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****************************************************************************
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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   63.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.300
    LOW LOSS FRACTION = 0.340
    TIME OF CONCENTRATION(MIN.) = 18.32
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    14.74
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     9.06

****************************************************************************
  TIME     VOLUME       Q    0.       30.0      60.0      90.0     120.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.12     0.0000      0.00  Q         .         .         .         .
  0.43     0.0328      2.60  Q         .         .         .         .
  0.73     0.0986      2.62  Q         .         .         .         .
  1.04     0.1652      2.66  Q         .         .         .         .
  1.34     0.2327      2.69  Q         .         .         .         .
  1.65     0.3011      2.73  Q         .         .         .         .
  1.95     0.3704      2.76  Q         .         .         .         .
  2.26     0.4407      2.81  Q         .         .         .         .
  2.57     0.5119      2.84  Q         .         .         .         .
  2.87     0.5841      2.89  Q         .         .         .         .
  3.18     0.6574      2.92  Q         .         .         .         .
  3.48     0.7318      2.98  Q         .         .         .         .
  3.79     0.8074      3.01  .Q        .         .         .         .
  4.09     0.8841      3.07  .Q        .         .         .         .
  4.40     0.9621      3.11  .Q        .         .         .         .
  4.70     1.0413      3.18  .Q        .         .         .         .
  5.01     1.1219      3.21  .Q        .         .         .         .
  5.31     1.2039      3.29  .Q        .         .         .         .
  5.62     1.2874      3.33  .Q        .         .         .         .
```

```
  5.92      1.3724      3.41  .Q        .         .         .         .
  6.23      1.4590      3.45  .Q        .         .         .         .
  6.53      1.5473      3.55  .Q        .         .         .         .
  6.84      1.6374      3.59  .Q        .         .         .         .
  7.15      1.7294      3.70  .Q        .         .         .         .
  7.45      1.8233      3.75  .Q        .         .         .         .
  7.76      1.9194      3.86  .Q        .         .         .         .
  8.06      2.0176      3.92  .Q        .         .         .         .
  8.37      2.1183      4.05  .Q        .         .         .         .
  8.67      2.2214      4.12  .Q        .         .         .         .
  8.98      2.3272      4.27  .Q        .         .         .         .
  9.28      2.4359      4.35  .Q        .         .         .         .
  9.59      2.5477      4.51  .Q        .         .         .         .
  9.89      2.6627      4.60  .Q        .         .         .         .
 10.20      2.7813      4.80  .Q        .         .         .         .
 10.50      2.9038      4.91  .Q        .         .         .         .
 10.81      3.0306      5.14  .Q        .         .         .         .
 11.11      3.1618      5.27  .Q        .         .         .         .
 11.42      3.2983      5.55  .Q        .         .         .         .
 11.73      3.4402      5.70  .Q        .         .         .         .
 12.03      3.5885      6.05  . Q       .         .         .         .
 12.34      3.7602      7.56  . Q       .         .         .         .
 12.64      3.9658      8.74  . Q       .         .         .         .
 12.95      4.1898      9.01  .  Q      .         .         .         .
 13.25      4.4250      9.63  .  Q      .         .         .         .
 13.56      4.6726     10.00  .  Q      .         .         .         .
 13.86      4.9358     10.86  .  Q      .         .         .         .
 14.17      5.2165     11.39  .  Q      .         .         .         .
 14.47      5.5185     12.55  .   Q     .         .         .         .
 14.78      5.8460     13.40  .   Q     .         .         .         .
 15.08      6.2142     15.78  .    Q    .         .         .         .
 15.39      6.6345     17.54  .    Q    .         .         .         .
 15.69      7.1167     20.68  .     Q   .         .         .         .
 16.00      7.7531     29.75  .        Q.         .         .         .
 16.31      9.5733    114.52  .         .         .         .       Q .
 16.61     11.2598     19.14  .     Q   .         .         .         .
 16.92     11.6836     14.45  .   Q     .         .         .         .
 17.22     12.0157     11.87  .  Q      .         .         .         .
 17.53     12.2966     10.40  .  Q      .         .         .         .
 17.83     12.5453      9.31  .  Q      .         .         .         .
 18.14     12.7698      8.49  . Q       .         .         .         .
 18.44     12.9510      5.87  .Q        .         .         .         .
 18.75     13.0932      5.40  .Q        .         .         .         .
 19.05     13.2247      5.02  .Q        .         .         .         .
 19.36     13.3473      4.70  .Q        .         .         .         .
 19.66     13.4625      4.43  .Q        .         .         .         .
 19.97     13.5712      4.19  .Q        .         .         .         .
 20.27     13.6744      3.99  .Q        .         .         .         .
 20.58     13.7728      3.81  .Q        .         .         .         .
 20.89     13.8668      3.64  .Q        .         .         .         .
 21.19     13.9569      3.50  .Q        .         .         .         .
 21.50     14.0435      3.37  .Q        .         .         .         .
 21.80     14.1270      3.25  .Q        .         .         .         .
 22.11     14.2076      3.14  .Q        .         .         .         .
 22.41     14.2856      3.04  .Q        .         .         .         .
 22.72     14.3612      2.95  Q         .         .         .         .
 23.02     14.4345      2.86  Q         .         .         .         .
 23.33     14.5057      2.78  Q         .         .         .         .
 23.63     14.5751      2.71  Q         .         .         .         .
 23.94     14.6426      2.64  Q         .         .         .         .
 24.24     14.7084      2.58  Q         .         .         .         .
 24.55     14.7410      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage D

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****************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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            Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                          Analysis prepared by:




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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   14.29
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.200
    LOW LOSS FRACTION = 0.300
    TIME OF CONCENTRATION(MIN.) = 10.60
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     3.51
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.83

****************************************************************************
  TIME     VOLUME       Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.10      0.0000      0.00  Q         .         .         .         .
  0.28      0.0045      0.62  Q         .         .         .         .
  0.45      0.0135      0.62  Q         .         .         .         .
  0.63      0.0226      0.63  Q         .         .         .         .
  0.81      0.0318      0.63  Q         .         .         .         .
  0.98      0.0410      0.64  Q         .         .         .         .
  1.16      0.0503      0.64  Q         .         .         .         .
  1.34      0.0597      0.65  Q         .         .         .         .
  1.51      0.0692      0.65  Q         .         .         .         .
  1.69      0.0787      0.66  Q         .         .         .         .
  1.87      0.0883      0.66  Q         .         .         .         .
  2.04      0.0979      0.67  Q         .         .         .         .
  2.22      0.1077      0.67  Q         .         .         .         .
  2.40      0.1175      0.68  Q         .         .         .         .
  2.57      0.1274      0.68  Q         .         .         .         .
  2.75      0.1374      0.69  Q         .         .         .         .
  2.93      0.1475      0.69  Q         .         .         .         .
  3.10      0.1576      0.70  Q         .         .         .         .
  3.28      0.1678      0.70  Q         .         .         .         .
  3.46      0.1782      0.71  Q         .         .         .         .
  3.63      0.1886      0.72  Q         .         .         .         .
  3.81      0.1991      0.72  Q         .         .         .         .
  3.99      0.2097      0.73  Q         .         .         .         .
  4.16      0.2205      0.74  Q         .         .         .         .
  4.34      0.2313      0.74  Q         .         .         .         .
  4.52      0.2422      0.75  Q         .         .         .         .
  4.69      0.2532      0.76  Q         .         .         .         .
  4.87      0.2643      0.77  Q         .         .         .         .
  5.05      0.2756      0.77  Q         .         .         .         .
  5.22      0.2869      0.78  Q         .         .         .         .
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```
  5.40      0.2984      0.79  Q         .         .         .         .
  5.58      0.3100      0.80  Q         .         .         .         .
  5.75      0.3217      0.81  Q         .         .         .         .
  5.93      0.3336      0.82  Q         .         .         .         .
  6.11      0.3456      0.82  Q         .         .         .         .
  6.28      0.3577      0.84  Q         .         .         .         .
  6.46      0.3699      0.84  Q         .         .         .         .
  6.64      0.3823      0.86  Q         .         .         .         .
  6.81      0.3949      0.86  Q         .         .         .         .
  6.99      0.4076      0.88  Q         .         .         .         .
  7.17      0.4204      0.88  Q         .         .         .         .
  7.34      0.4334      0.90  Q         .         .         .         .
  7.52      0.4466      0.91  Q         .         .         .         .
  7.70      0.4599      0.92  Q         .         .         .         .
  7.87      0.4735      0.93  Q         .         .         .         .
  8.05      0.4872      0.95  Q         .         .         .         .
  8.23      0.5011      0.96  Q         .         .         .         .
  8.40      0.5152      0.98  Q         .         .         .         .
  8.58      0.5295      0.99  Q         .         .         .         .
  8.76      0.5440      1.00  .Q        .         .         .         .
  8.93      0.5588      1.02  .Q        .         .         .         .
  9.11      0.5738      1.04  .Q        .         .         .         .
  9.29      0.5890      1.05  .Q        .         .         .         .
  9.46      0.6045      1.07  .Q        .         .         .         .
  9.64      0.6202      1.08  .Q        .         .         .         .
  9.82      0.6362      1.11  .Q        .         .         .         .
  9.99      0.6525      1.12  .Q        .         .         .         .
 10.17      0.6691      1.15  .Q        .         .         .         .
 10.35      0.6860      1.17  .Q        .         .         .         .
 10.52      0.7033      1.20  .Q        .         .         .         .
 10.70      0.7209      1.21  .Q        .         .         .         .
 10.88      0.7388      1.25  .Q        .         .         .         .
 11.05      0.7572      1.27  .Q        .         .         .         .
 11.23      0.7759      1.30  .Q        .         .         .         .
 11.41      0.7951      1.32  .Q        .         .         .         .
 11.58      0.8147      1.37  .Q        .         .         .         .
 11.76      0.8349      1.39  .Q        .         .         .         .
 11.94      0.8555      1.44  .Q        .         .         .         .
 12.11      0.8768      1.47  .Q        .         .         .         .
 12.29      0.9021      2.01  . Q       .         .         .         .
 12.47      0.9316      2.04  . Q       .         .         .         .
 12.64      0.9619      2.11  . Q       .         .         .         .
 12.82      0.9930      2.15  . Q       .         .         .         .
 13.00      1.0249      2.23  . Q       .         .         .         .
 13.17      1.0578      2.27  . Q       .         .         .         .
 13.35      1.0918      2.37  . Q       .         .         .         .
 13.53      1.1268      2.43  . Q       .         .         .         .
 13.70      1.1631      2.55  . Q       .         .         .         .
 13.88      1.2008      2.61  . Q       .         .         .         .
 14.06      1.2400      2.76  . Q       .         .         .         .
 14.23      1.2808      2.81  . Q       .         .         .         .
 14.41      1.3233      3.01  .  Q      .         .         .         .
 14.59      1.3681      3.13  .  Q      .         .         .         .
 14.76      1.4157      3.40  .  Q      .         .         .         .
 14.94      1.4666      3.57  .  Q      .         .         .         .
 15.12      1.5217      3.98  .  Q      .         .         .         .
 15.29      1.5818      4.25  .   Q     .         .         .         .
 15.47      1.6458      4.50  .   Q     .         .         .         .
 15.65      1.7136      4.79  .   Q     .         .         .         .
 15.82      1.8054      7.78  .      Q  .         .         .         .
 16.00      1.9467     11.57  .         .Q        .         .         .
 16.18      2.3069     37.76  .         .         .         .      Q  .
 16.35      2.6232      5.57  .    Q    .         .         .         .
 16.53      2.6974      4.59  .   Q     .         .         .         .
 16.71      2.7583      3.76  .  Q      .         .         .         .
 16.88      2.8095      3.25  .  Q      .         .         .         .
 17.06      2.8545      2.91  . Q       .         .         .         .
 17.24      2.8953      2.69  . Q       .         .         .         .
 17.41      2.9331      2.48  . Q       .         .         .         .
 17.59      2.9682      2.32  . Q       .         .         .         .
 17.77      3.0011      2.19  . Q       .         .         .         .
 17.94      3.0322      2.07  . Q       .         .         .         .
 18.12      3.0616      1.96  .Q        .         .         .         .
 18.30      3.0862      1.41  .Q        .         .         .         .
 18.47      3.1064      1.35  .Q        .         .         .         .
 18.65      3.1256      1.28  .Q        .         .         .         .
 18.83      3.1439      1.23  .Q        .         .         .         .
 19.00      3.1615      1.18  .Q        .         .         .         .
 19.18      3.1785      1.14  .Q        .         .         .         .
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```
 19.36      3.1948      1.10  .Q         .         .         .         .
 19.53      3.2105      1.06  .Q         .         .         .         .
 19.71      3.2257      1.03  .Q         .         .         .         .
 19.89      3.2405      0.99  Q          .         .         .         .
 20.06      3.2548      0.97  Q          .         .         .         .
 20.24      3.2687      0.94  Q          .         .         .         .
 20.42      3.2822      0.91  Q          .         .         .         .
 20.59      3.2954      0.89  Q          .         .         .         .
 20.77      3.3083      0.87  Q          .         .         .         .
 20.95      3.3208      0.85  Q          .         .         .         .
 21.12      3.3331      0.83  Q          .         .         .         .
 21.30      3.3450      0.81  Q          .         .         .         .
 21.48      3.3568      0.79  Q          .         .         .         .
 21.65      3.3682      0.78  Q          .         .         .         .
 21.83      3.3795      0.76  Q          .         .         .         .
 22.01      3.3905      0.75  Q          .         .         .         .
 22.18      3.4013      0.73  Q          .         .         .         .
 22.36      3.4119      0.72  Q          .         .         .         .
 22.54      3.4224      0.71  Q          .         .         .         .
 22.71      3.4326      0.70  Q          .         .         .         .
 22.89      3.4427      0.68  Q          .         .         .         .
 23.07      3.4526      0.67  Q          .         .         .         .
 23.24      3.4623      0.66  Q          .         .         .         .
 23.42      3.4719      0.65  Q          .         .         .         .
 23.60      3.4814      0.64  Q          .         .         .         .
 23.77      3.4907      0.63  Q          .         .         .         .
 23.95      3.4998      0.62  Q          .         .         .         .
 24.13      3.5089      0.61  Q          .         .         .         .
 24.30      3.5134      0.00  Q          .         .         .         .
-----------------------------------------------------------------------------
```

Drainage E

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                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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                          Analysis prepared by:

                            Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   97.20
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.090
    LOW LOSS FRACTION = 0.170
    TIME OF CONCENTRATION(MIN.) = 27.94
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    27.80
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     8.57

****************************************************************************
  TIME     VOLUME       Q    0.       40.0      80.0     120.0     160.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.17      0.0000      0.00  Q         .         .         .         .
  0.63      0.0964      5.01  .Q        .         .         .         .
  1.10      0.2906      5.08  .Q        .         .         .         .
  1.56      0.4885      5.21  .Q        .         .         .         .
  2.03      0.6904      5.28  .Q        .         .         .         .
  2.50      0.8966      5.43  .Q        .         .         .         .
  2.96      1.1071      5.51  .Q        .         .         .         .
  3.43      1.3224      5.68  .Q        .         .         .         .
  3.89      1.5427      5.77  .Q        .         .         .         .
  4.36      1.7682      5.96  .Q        .         .         .         .
  4.82      1.9994      6.06  .Q        .         .         .         .
  5.29      2.2366      6.27  .Q        .         .         .         .
  5.76      2.4801      6.39  .Q        .         .         .         .
  6.22      2.7306      6.63  .Q        .         .         .         .
  6.69      2.9885      6.77  .Q        .         .         .         .
  7.15      3.2544      7.05  .Q        .         .         .         .
  7.62      3.5289      7.21  .Q        .         .         .         .
  8.08      3.8130      7.55  .Q        .         .         .         .
  8.55      4.1072      7.74  .Q        .         .         .         .
  9.01      4.4130      8.15  . Q       .         .         .         .
  9.48      4.7311      8.38  . Q       .         .         .         .
  9.95      5.0635      8.89  . Q       .         .         .         .
 10.41      5.4112      9.18  . Q       .         .         .         .
 10.88      5.7770      9.83  . Q       .         .         .         .
 11.34      6.1627     10.21  . Q       .         .         .         .
 11.81      6.5724     11.08  . Q       .         .         .         .
 12.27      7.0088     11.60  . Q       .         .         .         .
 12.74      7.5548     16.78  .   Q     .         .         .         .
 13.21      8.2161     17.59  .   Q     .         .         .         .
 13.67      8.9322     19.62  .   Q     .         .         .         .
 14.14      9.7127     20.94  .    Q    .         .         .         .
```

```
 14.60     10.5834     24.31  .     Q   .         .         .         .
 15.07     11.5710     27.02  .     Q   .         .         .         .
 15.53     12.7835     35.99  .       Q .         .         .         .
 16.00     14.3149     43.59  .         Q         .         .         .
 16.47     18.0517    150.60  .         .         .         .      Q  .
 16.93     21.5433     30.85  .      Q  .         .         .         .
 17.40     22.5685     22.43  .    Q    .         .         .         .
 17.86     23.3565     18.52  .   Q     .         .         .         .
 18.33     24.0136     15.62  .  Q      .         .         .         .
 18.79     24.5186     10.62  . Q       .         .         .         .
 19.26     24.9056      9.49  . Q       .         .         .         .
 19.73     25.2542      8.63  . Q       .         .         .         .
 20.19     25.5730      7.94  .Q        .         .         .         .
 20.66     25.8677      7.38  .Q        .         .         .         .
 21.12     26.1425      6.91  .Q        .         .         .         .
 21.59     26.4006      6.51  .Q        .         .         .         .
 22.05     26.6444      6.16  .Q        .         .         .         .
 22.52     26.8757      5.86  .Q        .         .         .         .
 22.98     27.0960      5.59  .Q        .         .         .         .
 23.45     27.3067      5.36  .Q        .         .         .         .
 23.92     27.5087      5.14  .Q        .         .         .         .
 24.38     27.7032      4.96  .Q        .         .         .         .
 24.85     27.7987      0.00  Q         .         .         .         .
---------------------------------------------------------------------------
```

Drainage F

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                 16795 Von Karmon #100, Irvine, CA 92606


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----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    5.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  7.97
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.60
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.57

****************************************************************************
  TIME     VOLUME       Q    0.         5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.06      0.0000      0.00  Q          .         .         .         .
  0.19      0.0015      0.27  Q          .         .         .         .
  0.33      0.0045      0.27  Q          .         .         .         .
  0.46      0.0075      0.27  Q          .         .         .         .
  0.59      0.0105      0.28  Q          .         .         .         .
  0.72      0.0135      0.28  Q          .         .         .         .
  0.86      0.0166      0.28  Q          .         .         .         .
  0.99      0.0196      0.28  Q          .         .         .         .
  1.12      0.0227      0.28  Q          .         .         .         .
  1.26      0.0258      0.28  Q          .         .         .         .
  1.39      0.0290      0.28  Q          .         .         .         .
  1.52      0.0321      0.29  Q          .         .         .         .
  1.65      0.0352      0.29  Q          .         .         .         .
  1.79      0.0384      0.29  Q          .         .         .         .
  1.92      0.0416      0.29  Q          .         .         .         .
  2.05      0.0448      0.29  Q          .         .         .         .
  2.19      0.0481      0.29  Q          .         .         .         .
  2.32      0.0513      0.30  Q          .         .         .         .
  2.45      0.0546      0.30  Q          .         .         .         .
  2.58      0.0579      0.30  Q          .         .         .         .
  2.72      0.0612      0.30  Q          .         .         .         .
  2.85      0.0645      0.30  Q          .         .         .         .
  2.98      0.0679      0.31  Q          .         .         .         .
  3.12      0.0712      0.31  Q          .         .         .         .
  3.25      0.0746      0.31  Q          .         .         .         .
  3.38      0.0781      0.31  Q          .         .         .         .
  3.51      0.0815      0.31  Q          .         .         .         .
  3.65      0.0850      0.32  Q          .         .         .         .
  3.78      0.0885      0.32  Q          .         .         .         .
  3.91      0.0920      0.32  Q          .         .         .         .
  4.05      0.0955      0.32  Q          .         .         .         .
```

4.18	0.0991	0.33	Q	.	.	.	.
4.31	0.1027	0.33	Q	.	.	.	.
4.44	0.1063	0.33	Q	.	.	.	.
4.58	0.1099	0.33	Q	.	.	.	.
4.71	0.1136	0.34	Q	.	.	.	.
4.84	0.1173	0.34	Q	.	.	.	.
4.97	0.1210	0.34	Q	.	.	.	.
5.11	0.1248	0.34	Q	.	.	.	.
5.24	0.1285	0.35	Q	.	.	.	.
5.37	0.1324	0.35	Q	.	.	.	.
5.51	0.1362	0.35	Q	.	.	.	.
5.64	0.1401	0.35	Q	.	.	.	.
5.77	0.1440	0.36	Q	.	.	.	.
5.90	0.1479	0.36	Q	.	.	.	.
6.04	0.1519	0.36	Q	.	.	.	.
6.17	0.1559	0.37	Q	.	.	.	.
6.30	0.1599	0.37	Q	.	.	.	.
6.44	0.1640	0.37	Q	.	.	.	.
6.57	0.1681	0.38	Q	.	.	.	.
6.70	0.1722	0.38	Q	.	.	.	.
6.83	0.1764	0.38	Q	.	.	.	.
6.97	0.1806	0.39	Q	.	.	.	.
7.10	0.1849	0.39	Q	.	.	.	.
7.23	0.1892	0.39	Q	.	.	.	.
7.37	0.1935	0.40	Q	.	.	.	.
7.50	0.1979	0.40	Q	.	.	.	.
7.63	0.2023	0.41	Q	.	.	.	.
7.76	0.2068	0.41	Q	.	.	.	.
7.90	0.2113	0.41	Q	.	.	.	.
8.03	0.2158	0.42	Q	.	.	.	.
8.16	0.2204	0.42	Q	.	.	.	.
8.30	0.2251	0.43	Q	.	.	.	.
8.43	0.2298	0.43	Q	.	.	.	.
8.56	0.2345	0.43	Q	.	.	.	.
8.69	0.2394	0.44	Q	.	.	.	.
8.83	0.2442	0.44	Q	.	.	.	.
8.96	0.2491	0.45	Q	.	.	.	.
9.09	0.2541	0.46	Q	.	.	.	.
9.23	0.2592	0.46	Q	.	.	.	.
9.36	0.2643	0.47	Q	.	.	.	.
9.49	0.2694	0.47	Q	.	.	.	.
9.62	0.2747	0.48	Q	.	.	.	.
9.76	0.2800	0.49	Q	.	.	.	.
9.89	0.2854	0.49	Q	.	.	.	.
10.02	0.2908	0.50	.Q	.	.	.	.
10.16	0.2963	0.51	.Q	.	.	.	.
10.29	0.3019	0.52	.Q	.	.	.	.
10.42	0.3076	0.52	.Q	.	.	.	.
10.55	0.3134	0.53	.Q	.	.	.	.
10.69	0.3192	0.54	.Q	.	.	.	.
10.82	0.3252	0.55	.Q	.	.	.	.
10.95	0.3312	0.55	.Q	.	.	.	.
11.09	0.3374	0.57	.Q	.	.	.	.
11.22	0.3436	0.57	.Q	.	.	.	.
11.35	0.3500	0.59	.Q	.	.	.	.
11.48	0.3565	0.59	.Q	.	.	.	.
11.62	0.3631	0.61	.Q	.	.	.	.
11.75	0.3698	0.62	.Q	.	.	.	.
11.88	0.3766	0.63	.Q	.	.	.	.
12.02	0.3836	0.64	.Q	.	.	.	.
12.15	0.3919	0.87	.Q	.	.	.	.
12.28	0.4015	0.88	.Q	.	.	.	.
12.41	0.4113	0.90	.Q	.	.	.	.
12.55	0.4213	0.91	.Q	.	.	.	.
12.68	0.4315	0.94	.Q	.	.	.	.
12.81	0.4418	0.95	.Q	.	.	.	.
12.94	0.4524	0.98	.Q	.	.	.	.
13.08	0.4633	0.99	.Q	.	.	.	.
13.21	0.4744	1.04	. Q	.	.	.	.
13.34	0.4859	1.06	. Q	.	.	.	.
13.48	0.4978	1.10	. Q	.	.	.	.
13.61	0.5100	1.13	. Q	.	.	.	.
13.74	0.5227	1.19	. Q	.	.	.	.
13.87	0.5359	1.22	. Q	.	.	.	.
14.01	0.5496	1.28	. Q	.	.	.	.
14.14	0.5638	1.31	. Q	.	.	.	.
14.27	0.5785	1.38	. Q	.	.	.	.
14.41	0.5939	1.42	. Q	.	.	.	.
14.54	0.6101	1.52	. Q	.	.	.	.

```
 14.67      0.6271      1.58  .  Q      .         .         .         .
 14.80      0.6452      1.71  .  Q      .         .         .         .
 14.94      0.6644      1.79  .  Q      .         .         .         .
 15.07      0.6851      1.98  .  Q      .         .         .         .
 15.20      0.7074      2.09  .   Q     .         .         .         .
 15.34      0.7319      2.37  .   Q     .         .         .         .
 15.47      0.7576      2.32  .   Q     .         .         .         .
 15.60      0.7846      2.61  .    Q    .         .         .         .
 15.73      0.8153      2.98  .    Q    .         .         .         .
 15.87      0.8574      4.68  .        Q.         .         .         .
 16.00      0.9184      6.43  .         . Q       .         .         .
 16.13      1.0576     18.93  .         .         .         .      Q  .
 16.27      1.1820      3.74  .      Q  .         .         .         .
 16.40      1.2153      2.33  .   Q     .         .         .         .
 16.53      1.2402      2.22  .   Q     .         .         .         .
 16.66      1.2627      1.88  .  Q      .         .         .         .
 16.80      1.2820      1.64  .  Q      .         .         .         .
 16.93      1.2991      1.47  . Q       .         .         .         .
 17.06      1.3145      1.34  . Q       .         .         .         .
 17.20      1.3287      1.25  . Q       .         .         .         .
 17.33      1.3419      1.16  . Q       .         .         .         .
 17.46      1.3542      1.08  . Q       .         .         .         .
 17.59      1.3657      1.01  . Q       .         .         .         .
 17.73      1.3766      0.96  .Q        .         .         .         .
 17.86      1.3869      0.93  .Q        .         .         .         .
 17.99      1.3969      0.89  .Q        .         .         .         .
 18.13      1.4056      0.69  .Q        .         .         .         .
 18.26      1.4128      0.62  .Q        .         .         .         .
 18.39      1.4195      0.60  .Q        .         .         .         .
 18.52      1.4260      0.58  .Q        .         .         .         .
 18.66      1.4322      0.56  .Q        .         .         .         .
 18.79      1.4383      0.54  .Q        .         .         .         .
 18.92      1.4441      0.53  .Q        .         .         .         .
 19.06      1.4498      0.51  .Q        .         .         .         .
 19.19      1.4553      0.50  Q         .         .         .         .
 19.32      1.4607      0.48  Q         .         .         .         .
 19.45      1.4659      0.47  Q         .         .         .         .
 19.59      1.4710      0.46  Q         .         .         .         .
 19.72      1.4760      0.45  Q         .         .         .         .
 19.85      1.4809      0.44  Q         .         .         .         .
 19.98      1.4856      0.43  Q         .         .         .         .
 20.12      1.4903      0.42  Q         .         .         .         .
 20.25      1.4949      0.41  Q         .         .         .         .
 20.38      1.4993      0.40  Q         .         .         .         .
 20.52      1.5037      0.39  Q         .         .         .         .
 20.65      1.5080      0.39  Q         .         .         .         .
 20.78      1.5122      0.38  Q         .         .         .         .
 20.91      1.5164      0.37  Q         .         .         .         .
 21.05      1.5204      0.37  Q         .         .         .         .
 21.18      1.5244      0.36  Q         .         .         .         .
 21.31      1.5284      0.36  Q         .         .         .         .
 21.45      1.5322      0.35  Q         .         .         .         .
 21.58      1.5360      0.34  Q         .         .         .         .
 21.71      1.5398      0.34  Q         .         .         .         .
 21.84      1.5435      0.33  Q         .         .         .         .
 21.98      1.5471      0.33  Q         .         .         .         .
 22.11      1.5507      0.32  Q         .         .         .         .
 22.24      1.5543      0.32  Q         .         .         .         .
 22.38      1.5577      0.32  Q         .         .         .         .
 22.51      1.5612      0.31  Q         .         .         .         .
 22.64      1.5646      0.31  Q         .         .         .         .
 22.77      1.5679      0.30  Q         .         .         .         .
 22.91      1.5713      0.30  Q         .         .         .         .
 23.04      1.5745      0.30  Q         .         .         .         .
 23.17      1.5778      0.29  Q         .         .         .         .
 23.31      1.5810      0.29  Q         .         .         .         .
 23.44      1.5841      0.29  Q         .         .         .         .
 23.57      1.5872      0.28  Q         .         .         .         .
 23.70      1.5903      0.28  Q         .         .         .         .
 23.84      1.5934      0.28  Q         .         .         .         .
 23.97      1.5964      0.27  Q         .         .         .         .
 24.10      1.5994      0.27  Q         .         .         .         .
 24.24      1.6009      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
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Drainage G

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  8.11
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.50
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.18

****************************************************************************
  TIME     VOLUME       Q    0.         2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.05      0.0000     0.00  Q         .         .         .         .
  0.19      0.0005     0.08  Q         .         .         .         .
  0.32      0.0014     0.08  Q         .         .         .         .
  0.46      0.0024     0.09  Q         .         .         .         .
  0.59      0.0033     0.09  Q         .         .         .         .
  0.73      0.0043     0.09  Q         .         .         .         .
  0.86      0.0052     0.09  Q         .         .         .         .
  1.00      0.0062     0.09  Q         .         .         .         .
  1.13      0.0072     0.09  Q         .         .         .         .
  1.27      0.0082     0.09  Q         .         .         .         .
  1.40      0.0091     0.09  Q         .         .         .         .
  1.54      0.0101     0.09  Q         .         .         .         .
  1.67      0.0111     0.09  Q         .         .         .         .
  1.81      0.0121     0.09  Q         .         .         .         .
  1.94      0.0131     0.09  Q         .         .         .         .
  2.08      0.0142     0.09  Q         .         .         .         .
  2.21      0.0152     0.09  Q         .         .         .         .
  2.35      0.0162     0.09  Q         .         .         .         .
  2.48      0.0172     0.09  Q         .         .         .         .
  2.62      0.0183     0.09  Q         .         .         .         .
  2.75      0.0193     0.09  Q         .         .         .         .
  2.89      0.0204     0.09  Q         .         .         .         .
  3.02      0.0214     0.10  Q         .         .         .         .
  3.16      0.0225     0.10  Q         .         .         .         .
  3.29      0.0236     0.10  Q         .         .         .         .
  3.43      0.0247     0.10  Q         .         .         .         .
  3.56      0.0258     0.10  Q         .         .         .         .
  3.70      0.0269     0.10  Q         .         .         .         .
  3.84      0.0280     0.10  Q         .         .         .         .
  3.97      0.0291     0.10  Q         .         .         .         .
  4.11      0.0302     0.10  Q         .         .         .         .
```

4.24	0.0313	0.10	Q	.	.	.	.
4.38	0.0325	0.10	Q	.	.	.	.
4.51	0.0336	0.10	Q	.	.	.	.
4.65	0.0348	0.10	Q	.	.	.	.
4.78	0.0359	0.10	Q	.	.	.	.
4.92	0.0371	0.11	Q	.	.	.	.
5.05	0.0383	0.11	Q	.	.	.	.
5.19	0.0395	0.11	Q	.	.	.	.
5.32	0.0407	0.11	Q	.	.	.	.
5.46	0.0419	0.11	Q	.	.	.	.
5.59	0.0431	0.11	Q	.	.	.	.
5.73	0.0443	0.11	Q	.	.	.	.
5.86	0.0456	0.11	Q	.	.	.	.
6.00	0.0468	0.11	Q	.	.	.	.
6.13	0.0481	0.11	Q	.	.	.	.
6.27	0.0493	0.11	Q	.	.	.	.
6.40	0.0506	0.12	Q	.	.	.	.
6.54	0.0519	0.12	Q	.	.	.	.
6.67	0.0532	0.12	Q	.	.	.	.
6.81	0.0545	0.12	Q	.	.	.	.
6.94	0.0559	0.12	Q	.	.	.	.
7.08	0.0572	0.12	Q	.	.	.	.
7.21	0.0586	0.12	Q	.	.	.	.
7.35	0.0599	0.12	Q	.	.	.	.
7.48	0.0613	0.12	Q	.	.	.	.
7.62	0.0627	0.13	Q	.	.	.	.
7.75	0.0641	0.13	Q	.	.	.	.
7.89	0.0655	0.13	Q	.	.	.	.
8.03	0.0670	0.13	Q	.	.	.	.
8.16	0.0684	0.13	Q	.	.	.	.
8.30	0.0699	0.13	Q	.	.	.	.
8.43	0.0714	0.13	Q	.	.	.	.
8.57	0.0729	0.14	Q	.	.	.	.
8.70	0.0744	0.14	Q	.	.	.	.
8.84	0.0759	0.14	Q	.	.	.	.
8.97	0.0775	0.14	Q	.	.	.	.
9.11	0.0791	0.14	Q	.	.	.	.
9.24	0.0807	0.14	Q	.	.	.	.
9.38	0.0823	0.15	Q	.	.	.	.
9.51	0.0839	0.15	Q	.	.	.	.
9.65	0.0856	0.15	Q	.	.	.	.
9.78	0.0873	0.15	Q	.	.	.	.
9.92	0.0890	0.15	Q	.	.	.	.
10.05	0.0907	0.16	Q	.	.	.	.
10.19	0.0924	0.16	Q	.	.	.	.
10.32	0.0942	0.16	Q	.	.	.	.
10.46	0.0960	0.16	Q	.	.	.	.
10.59	0.0978	0.16	Q	.	.	.	.
10.73	0.0997	0.17	Q	.	.	.	.
10.86	0.1016	0.17	Q	.	.	.	.
11.00	0.1035	0.17	Q	.	.	.	.
11.13	0.1055	0.18	Q	.	.	.	.
11.27	0.1074	0.18	Q	.	.	.	.
11.40	0.1095	0.18	Q	.	.	.	.
11.54	0.1115	0.19	Q	.	.	.	.
11.67	0.1136	0.19	Q	.	.	.	.
11.81	0.1158	0.19	Q	.	.	.	.
11.95	0.1179	0.20	Q	.	.	.	.
12.08	0.1203	0.23	Q	.	.	.	.
12.22	0.1231	0.27	.Q	.	.	.	.
12.35	0.1262	0.28	.Q	.	.	.	.
12.49	0.1293	0.28	.Q	.	.	.	.
12.62	0.1325	0.29	.Q	.	.	.	.
12.76	0.1357	0.29	.Q	.	.	.	.
12.89	0.1390	0.30	.Q	.	.	.	.
13.03	0.1424	0.31	.Q	.	.	.	.
13.16	0.1459	0.32	.Q	.	.	.	.
13.30	0.1495	0.32	.Q	.	.	.	.
13.43	0.1532	0.34	.Q	.	.	.	.
13.57	0.1570	0.35	.Q	.	.	.	.
13.70	0.1610	0.36	.Q	.	.	.	.
13.84	0.1651	0.37	.Q	.	.	.	.
13.97	0.1694	0.39	.Q	.	.	.	.
14.11	0.1738	0.40	.Q	.	.	.	.
14.24	0.1784	0.42	.Q	.	.	.	.
14.38	0.1832	0.44	.Q	.	.	.	.
14.51	0.1883	0.47	.Q	.	.	.	.
14.65	0.1936	0.49	.Q	.	.	.	.
14.78	0.1993	0.53	. Q	.	.	.	.

```
 14.92      0.2053      0.55  . Q       .         .         .         .
 15.05      0.2117      0.61  . Q       .         .         .         .
 15.19      0.2187      0.64  . Q       .         .         .         .
 15.32      0.2264      0.73  . Q       .         .         .         .
 15.46      0.2345      0.73  . Q       .         .         .         .
 15.59      0.2430      0.80  .  Q      .         .         .         .
 15.73      0.2526      0.91  .  Q      .         .         .         .
 15.86      0.2657      1.44  .    Q    .         .         .         .
 16.00      0.2848      1.98  .      Q  .         .         .         .
 16.14      0.3283      5.82  .         .         .  Q      .         .
 16.27      0.3672      1.14  .   Q     .         .         .         .
 16.41      0.3775      0.71  . Q       .         .         .         .
 16.54      0.3853      0.68  . Q       .         .         .         .
 16.68      0.3924      0.58  . Q       .         .         .         .
 16.81      0.3984      0.50  . Q       .         .         .         .
 16.95      0.4037      0.45  .Q        .         .         .         .
 17.08      0.4086      0.41  .Q        .         .         .         .
 17.22      0.4130      0.38  .Q        .         .         .         .
 17.35      0.4171      0.35  .Q        .         .         .         .
 17.49      0.4209      0.33  .Q        .         .         .         .
 17.62      0.4245      0.31  .Q        .         .         .         .
 17.76      0.4279      0.30  .Q        .         .         .         .
 17.89      0.4312      0.28  .Q        .         .         .         .
 18.03      0.4343      0.27  .Q        .         .         .         .
 18.16      0.4369      0.20  Q         .         .         .         .
 18.30      0.4391      0.19  Q         .         .         .         .
 18.43      0.4412      0.18  Q         .         .         .         .
 18.57      0.4432      0.18  Q         .         .         .         .
 18.70      0.4452      0.17  Q         .         .         .         .
 18.84      0.4471      0.17  Q         .         .         .         .
 18.97      0.4489      0.16  Q         .         .         .         .
 19.11      0.4507      0.16  Q         .         .         .         .
 19.24      0.4524      0.15  Q         .         .         .         .
 19.38      0.4541      0.15  Q         .         .         .         .
 19.51      0.4557      0.14  Q         .         .         .         .
 19.65      0.4573      0.14  Q         .         .         .         .
 19.78      0.4589      0.14  Q         .         .         .         .
 19.92      0.4604      0.13  Q         .         .         .         .
 20.06      0.4619      0.13  Q         .         .         .         .
 20.19      0.4633      0.13  Q         .         .         .         .
 20.33      0.4648      0.13  Q         .         .         .         .
 20.46      0.4662      0.12  Q         .         .         .         .
 20.60      0.4675      0.12  Q         .         .         .         .
 20.73      0.4689      0.12  Q         .         .         .         .
 20.87      0.4702      0.12  Q         .         .         .         .
 21.00      0.4715      0.11  Q         .         .         .         .
 21.14      0.4727      0.11  Q         .         .         .         .
 21.27      0.4740      0.11  Q         .         .         .         .
 21.41      0.4752      0.11  Q         .         .         .         .
 21.54      0.4764      0.11  Q         .         .         .         .
 21.68      0.4776      0.11  Q         .         .         .         .
 21.81      0.4788      0.10  Q         .         .         .         .
 21.95      0.4799      0.10  Q         .         .         .         .
 22.08      0.4811      0.10  Q         .         .         .         .
 22.22      0.4822      0.10  Q         .         .         .         .
 22.35      0.4833      0.10  Q         .         .         .         .
 22.49      0.4844      0.10  Q         .         .         .         .
 22.62      0.4855      0.10  Q         .         .         .         .
 22.76      0.4865      0.09  Q         .         .         .         .
 22.89      0.4876      0.09  Q         .         .         .         .
 23.03      0.4886      0.09  Q         .         .         .         .
 23.16      0.4896      0.09  Q         .         .         .         .
 23.30      0.4906      0.09  Q         .         .         .         .
 23.43      0.4916      0.09  Q         .         .         .         .
 23.57      0.4926      0.09  Q         .         .         .         .
 23.70      0.4936      0.09  Q         .         .         .         .
 23.84      0.4946      0.09  Q         .         .         .         .
 23.97      0.4955      0.08  Q         .         .         .         .
 24.11      0.4965      0.08  Q         .         .         .         .
 24.25      0.4969      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
```

Drainage H

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


****************************************************************************
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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    7.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  8.31
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.93
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.69

****************************************************************************
  TIME     VOLUME       Q    0.        7.5      15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.07     0.0010      0.33  Q         .         .         .         .
  0.21     0.0047      0.33  Q         .         .         .         .
  0.35     0.0085      0.33  Q         .         .         .         .
  0.49     0.0123      0.33  Q         .         .         .         .
  0.63     0.0161      0.33  Q         .         .         .         .
  0.76     0.0199      0.33  Q         .         .         .         .
  0.90     0.0237      0.34  Q         .         .         .         .
  1.04     0.0276      0.34  Q         .         .         .         .
  1.18     0.0315      0.34  Q         .         .         .         .
  1.32     0.0354      0.34  Q         .         .         .         .
  1.46     0.0393      0.35  Q         .         .         .         .
  1.60     0.0433      0.35  Q         .         .         .         .
  1.73     0.0473      0.35  Q         .         .         .         .
  1.87     0.0513      0.35  Q         .         .         .         .
  2.01     0.0553      0.35  Q         .         .         .         .
  2.15     0.0594      0.36  Q         .         .         .         .
  2.29     0.0635      0.36  Q         .         .         .         .
  2.43     0.0676      0.36  Q         .         .         .         .
  2.57     0.0717      0.36  Q         .         .         .         .
  2.70     0.0759      0.36  Q         .         .         .         .
  2.84     0.0801      0.37  Q         .         .         .         .
  2.98     0.0843      0.37  Q         .         .         .         .
  3.12     0.0885      0.37  Q         .         .         .         .
  3.26     0.0928      0.37  Q         .         .         .         .
  3.40     0.0971      0.38  Q         .         .         .         .
  3.53     0.1015      0.38  Q         .         .         .         .
  3.67     0.1058      0.38  Q         .         .         .         .
  3.81     0.1102      0.39  Q         .         .         .         .
  3.95     0.1146      0.39  Q         .         .         .         .
  4.09     0.1191      0.39  Q         .         .         .         .
  4.23     0.1236      0.39  Q         .         .         .         .
```

```
  4.37      0.1281     0.40  Q          .          .          .          .
  4.50      0.1327     0.40  Q          .          .          .          .
  4.64      0.1373     0.40  Q          .          .          .          .
  4.78      0.1419     0.41  Q          .          .          .          .
  4.92      0.1466     0.41  Q          .          .          .          .
  5.06      0.1513     0.41  Q          .          .          .          .
  5.20      0.1560     0.42  Q          .          .          .          .
  5.34      0.1608     0.42  Q          .          .          .          .
  5.47      0.1656     0.42  Q          .          .          .          .
  5.61      0.1705     0.43  Q          .          .          .          .
  5.75      0.1754     0.43  Q          .          .          .          .
  5.89      0.1803     0.43  Q          .          .          .          .
  6.03      0.1853     0.44  Q          .          .          .          .
  6.17      0.1904     0.44  Q          .          .          .          .
  6.30      0.1954     0.44  Q          .          .          .          .
  6.44      0.2005     0.45  Q          .          .          .          .
  6.58      0.2057     0.45  Q          .          .          .          .
  6.72      0.2109     0.46  Q          .          .          .          .
  6.86      0.2162     0.46  Q          .          .          .          .
  7.00      0.2215     0.47  Q          .          .          .          .
  7.14      0.2269     0.47  Q          .          .          .          .
  7.27      0.2323     0.48  Q          .          .          .          .
  7.41      0.2378     0.48  Q          .          .          .          .
  7.55      0.2433     0.49  Q          .          .          .          .
  7.69      0.2489     0.49  Q          .          .          .          .
  7.83      0.2545     0.50  Q          .          .          .          .
  7.97      0.2602     0.50  Q          .          .          .          .
  8.11      0.2660     0.51  Q          .          .          .          .
  8.24      0.2718     0.51  Q          .          .          .          .
  8.38      0.2777     0.52  Q          .          .          .          .
  8.52      0.2837     0.52  Q          .          .          .          .
  8.66      0.2897     0.53  Q          .          .          .          .
  8.80      0.2958     0.54  Q          .          .          .          .
  8.94      0.3020     0.54  Q          .          .          .          .
  9.07      0.3082     0.55  Q          .          .          .          .
  9.21      0.3146     0.56  Q          .          .          .          .
  9.35      0.3210     0.56  Q          .          .          .          .
  9.49      0.3275     0.57  Q          .          .          .          .
  9.63      0.3341     0.58  Q          .          .          .          .
  9.77      0.3408     0.59  Q          .          .          .          .
  9.91      0.3475     0.59  Q          .          .          .          .
 10.04      0.3544     0.61  Q          .          .          .          .
 10.18      0.3614     0.61  Q          .          .          .          .
 10.32      0.3684     0.62  Q          .          .          .          .
 10.46      0.3756     0.63  Q          .          .          .          .
 10.60      0.3829     0.64  Q          .          .          .          .
 10.74      0.3903     0.65  Q          .          .          .          .
 10.88      0.3978     0.67  Q          .          .          .          .
 11.01      0.4055     0.67  Q          .          .          .          .
 11.15      0.4133     0.69  Q          .          .          .          .
 11.29      0.4212     0.70  Q          .          .          .          .
 11.43      0.4293     0.71  Q          .          .          .          .
 11.57      0.4375     0.72  Q          .          .          .          .
 11.71      0.4459     0.74  Q          .          .          .          .
 11.85      0.4545     0.75  .Q         .          .          .          .
 11.98      0.4632     0.77  .Q         .          .          .          .
 12.12      0.4726     0.87  .Q         .          .          .          .
 12.26      0.4837     1.07  .Q         .          .          .          .
 12.40      0.4960     1.08  .Q         .          .          .          .
 12.54      0.5085     1.11  .Q         .          .          .          .
 12.68      0.5213     1.12  .Q         .          .          .          .
 12.81      0.5343     1.16  .Q         .          .          .          .
 12.95      0.5477     1.17  .Q         .          .          .          .
 13.09      0.5613     1.21  .Q         .          .          .          .
 13.23      0.5754     1.24  .Q         .          .          .          .
 13.37      0.5899     1.30  .Q         .          .          .          .
 13.51      0.6049     1.33  .Q         .          .          .          .
 13.65      0.6205     1.39  .Q         .          .          .          .
 13.78      0.6366     1.43  .Q         .          .          .          .
 13.92      0.6534     1.51  . Q        .          .          .          .
 14.06      0.6709     1.55  . Q        .          .          .          .
 14.20      0.6890     1.62  . Q        .          .          .          .
 14.34      0.7078     1.67  . Q        .          .          .          .
 14.48      0.7276     1.79  . Q        .          .          .          .
 14.62      0.7485     1.86  . Q        .          .          .          .
 14.75      0.7707     2.02  . Q        .          .          .          .
 14.89      0.7943     2.11  . Q        .          .          .          .
 15.03      0.8196     2.32  .  Q       .          .          .          .
 15.17      0.8470     2.46  .  Q       .          .          .          .
```

```
 15.31     0.8770      2.79  .  Q      .         .         .         .
 15.45     0.9095      2.89  .  Q      .         .         .         .
 15.58     0.9435      3.06  .   Q     .         .         .         .
 15.72     0.9811      3.50  .   Q     .         .         .         .
 15.86     1.0326      5.51  .      Q  .         .         .         .
 16.00     1.1075      7.57  .         Q         .         .         .
 16.14     1.2785     22.30  .         .         .        Q.         .
 16.28     1.4310      4.34  .    Q    .         .         .         .
 16.42     1.4715      2.73  .  Q      .         .         .         .
 16.55     1.5020      2.61  .  Q      .         .         .         .
 16.69     1.5296      2.21  . Q       .         .         .         .
 16.83     1.5533      1.93  . Q       .         .         .         .
 16.97     1.5743      1.73  . Q       .         .         .         .
 17.11     1.5932      1.58  . Q       .         .         .         .
 17.25     1.6106      1.47  .Q        .         .         .         .
 17.39     1.6268      1.36  .Q        .         .         .         .
 17.52     1.6418      1.27  .Q        .         .         .         .
 17.66     1.6559      1.19  .Q        .         .         .         .
 17.80     1.6692      1.14  .Q        .         .         .         .
 17.94     1.6820      1.09  .Q        .         .         .         .
 18.08     1.6943      1.05  .Q        .         .         .         .
 18.22     1.7047      0.76  .Q        .         .         .         .
 18.35     1.7132      0.73  Q         .         .         .         .
 18.49     1.7215      0.71  Q         .         .         .         .
 18.63     1.7294      0.68  Q         .         .         .         .
 18.77     1.7371      0.66  Q         .         .         .         .
 18.91     1.7445      0.64  Q         .         .         .         .
 19.05     1.7517      0.62  Q         .         .         .         .
 19.19     1.7586      0.60  Q         .         .         .         .
 19.32     1.7654      0.58  Q         .         .         .         .
 19.46     1.7720      0.57  Q         .         .         .         .
 19.60     1.7784      0.55  Q         .         .         .         .
 19.74     1.7847      0.54  Q         .         .         .         .
 19.88     1.7908      0.53  Q         .         .         .         .
 20.02     1.7967      0.52  Q         .         .         .         .
 20.16     1.8026      0.50  Q         .         .         .         .
 20.29     1.8083      0.49  Q         .         .         .         .
 20.43     1.8138      0.48  Q         .         .         .         .
 20.57     1.8193      0.47  Q         .         .         .         .
 20.71     1.8247      0.46  Q         .         .         .         .
 20.85     1.8300      0.46  Q         .         .         .         .
 20.99     1.8351      0.45  Q         .         .         .         .
 21.12     1.8402      0.44  Q         .         .         .         .
 21.26     1.8452      0.43  Q         .         .         .         .
 21.40     1.8501      0.42  Q         .         .         .         .
 21.54     1.8549      0.42  Q         .         .         .         .
 21.68     1.8596      0.41  Q         .         .         .         .
 21.82     1.8643      0.40  Q         .         .         .         .
 21.96     1.8689      0.40  Q         .         .         .         .
 22.09     1.8734      0.39  Q         .         .         .         .
 22.23     1.8779      0.39  Q         .         .         .         .
 22.37     1.8823      0.38  Q         .         .         .         .
 22.51     1.8866      0.38  Q         .         .         .         .
 22.65     1.8909      0.37  Q         .         .         .         .
 22.79     1.8951      0.37  Q         .         .         .         .
 22.92     1.8993      0.36  Q         .         .         .         .
 23.06     1.9034      0.36  Q         .         .         .         .
 23.20     1.9075      0.35  Q         .         .         .         .
 23.34     1.9115      0.35  Q         .         .         .         .
 23.48     1.9154      0.34  Q         .         .         .         .
 23.62     1.9193      0.34  Q         .         .         .         .
 23.76     1.9232      0.34  Q         .         .         .         .
 23.89     1.9270      0.33  Q         .         .         .         .
 24.03     1.9308      0.33  Q         .         .         .         .
 24.17     1.9327      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage I

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) =  9.62
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.30
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.11

****************************************************************************
  TIME     VOLUME       Q    0.         2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.13      0.0003      0.05  Q          .         .         .         .
  0.29      0.0010      0.05  Q          .         .         .         .
  0.45      0.0016      0.05  Q          .         .         .         .
  0.61      0.0023      0.05  Q          .         .         .         .
  0.77      0.0030      0.05  Q          .         .         .         .
  0.93      0.0037      0.05  Q          .         .         .         .
  1.09      0.0044      0.05  Q          .         .         .         .
  1.25      0.0051      0.05  Q          .         .         .         .
  1.41      0.0058      0.05  Q          .         .         .         .
  1.57      0.0066      0.05  Q          .         .         .         .
  1.73      0.0073      0.05  Q          .         .         .         .
  1.89      0.0080      0.06  Q          .         .         .         .
  2.05      0.0088      0.06  Q          .         .         .         .
  2.21      0.0095      0.06  Q          .         .         .         .
  2.37      0.0102      0.06  Q          .         .         .         .
  2.53      0.0110      0.06  Q          .         .         .         .
  2.69      0.0117      0.06  Q          .         .         .         .
  2.85      0.0125      0.06  Q          .         .         .         .
  3.01      0.0133      0.06  Q          .         .         .         .
  3.17      0.0140      0.06  Q          .         .         .         .
  3.33      0.0148      0.06  Q          .         .         .         .
  3.49      0.0156      0.06  Q          .         .         .         .
  3.65      0.0164      0.06  Q          .         .         .         .
  3.81      0.0172      0.06  Q          .         .         .         .
  3.98      0.0180      0.06  Q          .         .         .         .
  4.14      0.0188      0.06  Q          .         .         .         .
  4.30      0.0196      0.06  Q          .         .         .         .
  4.46      0.0205      0.06  Q          .         .         .         .
  4.62      0.0213      0.06  Q          .         .         .         .
  4.78      0.0221      0.06  Q          .         .         .         .
  4.94      0.0230      0.06  Q          .         .         .         .
```

```
 5.10      0.0238      0.06  Q         .         .         .         .
 5.26      0.0247      0.07  Q         .         .         .         .
 5.42      0.0256      0.07  Q         .         .         .         .
 5.58      0.0265      0.07  Q         .         .         .         .
 5.74      0.0274      0.07  Q         .         .         .         .
 5.90      0.0283      0.07  Q         .         .         .         .
 6.06      0.0292      0.07  Q         .         .         .         .
 6.22      0.0301      0.07  Q         .         .         .         .
 6.38      0.0310      0.07  Q         .         .         .         .
 6.54      0.0319      0.07  Q         .         .         .         .
 6.70      0.0329      0.07  Q         .         .         .         .
 6.86      0.0338      0.07  Q         .         .         .         .
 7.02      0.0348      0.07  Q         .         .         .         .
 7.18      0.0358      0.07  Q         .         .         .         .
 7.34      0.0368      0.07  Q         .         .         .         .
 7.50      0.0378      0.08  Q         .         .         .         .
 7.66      0.0388      0.08  Q         .         .         .         .
 7.82      0.0398      0.08  Q         .         .         .         .
 7.98      0.0408      0.08  Q         .         .         .         .
 8.14      0.0419      0.08  Q         .         .         .         .
 8.30      0.0430      0.08  Q         .         .         .         .
 8.46      0.0440      0.08  Q         .         .         .         .
 8.62      0.0451      0.08  Q         .         .         .         .
 8.78      0.0462      0.08  Q         .         .         .         .
 8.95      0.0474      0.09  Q         .         .         .         .
 9.11      0.0485      0.09  Q         .         .         .         .
 9.27      0.0496      0.09  Q         .         .         .         .
 9.43      0.0508      0.09  Q         .         .         .         .
 9.59      0.0520      0.09  Q         .         .         .         .
 9.75      0.0532      0.09  Q         .         .         .         .
 9.91      0.0544      0.09  Q         .         .         .         .
10.07      0.0557      0.10  Q         .         .         .         .
10.23      0.0570      0.10  Q         .         .         .         .
10.39      0.0583      0.10  Q         .         .         .         .
10.55      0.0596      0.10  Q         .         .         .         .
10.71      0.0609      0.10  Q         .         .         .         .
10.87      0.0623      0.10  Q         .         .         .         .
11.03      0.0637      0.11  Q         .         .         .         .
11.19      0.0651      0.11  Q         .         .         .         .
11.35      0.0665      0.11  Q         .         .         .         .
11.51      0.0680      0.11  Q         .         .         .         .
11.67      0.0695      0.12  Q         .         .         .         .
11.83      0.0711      0.12  Q         .         .         .         .
11.99      0.0727      0.12  Q         .         .         .         .
12.15      0.0744      0.14  Q         .         .         .         .
12.31      0.0764      0.17  Q         .         .         .         .
12.47      0.0787      0.17  Q         .         .         .         .
12.63      0.0810      0.18  Q         .         .         .         .
12.79      0.0833      0.18  Q         .         .         .         .
12.95      0.0858      0.19  Q         .         .         .         .
13.11      0.0882      0.19  Q         .         .         .         .
13.27      0.0908      0.20  Q         .         .         .         .
13.43      0.0935      0.20  Q         .         .         .         .
13.60      0.0962      0.21  Q         .         .         .         .
13.76      0.0991      0.22  Q         .         .         .         .
13.92      0.1022      0.24  Q         .         .         .         .
14.08      0.1053      0.24  Q         .         .         .         .
14.24      0.1086      0.26  .Q        .         .         .         .
14.40      0.1121      0.27  .Q        .         .         .         .
14.56      0.1158      0.29  .Q        .         .         .         .
14.72      0.1197      0.30  .Q        .         .         .         .
14.88      0.1239      0.33  .Q        .         .         .         .
15.04      0.1284      0.35  .Q        .         .         .         .
15.20      0.1335      0.40  .Q        .         .         .         .
15.36      0.1390      0.43  .Q        .         .         .         .
15.52      0.1447      0.44  .Q        .         .         .         .
15.68      0.1509      0.50  .Q        .         .         .         .
15.84      0.1595      0.79  .  Q      .         .         .         .
16.00      0.1720      1.09  .   Q     .         .         .         .
16.16      0.2005      3.22  .         . Q       .         .         .
16.32      0.2258      0.60  . Q       .         .         .         .
16.48      0.2328      0.45  .Q        .         .         .         .
16.64      0.2382      0.38  .Q        .         .         .         .
16.80      0.2428      0.32  .Q        .         .         .         .
16.96      0.2468      0.28  .Q        .         .         .         .
17.12      0.2502      0.25  Q         .         .         .         .
17.28      0.2534      0.23  Q         .         .         .         .
17.44      0.2563      0.21  Q         .         .         .         .
17.60      0.2590      0.19  Q         .         .         .         .
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```
 17.76      0.2614      0.18  Q          .          .          .          .
 17.92      0.2638      0.17  Q          .          .          .          .
 18.08      0.2660      0.17  Q          .          .          .          .
 18.24      0.2679      0.12  Q          .          .          .          .
 18.41      0.2695      0.11  Q          .          .          .          .
 18.57      0.2710      0.11  Q          .          .          .          .
 18.73      0.2724      0.10  Q          .          .          .          .
 18.89      0.2738      0.10  Q          .          .          .          .
 19.05      0.2751      0.10  Q          .          .          .          .
 19.21      0.2763      0.09  Q          .          .          .          .
 19.37      0.2776      0.09  Q          .          .          .          .
 19.53      0.2788      0.09  Q          .          .          .          .
 19.69      0.2799      0.09  Q          .          .          .          .
 19.85      0.2810      0.08  Q          .          .          .          .
 20.01      0.2821      0.08  Q          .          .          .          .
 20.17      0.2832      0.08  Q          .          .          .          .
 20.33      0.2842      0.08  Q          .          .          .          .
 20.49      0.2852      0.08  Q          .          .          .          .
 20.65      0.2862      0.07  Q          .          .          .          .
 20.81      0.2872      0.07  Q          .          .          .          .
 20.97      0.2881      0.07  Q          .          .          .          .
 21.13      0.2891      0.07  Q          .          .          .          .
 21.29      0.2900      0.07  Q          .          .          .          .
 21.45      0.2909      0.07  Q          .          .          .          .
 21.61      0.2917      0.07  Q          .          .          .          .
 21.77      0.2926      0.06  Q          .          .          .          .
 21.93      0.2934      0.06  Q          .          .          .          .
 22.09      0.2943      0.06  Q          .          .          .          .
 22.25      0.2951      0.06  Q          .          .          .          .
 22.41      0.2959      0.06  Q          .          .          .          .
 22.57      0.2967      0.06  Q          .          .          .          .
 22.73      0.2974      0.06  Q          .          .          .          .
 22.89      0.2982      0.06  Q          .          .          .          .
 23.05      0.2989      0.06  Q          .          .          .          .
 23.22      0.2997      0.06  Q          .          .          .          .
 23.38      0.3004      0.05  Q          .          .          .          .
 23.54      0.3011      0.05  Q          .          .          .          .
 23.70      0.3018      0.05  Q          .          .          .          .
 23.86      0.3025      0.05  Q          .          .          .          .
 24.02      0.3032      0.05  Q          .          .          .          .
 24.18      0.3036      0.00  Q          .          .          .          .
-----------------------------------------------------------------------------
```

Drainage J

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   11.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) = 13.68
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     3.04
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.07

****************************************************************************
  TIME     VOLUME       Q    0.         7.5      15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.04     0.0000      0.00  Q          .         .         .         .
  0.27     0.0049      0.52  Q          .         .         .         .
  0.50     0.0146      0.52  Q          .         .         .         .
  0.72     0.0244      0.52  Q          .         .         .         .
  0.95     0.0343      0.53  Q          .         .         .         .
  1.18     0.0443      0.53  Q          .         .         .         .
  1.41     0.0545      0.54  Q          .         .         .         .
  1.64     0.0647      0.55  Q          .         .         .         .
  1.86     0.0750      0.55  Q          .         .         .         .
  2.09     0.0854      0.56  Q          .         .         .         .
  2.32     0.0959      0.56  Q          .         .         .         .
  2.55     0.1065      0.57  Q          .         .         .         .
  2.78     0.1173      0.57  Q          .         .         .         .
  3.00     0.1282      0.58  Q          .         .         .         .
  3.23     0.1391      0.59  Q          .         .         .         .
  3.46     0.1503      0.59  Q          .         .         .         .
  3.69     0.1615      0.60  Q          .         .         .         .
  3.92     0.1729      0.61  Q          .         .         .         .
  4.14     0.1844      0.61  Q          .         .         .         .
  4.37     0.1960      0.62  Q          .         .         .         .
  4.60     0.2078      0.63  Q          .         .         .         .
  4.83     0.2197      0.64  Q          .         .         .         .
  5.06     0.2318      0.64  Q          .         .         .         .
  5.28     0.2441      0.66  Q          .         .         .         .
  5.51     0.2565      0.66  Q          .         .         .         .
  5.74     0.2690      0.67  Q          .         .         .         .
  5.97     0.2818      0.68  Q          .         .         .         .
  6.20     0.2947      0.69  Q          .         .         .         .
  6.42     0.3079      0.70  Q          .         .         .         .
  6.65     0.3212      0.71  Q          .         .         .         .
  6.88     0.3347      0.72  Q          .         .         .         .
```

```
  7.11      0.3485      0.74  Q         .         .         .         .
  7.34      0.3624      0.74  Q         .         .         .         .
  7.56      0.3766      0.76  .Q        .         .         .         .
  7.79      0.3910      0.77  .Q        .         .         .         .
  8.02      0.4057      0.79  .Q        .         .         .         .
  8.25      0.4207      0.80  .Q        .         .         .         .
  8.48      0.4359      0.82  .Q        .         .         .         .
  8.70      0.4514      0.83  .Q        .         .         .         .
  8.93      0.4672      0.85  .Q        .         .         .         .
  9.16      0.4833      0.86  .Q        .         .         .         .
  9.39      0.4998      0.89  .Q        .         .         .         .
  9.62      0.5166      0.90  .Q        .         .         .         .
  9.84      0.5338      0.93  .Q        .         .         .         .
 10.07      0.5514      0.94  .Q        .         .         .         .
 10.30      0.5694      0.97  .Q        .         .         .         .
 10.53      0.5879      0.99  .Q        .         .         .         .
 10.76      0.6069      1.02  .Q        .         .         .         .
 10.98      0.6263      1.04  .Q        .         .         .         .
 11.21      0.6463      1.08  .Q        .         .         .         .
 11.44      0.6669      1.10  .Q        .         .         .         .
 11.67      0.6882      1.15  .Q        .         .         .         .
 11.90      0.7101      1.18  .Q        .         .         .         .
 12.12      0.7340      1.36  .Q        .         .         .         .
 12.35      0.7625      1.67  . Q       .         .         .         .
 12.58      0.7946      1.74  . Q       .         .         .         .
 12.81      0.8277      1.78  . Q       .         .         .         .
 13.04      0.8620      1.87  . Q       .         .         .         .
 13.26      0.8977      1.92  . Q       .         .         .         .
 13.49      0.9353      2.07  . Q       .         .         .         .
 13.72      0.9751      2.15  . Q       .         .         .         .
 13.95      1.0175      2.34  .  Q      .         .         .         .
 14.18      1.0626      2.45  .  Q      .         .         .         .
 14.40      1.1109      2.68  .  Q      .         .         .         .
 14.63      1.1628      2.84  .  Q      .         .         .         .
 14.86      1.2200      3.24  .   Q     .         .         .         .
 15.09      1.2835      3.50  .   Q     .         .         .         .
 15.32      1.3563      4.22  .    Q    .         .         .         .
 15.54      1.4379      4.44  .    Q    .         .         .         .
 15.77      1.5359      5.96  .      Q  .         .         .         .
 16.00      1.6753      8.83  .         .Q        .         .         .
 16.23      2.0061     26.28  .         .         .         .    Q    .
 16.46      2.2976      4.67  .     Q   .         .         .         .
 16.68      2.3776      3.82  .    Q    .         .         .         .
 16.91      2.4420      3.02  .   Q     .         .         .         .
 17.14      2.4944      2.54  .  Q      .         .         .         .
 17.37      2.5394      2.24  . Q       .         .         .         .
 17.60      2.5794      1.99  . Q       .         .         .         .
 17.82      2.6153      1.82  . Q       .         .         .         .
 18.05      2.6485      1.70  . Q       .         .         .         .
 18.28      2.6758      1.20  .Q        .         .         .         .
 18.51      2.6978      1.13  .Q        .         .         .         .
 18.74      2.7184      1.06  .Q        .         .         .         .
 18.96      2.7379      1.01  .Q        .         .         .         .
 19.19      2.7563      0.96  .Q        .         .         .         .
 19.42      2.7740      0.91  .Q        .         .         .         .
 19.65      2.7908      0.87  .Q        .         .         .         .
 19.88      2.8069      0.84  .Q        .         .         .         .
 20.10      2.8224      0.81  .Q        .         .         .         .
 20.33      2.8374      0.78  .Q        .         .         .         .
 20.56      2.8518      0.75  .Q        .         .         .         .
 20.79      2.8658      0.73  Q         .         .         .         .
 21.02      2.8793      0.71  Q         .         .         .         .
 21.24      2.8924      0.69  Q         .         .         .         .
 21.47      2.9052      0.67  Q         .         .         .         .
 21.70      2.9176      0.65  Q         .         .         .         .
 21.93      2.9297      0.63  Q         .         .         .         .
 22.16      2.9415      0.62  Q         .         .         .         .
 22.38      2.9530      0.60  Q         .         .         .         .
 22.61      2.9642      0.59  Q         .         .         .         .
 22.84      2.9752      0.58  Q         .         .         .         .
 23.07      2.9860      0.56  Q         .         .         .         .
 23.30      2.9965      0.55  Q         .         .         .         .
 23.52      3.0068      0.54  Q         .         .         .         .
 23.75      3.0169      0.53  Q         .         .         .         .
 23.98      3.0268      0.52  Q         .         .         .         .
 24.21      3.0366      0.51  Q         .         .         .         .
 24.44      3.0414      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage K

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                 16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    6.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.240
    TIME OF CONCENTRATION(MIN.) = 11.30
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.74
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.62

****************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.18      0.0023      0.29  Q         .         .         .         .
  0.37      0.0069      0.30  Q         .         .         .         .
  0.56      0.0115      0.30  Q         .         .         .         .
  0.74      0.0162      0.30  Q         .         .         .         .
  0.93      0.0209      0.30  Q         .         .         .         .
  1.12      0.0256      0.31  Q         .         .         .         .
  1.31      0.0304      0.31  Q         .         .         .         .
  1.50      0.0352      0.31  Q         .         .         .         .
  1.69      0.0400      0.31  Q         .         .         .         .
  1.87      0.0449      0.32  Q         .         .         .         .
  2.06      0.0499      0.32  Q         .         .         .         .
  2.25      0.0548      0.32  Q         .         .         .         .
  2.44      0.0599      0.32  Q         .         .         .         .
  2.63      0.0649      0.33  Q         .         .         .         .
  2.82      0.0700      0.33  Q         .         .         .         .
  3.00      0.0752      0.33  Q         .         .         .         .
  3.19      0.0804      0.34  Q         .         .         .         .
  3.38      0.0856      0.34  Q         .         .         .         .
  3.57      0.0909      0.34  Q         .         .         .         .
  3.76      0.0963      0.35  Q         .         .         .         .
  3.95      0.1017      0.35  Q         .         .         .         .
  4.13      0.1071      0.35  Q         .         .         .         .
  4.32      0.1126      0.36  Q         .         .         .         .
  4.51      0.1182      0.36  Q         .         .         .         .
  4.70      0.1238      0.36  Q         .         .         .         .
  4.89      0.1295      0.37  Q         .         .         .         .
  5.08      0.1353      0.37  Q         .         .         .         .
  5.26      0.1411      0.38  Q         .         .         .         .
  5.45      0.1469      0.38  Q         .         .         .         .
  5.64      0.1529      0.38  Q         .         .         .         .
  5.83      0.1589      0.39  Q         .         .         .         .
```

```
  6.02      0.1649      0.39  Q         .         .         .         .
  6.21      0.1711      0.40  Q         .         .         .         .
  6.39      0.1773      0.40  Q         .         .         .         .
  6.58      0.1836      0.41  Q         .         .         .         .
  6.77      0.1900      0.41  Q         .         .         .         .
  6.96      0.1964      0.42  Q         .         .         .         .
  7.15      0.2030      0.42  Q         .         .         .         .
  7.34      0.2096      0.43  Q         .         .         .         .
  7.53      0.2163      0.44  Q         .         .         .         .
  7.71      0.2231      0.44  Q         .         .         .         .
  7.90      0.2300      0.45  Q         .         .         .         .
  8.09      0.2371      0.45  Q         .         .         .         .
  8.28      0.2442      0.46  Q         .         .         .         .
  8.47      0.2514      0.47  Q         .         .         .         .
  8.65      0.2587      0.48  Q         .         .         .         .
  8.84      0.2662      0.48  Q         .         .         .         .
  9.03      0.2738      0.49  Q         .         .         .         .
  9.22      0.2815      0.50  Q         .         .         .         .
  9.41      0.2893      0.51  .Q        .         .         .         .
  9.60      0.2973      0.52  .Q        .         .         .         .
  9.78      0.3054      0.53  .Q        .         .         .         .
  9.97      0.3137      0.54  .Q        .         .         .         .
 10.16      0.3222      0.55  .Q        .         .         .         .
 10.35      0.3308      0.56  .Q        .         .         .         .
 10.54      0.3396      0.57  .Q        .         .         .         .
 10.73      0.3486      0.58  .Q        .         .         .         .
 10.91      0.3578      0.60  .Q        .         .         .         .
 11.10      0.3672      0.61  .Q        .         .         .         .
 11.29      0.3768      0.63  .Q        .         .         .         .
 11.48      0.3867      0.64  .Q        .         .         .         .
 11.67      0.3968      0.66  .Q        .         .         .         .
 11.86      0.4072      0.67  .Q        .         .         .         .
 12.05      0.4179      0.70  .Q        .         .         .         .
 12.23      0.4304      0.91  .Q        .         .         .         .
 12.42      0.4451      0.98  .Q        .         .         .         .
 12.61      0.4605      0.99  .Q        .         .         .         .
 12.80      0.4762      1.03  . Q       .         .         .         .
 12.99      0.4925      1.05  . Q       .         .         .         .
 13.18      0.5093      1.11  . Q       .         .         .         .
 13.36      0.5267      1.14  . Q       .         .         .         .
 13.55      0.5450      1.21  . Q       .         .         .         .
 13.74      0.5642      1.25  . Q       .         .         .         .
 13.93      0.5844      1.34  . Q       .         .         .         .
 14.12      0.6057      1.40  . Q       .         .         .         .
 14.30      0.6282      1.49  . Q       .         .         .         .
 14.49      0.6520      1.56  .  Q      .         .         .         .
 14.68      0.6776      1.73  .  Q      .         .         .         .
 14.87      0.7054      1.83  .  Q      .         .         .         .
 15.06      0.7359      2.09  .   Q     .         .         .         .
 15.25      0.7696      2.25  .   Q     .         .         .         .
 15.43      0.8071      2.56  .    Q    .         .         .         .
 15.62      0.8469      2.56  .    Q    .         .         .         .
 15.81      0.8981      4.01  .       Q .         .         .         .
 16.00      0.9734      5.67  .         .Q        .         .         .
 16.19      1.1484     16.81  .         .         .         .  Q      .
 16.38      1.3029      3.04  .     Q   .         .         .         .
 16.57      1.3456      2.45  .   Q     .         .         .         .
 16.75      1.3799      1.95  .  Q      .         .         .         .
 16.94      1.4078      1.64  .  Q      .         .         .         .
 17.13      1.4317      1.43  . Q       .         .         .         .
 17.32      1.4530      1.30  . Q       .         .         .         .
 17.51      1.4722      1.17  . Q       .         .         .         .
 17.69      1.4897      1.08  . Q       .         .         .         .
 17.88      1.5060      1.01  . Q       .         .         .         .
 18.07      1.5213      0.96  .Q        .         .         .         .
 18.26      1.5341      0.69  .Q        .         .         .         .
 18.45      1.5445      0.65  .Q        .         .         .         .
 18.64      1.5544      0.62  .Q        .         .         .         .
 18.83      1.5638      0.59  .Q        .         .         .         .
 19.01      1.5728      0.57  .Q        .         .         .         .
 19.20      1.5814      0.54  .Q        .         .         .         .
 19.39      1.5897      0.52  .Q        .         .         .         .
 19.58      1.5977      0.50  .Q        .         .         .         .
 19.77      1.6054      0.49  Q         .         .         .         .
 19.95      1.6129      0.47  Q         .         .         .         .
 20.14      1.6201      0.46  Q         .         .         .         .
 20.33      1.6271      0.44  Q         .         .         .         .
 20.52      1.6339      0.43  Q         .         .         .         .
 20.71      1.6405      0.42  Q         .         .         .         .
```

20.90	1.6470	0.41	Q	.	.	.	.
21.08	1.6533	0.40	Q	.	.	.	.
21.27	1.6594	0.39	Q	.	.	.	.
21.46	1.6655	0.38	Q	.	.	.	.
21.65	1.6713	0.37	Q	.	.	.	.
21.84	1.6771	0.37	Q	.	.	.	.
22.03	1.6827	0.36	Q	.	.	.	.
22.22	1.6882	0.35	Q	.	.	.	.
22.40	1.6936	0.34	Q	.	.	.	.
22.59	1.6989	0.34	Q	.	.	.	.
22.78	1.7041	0.33	Q	.	.	.	.
22.97	1.7092	0.33	Q	.	.	.	.
23.16	1.7142	0.32	Q	.	.	.	.
23.34	1.7192	0.31	Q	.	.	.	.
23.53	1.7240	0.31	Q	.	.	.	.
23.72	1.7288	0.30	Q	.	.	.	.
23.91	1.7335	0.30	Q	.	.	.	.
24.10	1.7381	0.29	Q	.	.	.	.
24.29	1.7404	0.00	Q	.	.	.	.

----

iii. EV 2-Year Storm Event

Drainage A

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
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                           Analysis prepared by:





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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  349.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.380
    LOW LOSS FRACTION = 0.540
    TIME OF CONCENTRATION(MIN.) = 37.45
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    17.29
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    24.66

****************************************************************************
  TIME     VOLUME       Q    0.       20.0      40.0      60.0      80.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.40      0.0542      3.31  .Q        .         .         .         .
  1.02      0.2262      3.35  .Q        .         .         .         .
  1.64      0.4022      3.47  .Q        .         .         .         .
  2.27      0.5828      3.53  .Q        .         .         .         .
  2.89      0.7684      3.67  .Q        .         .         .         .
  3.52      0.9593      3.74  .Q        .         .         .         .
  4.14      1.1561      3.89  .Q        .         .         .         .
  4.76      1.3590      3.98  .Q        .         .         .         .
  5.39      1.5688      4.16  . Q       .         .         .         .
  6.01      1.7860      4.26  . Q       .         .         .         .
  6.64      2.0114      4.48  . Q       .         .         .         .
  7.26      2.2457      4.60  . Q       .         .         .         .
  7.89      2.4902      4.88  . Q       .         .         .         .
  8.51      2.7458      5.03  . Q       .         .         .         .
  9.13      3.0143      5.38  . Q       .         .         .         .
  9.76      3.2969      5.58  . Q       .         .         .         .
 10.38      3.5967      6.04  .  Q      .         .         .         .
 11.01      3.9156      6.32  .  Q      .         .         .         .
 11.63      4.2586      6.98  .  Q      .         .         .         .
```

```
 12.26      4.6291       7.38  .  Q      .         .         .         .
 12.88      5.0771       9.99  .   Q     .         .         .         .
 13.50      5.6104      10.69  .    Q    .         .         .         .
 14.13      6.2128      12.67  .     Q   .         .         .         .
 14.75      6.9133      14.49  .      Q  .         .         .         .
 15.38      7.8026      19.99  .        Q.         .         .         .
 16.00      8.9432      24.24  .         . Q       .         .         .
 16.62     11.3992      70.98  .         .         .         .    Q    .
 17.25     13.6601      16.67  .       Q .         .         .         .
 17.87     14.3883      11.56  .    Q    .         .         .         .
 18.50     14.9136       8.80  .   Q     .         .         .         .
 19.12     15.3116       6.63  .  Q      .         .         .         .
 19.74     15.6321       5.80  . Q       .         .         .         .
 20.37     15.9158       5.20  . Q       .         .         .         .
 20.99     16.1719       4.73  . Q       .         .         .         .
 21.62     16.4067       4.37  . Q       .         .         .         .
 22.24     16.6242       4.06  . Q       .         .         .         .
 22.87     16.8273       3.81  .Q        .         .         .         .
 23.49     17.0184       3.60  .Q        .         .         .         .
 24.11     17.1992       3.41  .Q        .         .         .         .
 24.74     17.2871       0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage B

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
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                           Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  135.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.220
    LOW LOSS FRACTION = 0.360
    TIME OF CONCENTRATION(MIN.) = 37.48
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     9.30
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     6.92

****************************************************************************
  TIME     VOLUME       Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.38      0.0282      1.78  .Q       .         .         .         .
  1.01      0.1207      1.80  .Q       .         .         .         .
  1.63      0.2154      1.86  .Q       .         .         .         .
  2.26      0.3125      1.90  .Q       .         .         .         .
  2.88      0.4123      1.97  .Q       .         .         .         .
  3.51      0.5150      2.01  . Q      .         .         .         .
  4.13      0.6208      2.09  . Q      .         .         .         .
  4.76      0.7300      2.14  . Q      .         .         .         .
  5.38      0.8428      2.24  . Q      .         .         .         .
  6.01      0.9596      2.29  . Q      .         .         .         .
  6.63      1.0809      2.41  . Q      .         .         .         .
  7.25      1.2069      2.47  . Q      .         .         .         .
  7.88      1.3384      2.62  . Q      .         .         .         .
  8.50      1.4758      2.70  . Q      .         .         .         .
  9.13      1.6202      2.89  . Q      .         .         .         .
  9.75      1.7722      3.00  . Q      .         .         .         .
 10.38      1.9335      3.25  .  Q     .         .         .         .
 11.00      2.1050      3.40  .  Q     .         .         .         .
 11.63      2.2894      3.75  .  Q     .         .         .         .
```

```
 12.25      2.4887      3.97 .  Q      .         .         .         .
 12.88      2.7296      5.37 .    Q    .         .         .         .
 13.50      3.0165      5.75 .    Q    .         .         .         .
 14.13      3.3405      6.81 .     Q   .         .         .         .
 14.75      3.7173      7.79 .      Q  .         .         .         .
 15.38      4.1955     10.74 .         Q         .         .         .
 16.00      4.8091     13.03 .         .  Q      .         .         .
 16.62      6.1300     38.15 .         .         .         .       Q .
 17.25      7.3460      8.96 .       Q .         .         .         .
 17.87      7.7377      6.21 .     Q   .         .         .         .
 18.50      8.0201      4.73 .   Q     .         .         .         .
 19.12      8.2340      3.56 .  Q      .         .         .         .
 19.75      8.4064      3.12 .  Q      .         .         .         .
 20.37      8.5589      2.79 . Q       .         .         .         .
 21.00      8.6967      2.54 . Q       .         .         .         .
 21.62      8.8229      2.35 . Q       .         .         .         .
 22.25      8.9399      2.18 . Q       .         .         .         .
 22.87      9.0492      2.05 . Q       .         .         .         .
 23.50      9.1519      1.93 .Q        .         .         .         .
 24.12      9.2492      1.83 .Q        .         .         .         .
 24.75      9.2965      0.00 Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage C

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****************************************************************************
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                           Analysis prepared by:




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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   63.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.600
    LOW LOSS FRACTION = 0.670
    TIME OF CONCENTRATION(MIN.) = 20.15
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.25
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     5.38

****************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.22      0.0039      0.43  Q         .         .         .         .
  0.55      0.0159      0.43  Q         .         .         .         .
  0.89      0.0280      0.44  Q         .         .         .         .
  1.22      0.0404      0.45  Q         .         .         .         .
  1.56      0.0529      0.45  Q         .         .         .         .
  1.90      0.0656      0.46  Q         .         .         .         .
  2.23      0.0785      0.47  Q         .         .         .         .
  2.57      0.0915      0.47  Q         .         .         .         .
  2.90      0.1048      0.48  Q         .         .         .         .
  3.24      0.1182      0.49  Q         .         .         .         .
  3.57      0.1319      0.50  Q         .         .         .         .
  3.91      0.1459      0.50  .Q        .         .         .         .
  4.25      0.1600      0.52  .Q        .         .         .         .
  4.58      0.1744      0.52  .Q        .         .         .         .
  4.92      0.1891      0.53  .Q        .         .         .         .
  5.25      0.2040      0.54  .Q        .         .         .         .
  5.59      0.2192      0.56  .Q        .         .         .         .
  5.93      0.2347      0.56  .Q        .         .         .         .
  6.26      0.2505      0.58  .Q        .         .         .         .
```

```
  6.60      0.2667      0.59  .Q        .         .         .         .
  6.93      0.2832      0.60  .Q        .         .         .         .
  7.27      0.3001      0.61  .Q        .         .         .         .
  7.60      0.3174      0.63  .Q        .         .         .         .
  7.94      0.3351      0.64  .Q        .         .         .         .
  8.28      0.3532      0.66  .Q        .         .         .         .
  8.61      0.3718      0.68  .Q        .         .         .         .
  8.95      0.3910      0.70  .Q        .         .         .         .
  9.28      0.4106      0.72  .Q        .         .         .         .
  9.62      0.4309      0.75  .Q        .         .         .         .
  9.95      0.4519      0.76  .Q        .         .         .         .
 10.29      0.4735      0.80  .Q        .         .         .         .
 10.63      0.4959      0.82  .Q        .         .         .         .
 10.96      0.5191      0.86  .Q        .         .         .         .
 11.30      0.5433      0.88  .Q        .         .         .         .
 11.63      0.5685      0.93  .Q        .         .         .         .
 11.97      0.5948      0.96  .Q        .         .         .         .
 12.31      0.6249      1.21  . Q       .         .         .         .
 12.64      0.6593      1.27  . Q       .         .         .         .
 12.98      0.6959      1.37  . Q       .         .         .         .
 13.31      0.7346      1.42  . Q       .         .         .         .
 13.65      0.7758      1.55  .  Q      .         .         .         .
 13.98      0.8198      1.63  .  Q      .         .         .         .
 14.32      0.8685      1.88  .  Q      .         .         .         .
 14.66      0.9226      2.01  .   Q     .         .         .         .
 14.99      0.9835      2.37  .   Q     .         .         .         .
 15.33      1.0531      2.64  .    Q    .         .         .         .
 15.66      1.1335      3.15  .     Q   .         .         .         .
 16.00      1.2390      4.45  .       Q .         .         .         .
 16.34      1.4851     13.28  .         .         .     Q   .         .
 16.67      1.7113      3.02  .     Q   .         .         .         .
 17.01      1.7834      2.17  .   Q     .         .         .         .
 17.34      1.8375      1.72  .  Q      .         .         .         .
 17.68      1.8818      1.48  . Q       .         .         .         .
 18.02      1.9207      1.32  . Q       .         .         .         .
 18.35      1.9527      1.00  .Q        .         .         .         .
 18.69      1.9792      0.91  .Q        .         .         .         .
 19.02      2.0034      0.84  .Q        .         .         .         .
 19.36      2.0258      0.78  .Q        .         .         .         .
 19.69      2.0467      0.73  .Q        .         .         .         .
 20.03      2.0664      0.69  .Q        .         .         .         .
 20.37      2.0851      0.65  .Q        .         .         .         .
 20.70      2.1028      0.62  .Q        .         .         .         .
 21.04      2.1197      0.59  .Q        .         .         .         .
 21.37      2.1358      0.57  .Q        .         .         .         .
 21.71      2.1513      0.55  .Q        .         .         .         .
 22.05      2.1663      0.53  .Q        .         .         .         .
 22.38      2.1807      0.51  .Q        .         .         .         .
 22.72      2.1946      0.49  Q         .         .         .         .
 23.05      2.2081      0.48  Q         .         .         .         .
 23.39      2.2211      0.46  Q         .         .         .         .
 23.72      2.2338      0.45  Q         .         .         .         .
 24.06      2.2462      0.44  Q         .         .         .         .
 24.40      2.2523      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage D

```
****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                          Analysis prepared by:




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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   14.29
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.410
    LOW LOSS FRACTION = 0.580
    TIME OF CONCENTRATION(MIN.) = 12.72
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.67
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.04

****************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.10      0.0005      0.12  Q         .         .         .         .
  0.31      0.0027      0.12  Q         .         .         .         .
  0.52      0.0049      0.13  Q         .         .         .         .
  0.74      0.0071      0.13  Q         .         .         .         .
  0.95      0.0093      0.13  Q         .         .         .         .
  1.16      0.0115      0.13  Q         .         .         .         .
  1.37      0.0138      0.13  Q         .         .         .         .
  1.58      0.0160      0.13  Q         .         .         .         .
  1.80      0.0183      0.13  Q         .         .         .         .
  2.01      0.0207      0.13  Q         .         .         .         .
  2.22      0.0230      0.13  Q         .         .         .         .
  2.43      0.0254      0.14  Q         .         .         .         .
  2.64      0.0277      0.14  Q         .         .         .         .
  2.86      0.0301      0.14  Q         .         .         .         .
  3.07      0.0326      0.14  Q         .         .         .         .
  3.28      0.0350      0.14  Q         .         .         .         .
  3.49      0.0375      0.14  Q         .         .         .         .
  3.70      0.0400      0.14  Q         .         .         .         .
  3.92      0.0426      0.15  Q         .         .         .         .
  4.13      0.0451      0.15  Q         .         .         .         .
  4.34      0.0477      0.15  Q         .         .         .         .
  4.55      0.0503      0.15  Q         .         .         .         .
  4.76      0.0530      0.15  Q         .         .         .         .
  4.98      0.0556      0.15  Q         .         .         .         .
  5.19      0.0584      0.16  Q         .         .         .         .
  5.40      0.0611      0.16  Q         .         .         .         .
  5.61      0.0639      0.16  Q         .         .         .         .
  5.82      0.0667      0.16  Q         .         .         .         .
  6.04      0.0695      0.16  Q         .         .         .         .
  6.25      0.0724      0.17  Q         .         .         .         .
```

```
 6.46      0.0753      0.17  Q         .         .         .         .
 6.67      0.0783      0.17  Q         .         .         .         .
 6.88      0.0813      0.17  Q         .         .         .         .
 7.10      0.0843      0.17  Q         .         .         .         .
 7.31      0.0874      0.18  Q         .         .         .         .
 7.52      0.0906      0.18  Q         .         .         .         .
 7.73      0.0938      0.18  Q         .         .         .         .
 7.94      0.0970      0.19  Q         .         .         .         .
 8.16      0.1003      0.19  Q         .         .         .         .
 8.37      0.1036      0.19  Q         .         .         .         .
 8.58      0.1070      0.20  Q         .         .         .         .
 8.79      0.1105      0.20  Q         .         .         .         .
 9.00      0.1140      0.20  Q         .         .         .         .
 9.22      0.1176      0.21  Q         .         .         .         .
 9.43      0.1212      0.21  Q         .         .         .         .
 9.64      0.1249      0.21  Q         .         .         .         .
 9.85      0.1287      0.22  Q         .         .         .         .
10.06      0.1326      0.22  Q         .         .         .         .
10.28      0.1366      0.23  Q         .         .         .         .
10.49      0.1406      0.23  Q         .         .         .         .
10.70      0.1448      0.24  Q         .         .         .         .
10.91      0.1490      0.24  Q         .         .         .         .
11.12      0.1534      0.25  .Q        .         .         .         .
11.34      0.1579      0.26  .Q        .         .         .         .
11.55      0.1625      0.27  .Q        .         .         .         .
11.76      0.1672      0.27  .Q        .         .         .         .
11.97      0.1721      0.28  .Q        .         .         .         .
12.18      0.1772      0.31  .Q        .         .         .         .
12.40      0.1831      0.36  .Q        .         .         .         .
12.61      0.1895      0.37  .Q        .         .         .         .
12.82      0.1961      0.39  .Q        .         .         .         .
13.03      0.2029      0.39  .Q        .         .         .         .
13.24      0.2100      0.42  .Q        .         .         .         .
13.46      0.2174      0.43  .Q        .         .         .         .
13.67      0.2251      0.45  .Q        .         .         .         .
13.88      0.2332      0.47  .Q        .         .         .         .
14.09      0.2417      0.50  . Q       .         .         .         .
14.30      0.2508      0.54  . Q       .         .         .         .
14.52      0.2606      0.59  . Q       .         .         .         .
14.73      0.2711      0.61  . Q       .         .         .         .
14.94      0.2826      0.69  . Q       .         .         .         .
15.15      0.2950      0.73  . Q       .         .         .         .
15.36      0.3090      0.87  .  Q      .         .         .         .
15.58      0.3242      0.87  .  Q      .         .         .         .
15.79      0.3424      1.21  .   Q     .         .         .         .
16.00      0.3680      1.71  .     Q   .         .         .         .
16.21      0.4398      6.49  .         .         .    Q    .         .
16.42      0.5051      0.96  .  Q      .         .         .         .
16.64      0.5205      0.79  .  Q      .         .         .         .
16.85      0.5331      0.65  . Q       .         .         .         .
17.06      0.5437      0.56  . Q       .         .         .         .
17.27      0.5529      0.48  .Q        .         .         .         .
17.48      0.5609      0.44  .Q        .         .         .         .
17.70      0.5683      0.40  .Q        .         .         .         .
17.91      0.5752      0.38  .Q        .         .         .         .
18.12      0.5816      0.35  .Q        .         .         .         .
18.33      0.5871      0.28  .Q        .         .         .         .
18.54      0.5918      0.26  .Q        .         .         .         .
18.76      0.5963      0.25  Q         .         .         .         .
18.97      0.6006      0.24  Q         .         .         .         .
19.18      0.6046      0.23  Q         .         .         .         .
19.39      0.6085      0.22  Q         .         .         .         .
19.60      0.6122      0.21  Q         .         .         .         .
19.82      0.6158      0.20  Q         .         .         .         .
20.03      0.6193      0.19  Q         .         .         .         .
20.24      0.6226      0.19  Q         .         .         .         .
20.45      0.6258      0.18  Q         .         .         .         .
20.66      0.6290      0.18  Q         .         .         .         .
20.88      0.6320      0.17  Q         .         .         .         .
21.09      0.6350      0.17  Q         .         .         .         .
21.30      0.6379      0.16  Q         .         .         .         .
21.51      0.6407      0.16  Q         .         .         .         .
21.72      0.6434      0.15  Q         .         .         .         .
21.94      0.6461      0.15  Q         .         .         .         .
22.15      0.6487      0.15  Q         .         .         .         .
22.36      0.6513      0.14  Q         .         .         .         .
22.57      0.6538      0.14  Q         .         .         .         .
22.78      0.6562      0.14  Q         .         .         .         .
23.00      0.6587      0.14  Q         .         .         .         .
```

23.21	0.6610	0.13	Q	.	.	.	.
23.42	0.6633	0.13	Q	.	.	.	.
23.63	0.6656	0.13	Q	.	.	.	.
23.84	0.6678	0.13	Q	.	.	.	.
24.06	0.6700	0.12	Q	.	.	.	.
24.27	0.6711	0.00	Q	.	.	.	.

Drainage E

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   97.20
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.180
    LOW LOSS FRACTION = 0.350
    TIME OF CONCENTRATION(MIN.) = 34.68
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     6.79
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     4.88

****************************************************************************
  TIME     VOLUME       Q    0.        7.5      15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.39      0.0212      1.30  .Q        .         .         .         .
  0.97      0.0838      1.32  .Q        .         .         .         .
  1.55      0.1477      1.36  .Q        .         .         .         .
  2.13      0.2132      1.38  .Q        .         .         .         .
  2.71      0.2804      1.43  .Q        .         .         .         .
  3.28      0.3493      1.46  .Q        .         .         .         .
  3.86      0.4201      1.51  . Q       .         .         .         .
  4.44      0.4929      1.54  . Q       .         .         .         .
  5.02      0.5680      1.60  . Q       .         .         .         .
  5.60      0.6454      1.64  . Q       .         .         .         .
  6.17      0.7255      1.71  . Q       .         .         .         .
  6.75      0.8084      1.76  . Q       .         .         .         .
  7.33      0.8944      1.85  . Q       .         .         .         .
  7.91      0.9838      1.90  . Q       .         .         .         .
  8.49      1.0771      2.01  . Q       .         .         .         .
  9.06      1.1746      2.07  . Q       .         .         .         .
  9.64      1.2770      2.22  . Q       .         .         .         .
 10.22      1.3849      2.30  .  Q      .         .         .         .
 10.80      1.4993      2.49  .  Q      .         .         .         .
 11.38      1.6209      2.60  .  Q      .         .         .         .
 11.95      1.7518      2.88  .  Q      .         .         .         .
 12.53      1.8987      3.27  .   Q     .         .         .         .
 13.11      2.0745      4.09  .    Q    .         .         .         .
 13.69      2.2769      4.38  .    Q    .         .         .         .
 14.27      2.5062      5.22  .     Q   .         .         .         .
 14.84      2.7734      5.97  .      Q  .         .         .         .
 15.42      3.1112      8.18  .         Q         .         .         .
 16.00      3.5398      9.77  .         .  Q      .         .         .
 16.58      4.4705     29.20  .         .         .         .       Q .
 17.16      5.3308      6.82  .        Q.         .         .         .
```

```
 17.73       5.6069      4.74  .     Q   .         .         .         .
 18.31       5.8120      3.85  .    Q    .         .         .         .
 18.89       5.9692      2.73  .  Q      .         .         .         .
 19.47       6.0915      2.39  .  Q      .         .         .         .
 20.05       6.1997      2.14  . Q       .         .         .         .
 20.62       6.2974      1.95  . Q       .         .         .         .
 21.20       6.3870      1.80  . Q       .         .         .         .
 21.78       6.4700      1.67  . Q       .         .         .         .
 22.36       6.5475      1.57  . Q       .         .         .         .
 22.94       6.6204      1.48  .Q        .         .         .         .
 23.51       6.6894      1.41  .Q        .         .         .         .
 24.09       6.7549      1.34  .Q        .         .         .         .
 24.67       6.7869      0.00  Q         .         .         .         .
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Drainage F

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                      AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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Ver. 9.0 Release Date: 01/01/2003 License ID 1355

Analysis prepared by:

Fuscoe Engineering
16795 Von Karmon #100, Irvine, CA 92606

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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    5.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) =  7.97
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.47
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.23

****************************************************************************
  TIME     VOLUME      Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.06      0.0000     0.00  Q         .         .         .         .
  0.19      0.0005     0.09  Q         .         .         .         .
  0.33      0.0015     0.09  Q         .         .         .         .
  0.46      0.0024     0.09  Q         .         .         .         .
  0.59      0.0034     0.09  Q         .         .         .         .
  0.72      0.0044     0.09  Q         .         .         .         .
  0.86      0.0054     0.09  Q         .         .         .         .
  0.99      0.0064     0.09  Q         .         .         .         .
  1.12      0.0074     0.09  Q         .         .         .         .
  1.26      0.0084     0.09  Q         .         .         .         .
  1.39      0.0094     0.09  Q         .         .         .         .
  1.52      0.0105     0.09  Q         .         .         .         .
  1.65      0.0115     0.09  Q         .         .         .         .
  1.79      0.0125     0.09  Q         .         .         .         .
  1.92      0.0136     0.09  Q         .         .         .         .
  2.05      0.0146     0.10  Q         .         .         .         .
  2.19      0.0157     0.10  Q         .         .         .         .
  2.32      0.0167     0.10  Q         .         .         .         .
  2.45      0.0178     0.10  Q         .         .         .         .
  2.58      0.0188     0.10  Q         .         .         .         .
  2.72      0.0199     0.10  Q         .         .         .         .
  2.85      0.0210     0.10  Q         .         .         .         .
  2.98      0.0221     0.10  Q         .         .         .         .
  3.12      0.0232     0.10  Q         .         .         .         .
  3.25      0.0243     0.10  Q         .         .         .         .
  3.38      0.0254     0.10  Q         .         .         .         .
  3.51      0.0265     0.10  Q         .         .         .         .
  3.65      0.0277     0.10  Q         .         .         .         .
  3.78      0.0288     0.10  Q         .         .         .         .
  3.91      0.0299     0.10  Q         .         .         .         .
```

4.05	0.0311	0.10	Q	.	.	.	.
4.18	0.0322	0.11	Q	.	.	.	.
4.31	0.0334	0.11	Q	.	.	.	.
4.44	0.0346	0.11	Q	.	.	.	.
4.58	0.0357	0.11	Q	.	.	.	.
4.71	0.0369	0.11	Q	.	.	.	.
4.84	0.0381	0.11	Q	.	.	.	.
4.97	0.0393	0.11	Q	.	.	.	.
5.11	0.0406	0.11	Q	.	.	.	.
5.24	0.0418	0.11	Q	.	.	.	.
5.37	0.0430	0.11	Q	.	.	.	.
5.51	0.0443	0.11	Q	.	.	.	.
5.64	0.0455	0.11	Q	.	.	.	.
5.77	0.0468	0.12	Q	.	.	.	.
5.90	0.0481	0.12	Q	.	.	.	.
6.04	0.0493	0.12	Q	.	.	.	.
6.17	0.0506	0.12	Q	.	.	.	.
6.30	0.0519	0.12	Q	.	.	.	.
6.44	0.0532	0.12	Q	.	.	.	.
6.57	0.0546	0.12	Q	.	.	.	.
6.70	0.0559	0.12	Q	.	.	.	.
6.83	0.0573	0.12	Q	.	.	.	.
6.97	0.0586	0.12	Q	.	.	.	.
7.10	0.0600	0.13	Q	.	.	.	.
7.23	0.0614	0.13	Q	.	.	.	.
7.37	0.0628	0.13	Q	.	.	.	.
7.50	0.0642	0.13	Q	.	.	.	.
7.63	0.0656	0.13	Q	.	.	.	.
7.76	0.0671	0.13	Q	.	.	.	.
7.90	0.0685	0.13	Q	.	.	.	.
8.03	0.0700	0.13	Q	.	.	.	.
8.16	0.0715	0.14	Q	.	.	.	.
8.30	0.0730	0.14	Q	.	.	.	.
8.43	0.0745	0.14	Q	.	.	.	.
8.56	0.0760	0.14	Q	.	.	.	.
8.69	0.0776	0.14	Q	.	.	.	.
8.83	0.0791	0.14	Q	.	.	.	.
8.96	0.0807	0.15	Q	.	.	.	.
9.09	0.0823	0.15	Q	.	.	.	.
9.23	0.0840	0.15	Q	.	.	.	.
9.36	0.0856	0.15	Q	.	.	.	.
9.49	0.0873	0.15	Q	.	.	.	.
9.62	0.0889	0.15	Q	.	.	.	.
9.76	0.0906	0.16	Q	.	.	.	.
9.89	0.0924	0.16	Q	.	.	.	.
10.02	0.0941	0.16	Q	.	.	.	.
10.16	0.0959	0.16	Q	.	.	.	.
10.29	0.0977	0.17	Q	.	.	.	.
10.42	0.0995	0.17	Q	.	.	.	.
10.55	0.1014	0.17	Q	.	.	.	.
10.69	0.1032	0.17	Q	.	.	.	.
10.82	0.1052	0.18	Q	.	.	.	.
10.95	0.1071	0.18	Q	.	.	.	.
11.09	0.1091	0.18	Q	.	.	.	.
11.22	0.1111	0.18	Q	.	.	.	.
11.35	0.1131	0.19	Q	.	.	.	.
11.48	0.1152	0.19	Q	.	.	.	.
11.62	0.1173	0.19	Q	.	.	.	.
11.75	0.1194	0.20	Q	.	.	.	.
11.88	0.1216	0.20	Q	.	.	.	.
12.02	0.1238	0.20	Q	.	.	.	.
12.15	0.1263	0.25	.Q	.	.	.	.
12.28	0.1291	0.25	.Q	.	.	.	.
12.41	0.1319	0.26	.Q	.	.	.	.
12.55	0.1348	0.26	.Q	.	.	.	.
12.68	0.1378	0.27	.Q	.	.	.	.
12.81	0.1408	0.28	.Q	.	.	.	.
12.94	0.1438	0.28	.Q	.	.	.	.
13.08	0.1470	0.29	.Q	.	.	.	.
13.21	0.1502	0.30	.Q	.	.	.	.
13.34	0.1535	0.30	.Q	.	.	.	.
13.48	0.1569	0.31	.Q	.	.	.	.
13.61	0.1604	0.32	.Q	.	.	.	.
13.74	0.1639	0.33	.Q	.	.	.	.
13.87	0.1676	0.34	.Q	.	.	.	.
14.01	0.1715	0.36	.Q	.	.	.	.
14.14	0.1755	0.37	.Q	.	.	.	.
14.27	0.1797	0.39	.Q	.	.	.	.
14.41	0.1840	0.41	.Q	.	.	.	.

```
 14.54      0.1886      0.43  .Q        .         .         .         .
 14.67      0.1934      0.44  .Q        .         .         .         .
 14.80      0.1985      0.47  .Q        .         .         .         .
 14.94      0.2038      0.49  .Q        .         .         .         .
 15.07      0.2094      0.54  . Q       .         .         .         .
 15.20      0.2155      0.56  . Q       .         .         .         .
 15.34      0.2220      0.63  . Q       .         .         .         .
 15.47      0.2289      0.62  . Q       .         .         .         .
 15.60      0.2361      0.69  . Q       .         .         .         .
 15.73      0.2442      0.78  .  Q      .         .         .         .
 15.87      0.2550      1.18  .   Q     .         .         .         .
 16.00      0.2702      1.60  .     Q   .         .         .         .
 16.13      0.3097      5.61  .         .         . Q       .         .
 16.27      0.3458      0.96  .  Q      .         .         .         .
 16.40      0.3545      0.63  . Q       .         .         .         .
 16.53      0.3612      0.59  . Q       .         .         .         .
 16.66      0.3673      0.51  . Q       .         .         .         .
 16.80      0.3726      0.46  .Q        .         .         .         .
 16.93      0.3774      0.42  .Q        .         .         .         .
 17.06      0.3818      0.39  .Q        .         .         .         .
 17.20      0.3858      0.35  .Q        .         .         .         .
 17.33      0.3895      0.33  .Q        .         .         .         .
 17.46      0.3930      0.31  .Q        .         .         .         .
 17.59      0.3963      0.29  .Q        .         .         .         .
 17.73      0.3995      0.28  .Q        .         .         .         .
 17.86      0.4025      0.27  .Q        .         .         .         .
 17.99      0.4054      0.26  .Q        .         .         .         .
 18.13      0.4079      0.21  Q         .         .         .         .
 18.26      0.4102      0.20  Q         .         .         .         .
 18.39      0.4124      0.19  Q         .         .         .         .
 18.52      0.4144      0.19  Q         .         .         .         .
 18.66      0.4164      0.18  Q         .         .         .         .
 18.79      0.4184      0.17  Q         .         .         .         .
 18.92      0.4202      0.17  Q         .         .         .         .
 19.06      0.4221      0.16  Q         .         .         .         .
 19.19      0.4238      0.16  Q         .         .         .         .
 19.32      0.4256      0.16  Q         .         .         .         .
 19.45      0.4272      0.15  Q         .         .         .         .
 19.59      0.4289      0.15  Q         .         .         .         .
 19.72      0.4305      0.14  Q         .         .         .         .
 19.85      0.4321      0.14  Q         .         .         .         .
 19.98      0.4336      0.14  Q         .         .         .         .
 20.12      0.4351      0.14  Q         .         .         .         .
 20.25      0.4366      0.13  Q         .         .         .         .
 20.38      0.4380      0.13  Q         .         .         .         .
 20.52      0.4394      0.13  Q         .         .         .         .
 20.65      0.4408      0.13  Q         .         .         .         .
 20.78      0.4422      0.12  Q         .         .         .         .
 20.91      0.4435      0.12  Q         .         .         .         .
 21.05      0.4448      0.12  Q         .         .         .         .
 21.18      0.4461      0.12  Q         .         .         .         .
 21.31      0.4474      0.12  Q         .         .         .         .
 21.45      0.4486      0.11  Q         .         .         .         .
 21.58      0.4499      0.11  Q         .         .         .         .
 21.71      0.4511      0.11  Q         .         .         .         .
 21.84      0.4523      0.11  Q         .         .         .         .
 21.98      0.4535      0.11  Q         .         .         .         .
 22.11      0.4546      0.11  Q         .         .         .         .
 22.24      0.4558      0.10  Q         .         .         .         .
 22.38      0.4569      0.10  Q         .         .         .         .
 22.51      0.4580      0.10  Q         .         .         .         .
 22.64      0.4591      0.10  Q         .         .         .         .
 22.77      0.4602      0.10  Q         .         .         .         .
 22.91      0.4613      0.10  Q         .         .         .         .
 23.04      0.4624      0.10  Q         .         .         .         .
 23.17      0.4634      0.10  Q         .         .         .         .
 23.31      0.4645      0.09  Q         .         .         .         .
 23.44      0.4655      0.09  Q         .         .         .         .
 23.57      0.4665      0.09  Q         .         .         .         .
 23.70      0.4675      0.09  Q         .         .         .         .
 23.84      0.4685      0.09  Q         .         .         .         .
 23.97      0.4695      0.09  Q         .         .         .         .
 24.10      0.4705      0.09  Q         .         .         .         .
 24.24      0.4709      0.00  Q         .         .         .         .
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Drainage G

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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Ver. 9.0 Release Date: 01/01/2003 License ID 1355

Analysis prepared by:

Fuscoe Engineering
16795 Von Karmon #100, Irvine, CA 92606

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Problem Descriptions:

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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) =  8.11
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

-----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.15
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.07

*****************************************************************************
```

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.19	0.0002	0.03	Q	.	.	.	.
0.32	0.0005	0.03	Q	.	.	.	.
0.46	0.0008	0.03	Q	.	.	.	.
0.59	0.0011	0.03	Q	.	.	.	.
0.73	0.0014	0.03	Q	.	.	.	.
0.86	0.0017	0.03	Q	.	.	.	.
1.00	0.0020	0.03	Q	.	.	.	.
1.13	0.0023	0.03	Q	.	.	.	.
1.27	0.0027	0.03	Q	.	.	.	.
1.40	0.0030	0.03	Q	.	.	.	.
1.54	0.0033	0.03	Q	.	.	.	.
1.67	0.0036	0.03	Q	.	.	.	.
1.81	0.0040	0.03	Q	.	.	.	.
1.94	0.0043	0.03	Q	.	.	.	.
2.08	0.0046	0.03	Q	.	.	.	.
2.21	0.0049	0.03	Q	.	.	.	.
2.35	0.0053	0.03	Q	.	.	.	.
2.48	0.0056	0.03	Q	.	.	.	.
2.62	0.0060	0.03	Q	.	.	.	.
2.75	0.0063	0.03	Q	.	.	.	.
2.89	0.0066	0.03	Q	.	.	.	.
3.02	0.0070	0.03	Q	.	.	.	.
3.16	0.0073	0.03	Q	.	.	.	.
3.29	0.0077	0.03	Q	.	.	.	.
3.43	0.0080	0.03	Q	.	.	.	.
3.56	0.0084	0.03	Q	.	.	.	.
3.70	0.0087	0.03	Q	.	.	.	.
3.84	0.0091	0.03	Q	.	.	.	.
3.97	0.0095	0.03	Q	.	.	.	.

4.11	0.0098	0.03	Q	.	.	.	.
4.24	0.0102	0.03	Q	.	.	.	.
4.38	0.0106	0.03	Q	.	.	.	.
4.51	0.0109	0.03	Q	.	.	.	.
4.65	0.0113	0.03	Q	.	.	.	.
4.78	0.0117	0.03	Q	.	.	.	.
4.92	0.0121	0.03	Q	.	.	.	.
5.05	0.0124	0.03	Q	.	.	.	.
5.19	0.0128	0.03	Q	.	.	.	.
5.32	0.0132	0.03	Q	.	.	.	.
5.46	0.0136	0.04	Q	.	.	.	.
5.59	0.0140	0.04	Q	.	.	.	.
5.73	0.0144	0.04	Q	.	.	.	.
5.86	0.0148	0.04	Q	.	.	.	.
6.00	0.0152	0.04	Q	.	.	.	.
6.13	0.0156	0.04	Q	.	.	.	.
6.27	0.0160	0.04	Q	.	.	.	.
6.40	0.0164	0.04	Q	.	.	.	.
6.54	0.0169	0.04	Q	.	.	.	.
6.67	0.0173	0.04	Q	.	.	.	.
6.81	0.0177	0.04	Q	.	.	.	.
6.94	0.0181	0.04	Q	.	.	.	.
7.08	0.0186	0.04	Q	.	.	.	.
7.21	0.0190	0.04	Q	.	.	.	.
7.35	0.0194	0.04	Q	.	.	.	.
7.48	0.0199	0.04	Q	.	.	.	.
7.62	0.0203	0.04	Q	.	.	.	.
7.75	0.0208	0.04	Q	.	.	.	.
7.89	0.0213	0.04	Q	.	.	.	.
8.03	0.0217	0.04	Q	.	.	.	.
8.16	0.0222	0.04	Q	.	.	.	.
8.30	0.0227	0.04	Q	.	.	.	.
8.43	0.0231	0.04	Q	.	.	.	.
8.57	0.0236	0.04	Q	.	.	.	.
8.70	0.0241	0.04	Q	.	.	.	.
8.84	0.0246	0.04	Q	.	.	.	.
8.97	0.0251	0.05	Q	.	.	.	.
9.11	0.0256	0.05	Q	.	.	.	.
9.24	0.0261	0.05	Q	.	.	.	.
9.38	0.0267	0.05	Q	.	.	.	.
9.51	0.0272	0.05	Q	.	.	.	.
9.65	0.0277	0.05	Q	.	.	.	.
9.78	0.0283	0.05	Q	.	.	.	.
9.92	0.0288	0.05	Q	.	.	.	.
10.05	0.0294	0.05	Q	.	.	.	.
10.19	0.0299	0.05	Q	.	.	.	.
10.32	0.0305	0.05	Q	.	.	.	.
10.46	0.0311	0.05	Q	.	.	.	.
10.59	0.0316	0.05	Q	.	.	.	.
10.73	0.0322	0.05	Q	.	.	.	.
10.86	0.0328	0.05	Q	.	.	.	.
11.00	0.0335	0.06	Q	.	.	.	.
11.13	0.0341	0.06	Q	.	.	.	.
11.27	0.0347	0.06	Q	.	.	.	.
11.40	0.0354	0.06	Q	.	.	.	.
11.54	0.0360	0.06	Q	.	.	.	.
11.67	0.0367	0.06	Q	.	.	.	.
11.81	0.0374	0.06	Q	.	.	.	.
11.95	0.0381	0.06	Q	.	.	.	.
12.08	0.0388	0.07	Q	.	.	.	.
12.22	0.0396	0.08	Q	.	.	.	.
12.35	0.0405	0.08	Q	.	.	.	.
12.49	0.0414	0.08	Q	.	.	.	.
12.62	0.0423	0.08	Q	.	.	.	.
12.76	0.0433	0.08	Q	.	.	.	.
12.89	0.0442	0.09	Q	.	.	.	.
13.03	0.0452	0.09	Q	.	.	.	.
13.16	0.0462	0.09	Q	.	.	.	.
13.30	0.0473	0.09	Q	.	.	.	.
13.43	0.0483	0.10	Q	.	.	.	.
13.57	0.0494	0.10	Q	.	.	.	.
13.70	0.0505	0.10	Q	.	.	.	.
13.84	0.0517	0.10	Q	.	.	.	.
13.97	0.0529	0.11	Q	.	.	.	.
14.11	0.0541	0.11	Q	.	.	.	.
14.24	0.0554	0.12	Q	.	.	.	.
14.38	0.0568	0.12	Q	.	.	.	.
14.51	0.0582	0.13	Q	.	.	.	.
14.65	0.0597	0.14	Q	.	.	.	.

```
 14.78      0.0613      0.15  Q         .         .         .         .
 14.92      0.0630      0.15  Q         .         .         .         .
 15.05      0.0648      0.17  Q         .         .         .         .
 15.19      0.0666      0.17  Q         .         .         .         .
 15.32      0.0687      0.19  Q         .         .         .         .
 15.46      0.0709      0.20  Q         .         .         .         .
 15.59      0.0731      0.21  Q         .         .         .         .
 15.73      0.0757      0.24  Q         .         .         .         .
 15.86      0.0790      0.36  .Q        .         .         .         .
 16.00      0.0838      0.49  .Q        .         .         .         .
 16.14      0.0962      1.72  .     Q   .         .         .         .
 16.27      0.1074      0.29  .Q        .         .         .         .
 16.41      0.1101      0.19  Q         .         .         .         .
 16.54      0.1122      0.18  Q         .         .         .         .
 16.68      0.1141      0.16  Q         .         .         .         .
 16.81      0.1158      0.14  Q         .         .         .         .
 16.95      0.1173      0.13  Q         .         .         .         .
 17.08      0.1187      0.12  Q         .         .         .         .
 17.22      0.1199      0.11  Q         .         .         .         .
 17.35      0.1211      0.10  Q         .         .         .         .
 17.49      0.1222      0.09  Q         .         .         .         .
 17.62      0.1232      0.09  Q         .         .         .         .
 17.76      0.1242      0.09  Q         .         .         .         .
 17.89      0.1251      0.08  Q         .         .         .         .
 18.03      0.1260      0.08  Q         .         .         .         .
 18.16      0.1268      0.06  Q         .         .         .         .
 18.30      0.1275      0.06  Q         .         .         .         .
 18.43      0.1282      0.06  Q         .         .         .         .
 18.57      0.1288      0.06  Q         .         .         .         .
 18.70      0.1295      0.06  Q         .         .         .         .
 18.84      0.1301      0.05  Q         .         .         .         .
 18.97      0.1307      0.05  Q         .         .         .         .
 19.11      0.1312      0.05  Q         .         .         .         .
 19.24      0.1318      0.05  Q         .         .         .         .
 19.38      0.1323      0.05  Q         .         .         .         .
 19.51      0.1328      0.05  Q         .         .         .         .
 19.65      0.1334      0.05  Q         .         .         .         .
 19.78      0.1339      0.04  Q         .         .         .         .
 19.92      0.1344      0.04  Q         .         .         .         .
 20.06      0.1348      0.04  Q         .         .         .         .
 20.19      0.1353      0.04  Q         .         .         .         .
 20.33      0.1358      0.04  Q         .         .         .         .
 20.46      0.1362      0.04  Q         .         .         .         .
 20.60      0.1366      0.04  Q         .         .         .         .
 20.73      0.1371      0.04  Q         .         .         .         .
 20.87      0.1375      0.04  Q         .         .         .         .
 21.00      0.1379      0.04  Q         .         .         .         .
 21.14      0.1383      0.04  Q         .         .         .         .
 21.27      0.1387      0.04  Q         .         .         .         .
 21.41      0.1391      0.04  Q         .         .         .         .
 21.54      0.1395      0.03  Q         .         .         .         .
 21.68      0.1399      0.03  Q         .         .         .         .
 21.81      0.1403      0.03  Q         .         .         .         .
 21.95      0.1407      0.03  Q         .         .         .         .
 22.08      0.1410      0.03  Q         .         .         .         .
 22.22      0.1414      0.03  Q         .         .         .         .
 22.35      0.1418      0.03  Q         .         .         .         .
 22.49      0.1421      0.03  Q         .         .         .         .
 22.62      0.1425      0.03  Q         .         .         .         .
 22.76      0.1428      0.03  Q         .         .         .         .
 22.89      0.1432      0.03  Q         .         .         .         .
 23.03      0.1435      0.03  Q         .         .         .         .
 23.16      0.1438      0.03  Q         .         .         .         .
 23.30      0.1441      0.03  Q         .         .         .         .
 23.43      0.1445      0.03  Q         .         .         .         .
 23.57      0.1448      0.03  Q         .         .         .         .
 23.70      0.1451      0.03  Q         .         .         .         .
 23.84      0.1454      0.03  Q         .         .         .         .
 23.97      0.1457      0.03  Q         .         .         .         .
 24.11      0.1460      0.03  Q         .         .         .         .
 24.25      0.1462      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
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Drainage H

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****************************************************************************
         NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                  AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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           Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                         Analysis prepared by:

                           Fuscoe Engineering
                 16795 Von Karmon #100, Irvine, CA 92606


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----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    7.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) =  9.37
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.57
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.27

****************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.07      0.0000      0.00  Q         .         .         .         .
  0.23      0.0007      0.11  Q         .         .         .         .
  0.38      0.0021      0.11  Q         .         .         .         .
  0.54      0.0035      0.11  Q         .         .         .         .
  0.70      0.0049      0.11  Q         .         .         .         .
  0.85      0.0063      0.11  Q         .         .         .         .
  1.01      0.0077      0.11  Q         .         .         .         .
  1.16      0.0091      0.11  Q         .         .         .         .
  1.32      0.0105      0.11  Q         .         .         .         .
  1.48      0.0120      0.11  Q         .         .         .         .
  1.63      0.0134      0.11  Q         .         .         .         .
  1.79      0.0149      0.11  Q         .         .         .         .
  1.95      0.0164      0.11  Q         .         .         .         .
  2.10      0.0179      0.12  Q         .         .         .         .
  2.26      0.0194      0.12  Q         .         .         .         .
  2.41      0.0209      0.12  Q         .         .         .         .
  2.57      0.0224      0.12  Q         .         .         .         .
  2.73      0.0239      0.12  Q         .         .         .         .
  2.88      0.0255      0.12  Q         .         .         .         .
  3.04      0.0270      0.12  Q         .         .         .         .
  3.19      0.0286      0.12  Q         .         .         .         .
  3.35      0.0301      0.12  Q         .         .         .         .
  3.51      0.0317      0.12  Q         .         .         .         .
  3.66      0.0333      0.12  Q         .         .         .         .
  3.82      0.0349      0.12  Q         .         .         .         .
  3.98      0.0365      0.13  Q         .         .         .         .
  4.13      0.0382      0.13  Q         .         .         .         .
  4.29      0.0398      0.13  Q         .         .         .         .
  4.44      0.0415      0.13  Q         .         .         .         .
  4.60      0.0432      0.13  Q         .         .         .         .
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```
  4.76      0.0448      0.13  Q         .         .         .         .
  4.91      0.0466      0.13  Q         .         .         .         .
  5.07      0.0483      0.13  Q         .         .         .         .
  5.22      0.0500      0.14  Q         .         .         .         .
  5.38      0.0518      0.14  Q         .         .         .         .
  5.54      0.0535      0.14  Q         .         .         .         .
  5.69      0.0553      0.14  Q         .         .         .         .
  5.85      0.0571      0.14  Q         .         .         .         .
  6.01      0.0589      0.14  Q         .         .         .         .
  6.16      0.0607      0.14  Q         .         .         .         .
  6.32      0.0626      0.14  Q         .         .         .         .
  6.47      0.0645      0.15  Q         .         .         .         .
  6.63      0.0663      0.15  Q         .         .         .         .
  6.79      0.0683      0.15  Q         .         .         .         .
  6.94      0.0702      0.15  Q         .         .         .         .
  7.10      0.0721      0.15  Q         .         .         .         .
  7.25      0.0741      0.15  Q         .         .         .         .
  7.41      0.0761      0.16  Q         .         .         .         .
  7.57      0.0781      0.16  Q         .         .         .         .
  7.72      0.0801      0.16  Q         .         .         .         .
  7.88      0.0822      0.16  Q         .         .         .         .
  8.04      0.0843      0.16  Q         .         .         .         .
  8.19      0.0864      0.16  Q         .         .         .         .
  8.35      0.0885      0.17  Q         .         .         .         .
  8.50      0.0907      0.17  Q         .         .         .         .
  8.66      0.0929      0.17  Q         .         .         .         .
  8.82      0.0951      0.17  Q         .         .         .         .
  8.97      0.0973      0.18  Q         .         .         .         .
  9.13      0.0996      0.18  Q         .         .         .         .
  9.28      0.1019      0.18  Q         .         .         .         .
  9.44      0.1042      0.18  Q         .         .         .         .
  9.60      0.1066      0.19  Q         .         .         .         .
  9.75      0.1090      0.19  Q         .         .         .         .
  9.91      0.1115      0.19  Q         .         .         .         .
 10.07      0.1140      0.19  Q         .         .         .         .
 10.22      0.1165      0.20  Q         .         .         .         .
 10.38      0.1190      0.20  Q         .         .         .         .
 10.53      0.1217      0.20  Q         .         .         .         .
 10.69      0.1243      0.21  Q         .         .         .         .
 10.85      0.1270      0.21  Q         .         .         .         .
 11.00      0.1298      0.21  Q         .         .         .         .
 11.16      0.1326      0.22  Q         .         .         .         .
 11.32      0.1354      0.22  Q         .         .         .         .
 11.47      0.1384      0.23  Q         .         .         .         .
 11.63      0.1413      0.23  Q         .         .         .         .
 11.78      0.1444      0.24  Q         .         .         .         .
 11.94      0.1475      0.24  Q         .         .         .         .
 12.10      0.1508      0.27  .Q        .         .         .         .
 12.25      0.1545      0.30  .Q        .         .         .         .
 12.41      0.1585      0.31  .Q        .         .         .         .
 12.56      0.1626      0.32  .Q        .         .         .         .
 12.72      0.1668      0.33  .Q        .         .         .         .
 12.88      0.1711      0.33  .Q        .         .         .         .
 13.03      0.1755      0.35  .Q        .         .         .         .
 13.19      0.1800      0.35  .Q        .         .         .         .
 13.35      0.1847      0.37  .Q        .         .         .         .
 13.50      0.1895      0.38  .Q        .         .         .         .
 13.66      0.1944      0.39  .Q        .         .         .         .
 13.81      0.1996      0.40  .Q        .         .         .         .
 13.97      0.2049      0.42  .Q        .         .         .         .
 14.13      0.2104      0.44  .Q        .         .         .         .
 14.28      0.2163      0.48  .Q        .         .         .         .
 14.44      0.2226      0.49  .Q        .         .         .         .
 14.59      0.2291      0.53  . Q       .         .         .         .
 14.75      0.2361      0.55  . Q       .         .         .         .
 14.91      0.2434      0.59  . Q       .         .         .         .
 15.06      0.2513      0.62  . Q       .         .         .         .
 15.22      0.2598      0.70  . Q       .         .         .         .
 15.38      0.2691      0.75  . Q       .         .         .         .
 15.53      0.2788      0.76  .  Q      .         .         .         .
 15.69      0.2893      0.86  .  Q      .         .         .         .
 15.84      0.3032      1.30  .    Q    .         .         .         .
 16.00      0.3229      1.75  .      Q  .         .         .         .
 16.16      0.3736      6.11  .         .         .   Q     .         .
 16.31      0.4195      1.01  .   Q     .         .         .         .
 16.47      0.4310      0.76  .  Q      .         .         .         .
 16.62      0.4401      0.66  . Q       .         .         .         .
 16.78      0.4480      0.57  . Q       .         .         .         .
 16.94      0.4550      0.51  . Q       .         .         .         .
```

17.09	0.4612	0.46	.Q	.	.	.	.
17.25	0.4669	0.41	.Q	.	.	.	.
17.41	0.4720	0.38	.Q	.	.	.	.
17.56	0.4768	0.36	.Q	.	.	.	.
17.72	0.4813	0.34	.Q	.	.	.	.
17.87	0.4856	0.32	.Q	.	.	.	.
18.03	0.4897	0.31	.Q	.	.	.	.
18.19	0.4933	0.25	Q	.	.	.	.
18.34	0.4964	0.24	Q	.	.	.	.
18.50	0.4994	0.23	Q	.	.	.	.
18.65	0.5023	0.22	Q	.	.	.	.
18.81	0.5050	0.21	Q	.	.	.	.
18.97	0.5077	0.20	Q	.	.	.	.
19.12	0.5102	0.20	Q	.	.	.	.
19.28	0.5127	0.19	Q	.	.	.	.
19.44	0.5151	0.18	Q	.	.	.	.
19.59	0.5175	0.18	Q	.	.	.	.
19.75	0.5197	0.17	Q	.	.	.	.
19.90	0.5220	0.17	Q	.	.	.	.
20.06	0.5241	0.17	Q	.	.	.	.
20.22	0.5262	0.16	Q	.	.	.	.
20.37	0.5283	0.16	Q	.	.	.	.
20.53	0.5303	0.15	Q	.	.	.	.
20.68	0.5323	0.15	Q	.	.	.	.
20.84	0.5342	0.15	Q	.	.	.	.
21.00	0.5361	0.14	Q	.	.	.	.
21.15	0.5379	0.14	Q	.	.	.	.
21.31	0.5397	0.14	Q	.	.	.	.
21.47	0.5415	0.14	Q	.	.	.	.
21.62	0.5433	0.13	Q	.	.	.	.
21.78	0.5450	0.13	Q	.	.	.	.
21.93	0.5467	0.13	Q	.	.	.	.
22.09	0.5483	0.13	Q	.	.	.	.
22.25	0.5500	0.13	Q	.	.	.	.
22.40	0.5516	0.12	Q	.	.	.	.
22.56	0.5532	0.12	Q	.	.	.	.
22.72	0.5547	0.12	Q	.	.	.	.
22.87	0.5563	0.12	Q	.	.	.	.
23.03	0.5578	0.12	Q	.	.	.	.
23.18	0.5593	0.12	Q	.	.	.	.
23.34	0.5607	0.11	Q	.	.	.	.
23.50	0.5622	0.11	Q	.	.	.	.
23.65	0.5636	0.11	Q	.	.	.	.
23.81	0.5651	0.11	Q	.	.	.	.
23.96	0.5665	0.11	Q	.	.	.	.
24.12	0.5678	0.11	Q	.	.	.	.
24.28	0.5685	0.00	Q	.	.	.	.

Drainage I

```
****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.10
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) =  9.32
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.09
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.04

****************************************************************************
  TIME     VOLUME      Q    0.         2.5       5.0       7.5      10.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.00     0.0000     0.00  Q          .         .         .         .
  0.16     0.0001     0.02  Q          .         .         .         .
  0.31     0.0003     0.02  Q          .         .         .         .
  0.47     0.0005     0.02  Q          .         .         .         .
  0.62     0.0008     0.02  Q          .         .         .         .
  0.78     0.0010     0.02  Q          .         .         .         .
  0.93     0.0012     0.02  Q          .         .         .         .
  1.09     0.0014     0.02  Q          .         .         .         .
  1.24     0.0016     0.02  Q          .         .         .         .
  1.40     0.0019     0.02  Q          .         .         .         .
  1.55     0.0021     0.02  Q          .         .         .         .
  1.71     0.0023     0.02  Q          .         .         .         .
  1.86     0.0026     0.02  Q          .         .         .         .
  2.02     0.0028     0.02  Q          .         .         .         .
  2.18     0.0030     0.02  Q          .         .         .         .
  2.33     0.0033     0.02  Q          .         .         .         .
  2.49     0.0035     0.02  Q          .         .         .         .
  2.64     0.0037     0.02  Q          .         .         .         .
  2.80     0.0040     0.02  Q          .         .         .         .
  2.95     0.0042     0.02  Q          .         .         .         .
  3.11     0.0044     0.02  Q          .         .         .         .
  3.26     0.0047     0.02  Q          .         .         .         .
  3.42     0.0049     0.02  Q          .         .         .         .
  3.57     0.0052     0.02  Q          .         .         .         .
  3.73     0.0054     0.02  Q          .         .         .         .
  3.88     0.0057     0.02  Q          .         .         .         .
  4.04     0.0059     0.02  Q          .         .         .         .
  4.19     0.0062     0.02  Q          .         .         .         .
  4.35     0.0065     0.02  Q          .         .         .         .
  4.51     0.0067     0.02  Q          .         .         .         .
```

4.66	0.0070	0.02	Q	.	.	.	.
4.82	0.0072	0.02	Q	.	.	.	.
4.97	0.0075	0.02	Q	.	.	.	.
5.13	0.0078	0.02	Q	.	.	.	.
5.28	0.0081	0.02	Q	.	.	.	.
5.44	0.0083	0.02	Q	.	.	.	.
5.59	0.0086	0.02	Q	.	.	.	.
5.75	0.0089	0.02	Q	.	.	.	.
5.90	0.0092	0.02	Q	.	.	.	.
6.06	0.0095	0.02	Q	.	.	.	.
6.21	0.0097	0.02	Q	.	.	.	.
6.37	0.0100	0.02	Q	.	.	.	.
6.52	0.0103	0.02	Q	.	.	.	.
6.68	0.0106	0.02	Q	.	.	.	.
6.84	0.0109	0.02	Q	.	.	.	.
6.99	0.0112	0.02	Q	.	.	.	.
7.15	0.0115	0.02	Q	.	.	.	.
7.30	0.0118	0.02	Q	.	.	.	.
7.46	0.0121	0.02	Q	.	.	.	.
7.61	0.0125	0.02	Q	.	.	.	.
7.77	0.0128	0.03	Q	.	.	.	.
7.92	0.0131	0.03	Q	.	.	.	.
8.08	0.0134	0.03	Q	.	.	.	.
8.23	0.0138	0.03	Q	.	.	.	.
8.39	0.0141	0.03	Q	.	.	.	.
8.54	0.0144	0.03	Q	.	.	.	.
8.70	0.0148	0.03	Q	.	.	.	.
8.85	0.0151	0.03	Q	.	.	.	.
9.01	0.0155	0.03	Q	.	.	.	.
9.17	0.0158	0.03	Q	.	.	.	.
9.32	0.0162	0.03	Q	.	.	.	.
9.48	0.0166	0.03	Q	.	.	.	.
9.63	0.0169	0.03	Q	.	.	.	.
9.79	0.0173	0.03	Q	.	.	.	.
9.94	0.0177	0.03	Q	.	.	.	.
10.10	0.0181	0.03	Q	.	.	.	.
10.25	0.0185	0.03	Q	.	.	.	.
10.41	0.0189	0.03	Q	.	.	.	.
10.56	0.0193	0.03	Q	.	.	.	.
10.72	0.0197	0.03	Q	.	.	.	.
10.87	0.0201	0.03	Q	.	.	.	.
11.03	0.0206	0.03	Q	.	.	.	.
11.18	0.0210	0.03	Q	.	.	.	.
11.34	0.0215	0.04	Q	.	.	.	.
11.50	0.0219	0.04	Q	.	.	.	.
11.65	0.0224	0.04	Q	.	.	.	.
11.81	0.0229	0.04	Q	.	.	.	.
11.96	0.0233	0.04	Q	.	.	.	.
12.12	0.0239	0.04	Q	.	.	.	.
12.27	0.0245	0.05	Q	.	.	.	.
12.43	0.0251	0.05	Q	.	.	.	.
12.58	0.0257	0.05	Q	.	.	.	.
12.74	0.0264	0.05	Q	.	.	.	.
12.89	0.0271	0.05	Q	.	.	.	.
13.05	0.0278	0.05	Q	.	.	.	.
13.20	0.0285	0.06	Q	.	.	.	.
13.36	0.0292	0.06	Q	.	.	.	.
13.51	0.0299	0.06	Q	.	.	.	.
13.67	0.0307	0.06	Q	.	.	.	.
13.83	0.0315	0.06	Q	.	.	.	.
13.98	0.0324	0.07	Q	.	.	.	.
14.14	0.0332	0.07	Q	.	.	.	.
14.29	0.0342	0.07	Q	.	.	.	.
14.45	0.0351	0.08	Q	.	.	.	.
14.60	0.0362	0.08	Q	.	.	.	.
14.76	0.0373	0.09	Q	.	.	.	.
14.91	0.0384	0.09	Q	.	.	.	.
15.07	0.0396	0.10	Q	.	.	.	.
15.22	0.0410	0.11	Q	.	.	.	.
15.38	0.0424	0.12	Q	.	.	.	.
15.53	0.0440	0.12	Q	.	.	.	.
15.69	0.0456	0.14	Q	.	.	.	.
15.84	0.0478	0.20	Q	.	.	.	.
16.00	0.0509	0.28	.Q	.	.	.	.
16.16	0.0588	0.96	. Q	.	.	.	.
16.31	0.0660	0.16	Q	.	.	.	.
16.47	0.0678	0.12	Q	.	.	.	.
16.62	0.0692	0.10	Q	.	.	.	.
16.78	0.0705	0.09	Q	.	.	.	.

16.93	0.0716	0.08	Q	.	.	.	.
17.09	0.0725	0.07	Q	.	.	.	.
17.24	0.0734	0.07	Q	.	.	.	.
17.40	0.0742	0.06	Q	.	.	.	.
17.55	0.0750	0.06	Q	.	.	.	.
17.71	0.0757	0.05	Q	.	.	.	.
17.86	0.0764	0.05	Q	.	.	.	.
18.02	0.0770	0.05	Q	.	.	.	.
18.17	0.0776	0.04	Q	.	.	.	.
18.33	0.0781	0.04	Q	.	.	.	.
18.49	0.0785	0.04	Q	.	.	.	.
18.64	0.0790	0.03	Q	.	.	.	.
18.80	0.0794	0.03	Q	.	.	.	.
18.95	0.0798	0.03	Q	.	.	.	.
19.11	0.0802	0.03	Q	.	.	.	.
19.26	0.0806	0.03	Q	.	.	.	.
19.42	0.0810	0.03	Q	.	.	.	.
19.57	0.0814	0.03	Q	.	.	.	.
19.73	0.0817	0.03	Q	.	.	.	.
19.88	0.0821	0.03	Q	.	.	.	.
20.04	0.0824	0.03	Q	.	.	.	.
20.19	0.0827	0.03	Q	.	.	.	.
20.35	0.0831	0.02	Q	.	.	.	.
20.50	0.0834	0.02	Q	.	.	.	.
20.66	0.0837	0.02	Q	.	.	.	.
20.82	0.0840	0.02	Q	.	.	.	.
20.97	0.0843	0.02	Q	.	.	.	.
21.13	0.0846	0.02	Q	.	.	.	.
21.28	0.0849	0.02	Q	.	.	.	.
21.44	0.0851	0.02	Q	.	.	.	.
21.59	0.0854	0.02	Q	.	.	.	.
21.75	0.0857	0.02	Q	.	.	.	.
21.90	0.0860	0.02	Q	.	.	.	.
22.06	0.0862	0.02	Q	.	.	.	.
22.21	0.0865	0.02	Q	.	.	.	.
22.37	0.0867	0.02	Q	.	.	.	.
22.52	0.0870	0.02	Q	.	.	.	.
22.68	0.0872	0.02	Q	.	.	.	.
22.83	0.0875	0.02	Q	.	.	.	.
22.99	0.0877	0.02	Q	.	.	.	.
23.15	0.0879	0.02	Q	.	.	.	.
23.30	0.0882	0.02	Q	.	.	.	.
23.46	0.0884	0.02	Q	.	.	.	.
23.61	0.0886	0.02	Q	.	.	.	.
23.77	0.0888	0.02	Q	.	.	.	.
23.92	0.0891	0.02	Q	.	.	.	.
24.08	0.0893	0.02	Q	.	.	.	.
24.23	0.0894	0.00	Q	.	.	.	.

Drainage J

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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             Ver. 9.0  Release Date: 01/01/2003  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                  16795 Von Karmon #100, Irvine, CA 92606


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----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   11.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) = 15.25
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.89
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.43

****************************************************************************
  TIME     VOLUME      Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.24      0.0018      0.17  Q         .         .         .         .
  0.50      0.0053      0.17  Q         .         .         .         .
  0.75      0.0089      0.17  Q         .         .         .         .
  1.00      0.0125      0.17  Q         .         .         .         .
  1.26      0.0161      0.17  Q         .         .         .         .
  1.51      0.0198      0.18  Q         .         .         .         .
  1.77      0.0235      0.18  Q         .         .         .         .
  2.02      0.0273      0.18  Q         .         .         .         .
  2.28      0.0311      0.18  Q         .         .         .         .
  2.53      0.0349      0.18  Q         .         .         .         .
  2.78      0.0388      0.19  Q         .         .         .         .
  3.04      0.0428      0.19  Q         .         .         .         .
  3.29      0.0467      0.19  Q         .         .         .         .
  3.55      0.0508      0.19  Q         .         .         .         .
  3.80      0.0549      0.20  Q         .         .         .         .
  4.05      0.0590      0.20  Q         .         .         .         .
  4.31      0.0632      0.20  Q         .         .         .         .
  4.56      0.0674      0.20  Q         .         .         .         .
  4.82      0.0717      0.21  Q         .         .         .         .
  5.07      0.0761      0.21  Q         .         .         .         .
  5.32      0.0805      0.21  Q         .         .         .         .
  5.58      0.0850      0.22  Q         .         .         .         .
  5.83      0.0896      0.22  Q         .         .         .         .
  6.09      0.0942      0.22  Q         .         .         .         .
  6.34      0.0989      0.22  Q         .         .         .         .
  6.60      0.1037      0.23  Q         .         .         .         .
  6.85      0.1085      0.23  Q         .         .         .         .
  7.10      0.1135      0.24  Q         .         .         .         .
  7.36      0.1185      0.24  Q         .         .         .         .
  7.61      0.1236      0.25  Q         .         .         .         .
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  7.87      0.1288     0.25  Q         .         .         .         .
  8.12      0.1341     0.26  .Q        .         .         .         .
  8.38      0.1395     0.26  .Q        .         .         .         .
  8.63      0.1450     0.27  .Q        .         .         .         .
  8.88      0.1507     0.27  .Q        .         .         .         .
  9.14      0.1564     0.28  .Q        .         .         .         .
  9.39      0.1623     0.28  .Q        .         .         .         .
  9.65      0.1684     0.29  .Q        .         .         .         .
  9.90      0.1745     0.30  .Q        .         .         .         .
 10.15      0.1809     0.31  .Q        .         .         .         .
 10.41      0.1874     0.31  .Q        .         .         .         .
 10.66      0.1940     0.32  .Q        .         .         .         .
 10.92      0.2009     0.33  .Q        .         .         .         .
 11.17      0.2080     0.34  .Q        .         .         .         .
 11.43      0.2153     0.35  .Q        .         .         .         .
 11.68      0.2228     0.37  .Q        .         .         .         .
 11.93      0.2306     0.38  .Q        .         .         .         .
 12.19      0.2392     0.44  .Q        .         .         .         .
 12.44      0.2490     0.48  .Q        .         .         .         .
 12.70      0.2594     0.51  . Q       .         .         .         .
 12.95      0.2703     0.52  . Q       .         .         .         .
 13.20      0.2816     0.56  . Q       .         .         .         .
 13.46      0.2935     0.57  . Q       .         .         .         .
 13.71      0.3060     0.62  . Q       .         .         .         .
 13.97      0.3192     0.64  . Q       .         .         .         .
 14.22      0.3335     0.72  . Q       .         .         .         .
 14.48      0.3490     0.76  .  Q      .         .         .         .
 14.73      0.3658     0.85  .  Q      .         .         .         .
 14.98      0.3842     0.91  .  Q      .         .         .         .
 15.24      0.4049     1.07  .   Q     .         .         .         .
 15.49      0.4286     1.19  .   Q     .         .         .         .
 15.75      0.4562     1.44  .    Q    .         .         .         .
 16.00      0.4932     2.08  .       Q .         .         .         .
 16.25      0.5884     6.97  .         .         .      Q  .         .
 16.51      0.6741     1.18  .   Q     .         .         .         .
 16.76      0.6968     0.98  .  Q      .         .         .         .
 17.02      0.7154     0.80  .  Q      .         .         .         .
 17.27      0.7308     0.67  . Q       .         .         .         .
 17.52      0.7441     0.59  . Q       .         .         .         .
 17.78      0.7560     0.54  . Q       .         .         .         .
 18.03      0.7669     0.50  .Q        .         .         .         .
 18.29      0.7761     0.39  .Q        .         .         .         .
 18.54      0.7840     0.36  .Q        .         .         .         .
 18.80      0.7913     0.34  .Q        .         .         .         .
 19.05      0.7981     0.32  .Q        .         .         .         .
 19.30      0.8046     0.30  .Q        .         .         .         .
 19.56      0.8108     0.29  .Q        .         .         .         .
 19.81      0.8167     0.27  .Q        .         .         .         .
 20.07      0.8224     0.26  .Q        .         .         .         .
 20.32      0.8278     0.25  .Q        .         .         .         .
 20.58      0.8330     0.24  Q         .         .         .         .
 20.83      0.8380     0.23  Q         .         .         .         .
 21.08      0.8429     0.23  Q         .         .         .         .
 21.34      0.8476     0.22  Q         .         .         .         .
 21.59      0.8521     0.21  Q         .         .         .         .
 21.85      0.8565     0.21  Q         .         .         .         .
 22.10      0.8608     0.20  Q         .         .         .         .
 22.35      0.8650     0.20  Q         .         .         .         .
 22.61      0.8691     0.19  Q         .         .         .         .
 22.86      0.8731     0.19  Q         .         .         .         .
 23.12      0.8770     0.18  Q         .         .         .         .
 23.37      0.8808     0.18  Q         .         .         .         .
 23.62      0.8845     0.18  Q         .         .         .         .
 23.88      0.8882     0.17  Q         .         .         .         .
 24.13      0.8917     0.17  Q         .         .         .         .
 24.39      0.8935     0.00  Q         .         .         .         .
----------------------------------------------------------------------------
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Drainage K

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                      SMALL AREA UNIT HYDROGRAPH MODEL
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                          Analysis prepared by:

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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    6.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) = 11.93
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.51
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.24

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  TIME     VOLUME       Q    0.         2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.09      0.0000      0.00  Q         .         .         .         .
  0.29      0.0008      0.10  Q         .         .         .         .
  0.49      0.0024      0.10  Q         .         .         .         .
  0.69      0.0040      0.10  Q         .         .         .         .
  0.89      0.0056      0.10  Q         .         .         .         .
  1.09      0.0072      0.10  Q         .         .         .         .
  1.29      0.0089      0.10  Q         .         .         .         .
  1.49      0.0105      0.10  Q         .         .         .         .
  1.68      0.0122      0.10  Q         .         .         .         .
  1.88      0.0139      0.10  Q         .         .         .         .
  2.08      0.0155      0.10  Q         .         .         .         .
  2.28      0.0173      0.10  Q         .         .         .         .
  2.48      0.0190      0.11  Q         .         .         .         .
  2.68      0.0207      0.11  Q         .         .         .         .
  2.88      0.0225      0.11  Q         .         .         .         .
  3.08      0.0243      0.11  Q         .         .         .         .
  3.27      0.0260      0.11  Q         .         .         .         .
  3.47      0.0279      0.11  Q         .         .         .         .
  3.67      0.0297      0.11  Q         .         .         .         .
  3.87      0.0315      0.11  Q         .         .         .         .
  4.07      0.0334      0.11  Q         .         .         .         .
  4.27      0.0353      0.12  Q         .         .         .         .
  4.47      0.0372      0.12  Q         .         .         .         .
  4.67      0.0391      0.12  Q         .         .         .         .
  4.87      0.0410      0.12  Q         .         .         .         .
  5.06      0.0430      0.12  Q         .         .         .         .
  5.26      0.0450      0.12  Q         .         .         .         .
  5.46      0.0470      0.12  Q         .         .         .         .
  5.66      0.0490      0.12  Q         .         .         .         .
  5.86      0.0511      0.13  Q         .         .         .         .
  6.06      0.0531      0.13  Q         .         .         .         .
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 6.26      0.0552      0.13  Q         .         .         .         .
 6.46      0.0574      0.13  Q         .         .         .         .
 6.65      0.0595      0.13  Q         .         .         .         .
 6.85      0.0617      0.13  Q         .         .         .         .
 7.05      0.0639      0.14  Q         .         .         .         .
 7.25      0.0662      0.14  Q         .         .         .         .
 7.45      0.0685      0.14  Q         .         .         .         .
 7.65      0.0708      0.14  Q         .         .         .         .
 7.85      0.0731      0.14  Q         .         .         .         .
 8.05      0.0755      0.15  Q         .         .         .         .
 8.25      0.0779      0.15  Q         .         .         .         .
 8.44      0.0803      0.15  Q         .         .         .         .
 8.64      0.0828      0.15  Q         .         .         .         .
 8.84      0.0854      0.15  Q         .         .         .         .
 9.04      0.0879      0.16  Q         .         .         .         .
 9.24      0.0906      0.16  Q         .         .         .         .
 9.44      0.0932      0.16  Q         .         .         .         .
 9.64      0.0960      0.17  Q         .         .         .         .
 9.84      0.0987      0.17  Q         .         .         .         .
10.03      0.1015      0.17  Q         .         .         .         .
10.23      0.1044      0.18  Q         .         .         .         .
10.43      0.1074      0.18  Q         .         .         .         .
10.63      0.1104      0.19  Q         .         .         .         .
10.83      0.1134      0.19  Q         .         .         .         .
11.03      0.1166      0.19  Q         .         .         .         .
11.23      0.1198      0.20  Q         .         .         .         .
11.43      0.1231      0.20  Q         .         .         .         .
11.63      0.1265      0.21  Q         .         .         .         .
11.82      0.1300      0.22  Q         .         .         .         .
12.02      0.1336      0.22  Q         .         .         .         .
12.22      0.1376      0.27  .Q        .         .         .         .
12.42      0.1422      0.28  .Q        .         .         .         .
12.62      0.1468      0.29  .Q        .         .         .         .
12.82      0.1517      0.30  .Q        .         .         .         .
13.02      0.1567      0.31  .Q        .         .         .         .
13.22      0.1618      0.32  .Q        .         .         .         .
13.42      0.1672      0.33  .Q        .         .         .         .
13.61      0.1727      0.34  .Q        .         .         .         .
13.81      0.1785      0.36  .Q        .         .         .         .
14.01      0.1846      0.38  .Q        .         .         .         .
14.21      0.1911      0.42  .Q        .         .         .         .
14.41      0.1981      0.43  .Q        .         .         .         .
14.61      0.2055      0.47  .Q        .         .         .         .
14.81      0.2134      0.49  .Q        .         .         .         .
15.01      0.2220      0.55  . Q       .         .         .         .
15.20      0.2314      0.59  . Q       .         .         .         .
15.40      0.2420      0.69  . Q       .         .         .         .
15.60      0.2532      0.67  . Q       .         .         .         .
15.80      0.2668      0.99  .  Q      .         .         .         .
16.00      0.2862      1.38  .    Q    .         .         .         .
16.20      0.3361      4.70  .         .       Q .         .         .
16.40      0.3811      0.78  .  Q      .         .         .         .
16.60      0.3927      0.64  . Q       .         .         .         .
16.80      0.4022      0.52  . Q       .         .         .         .
16.99      0.4102      0.45  .Q        .         .         .         .
17.19      0.4171      0.39  .Q        .         .         .         .
17.39      0.4232      0.35  .Q        .         .         .         .
17.59      0.4288      0.33  .Q        .         .         .         .
17.79      0.4340      0.30  .Q        .         .         .         .
17.99      0.4388      0.28  .Q        .         .         .         .
18.19      0.4430      0.23  Q         .         .         .         .
18.39      0.4467      0.21  Q         .         .         .         .
18.58      0.4501      0.20  Q         .         .         .         .
18.78      0.4533      0.19  Q         .         .         .         .
18.98      0.4564      0.18  Q         .         .         .         .
19.18      0.4593      0.18  Q         .         .         .         .
19.38      0.4621      0.17  Q         .         .         .         .
19.58      0.4649      0.16  Q         .         .         .         .
19.78      0.4675      0.16  Q         .         .         .         .
19.98      0.4700      0.15  Q         .         .         .         .
20.18      0.4725      0.15  Q         .         .         .         .
20.37      0.4749      0.14  Q         .         .         .         .
20.57      0.4772      0.14  Q         .         .         .         .
20.77      0.4794      0.13  Q         .         .         .         .
20.97      0.4816      0.13  Q         .         .         .         .
21.17      0.4837      0.13  Q         .         .         .         .
21.37      0.4858      0.12  Q         .         .         .         .
21.57      0.4878      0.12  Q         .         .         .         .
21.77      0.4898      0.12  Q         .         .         .         .
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21.97	0.4918	0.12	Q	.	.	.	.
22.16	0.4937	0.11	Q	.	.	.	.
22.36	0.4955	0.11	Q	.	.	.	.
22.56	0.4973	0.11	Q	.	.	.	.
22.76	0.4991	0.11	Q	.	.	.	.
22.96	0.5009	0.11	Q	.	.	.	.
23.16	0.5026	0.10	Q	.	.	.	.
23.36	0.5043	0.10	Q	.	.	.	.
23.56	0.5060	0.10	Q	.	.	.	.
23.75	0.5076	0.10	Q	.	.	.	.
23.95	0.5092	0.10	Q	.	.	.	.
24.15	0.5108	0.10	Q	.	.	.	.
24.35	0.5116	0.00	Q	.	.	.	.

B4 Proposed Condition Small Area Unit Hydrograph Calculations

a) High Confidence Events

i. Infiltration Analysis

INFILTRATION RATE CALCULATION SUMMARY

PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR HIGH-CONFIDENCE EVENT

Proposed Condition			
Node	**A**	**B**	**C**
Total Area (ac)	315.98	127.93	104.35
Y	0.88	0.96	0.94
Ybar	0.12	0.04	0.06
Average a_p	0.47	0.32	0.61
Total Fm (in/hr)	0.12	0.06	0.12

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 315.98

Y = 0.88

Ybar = 1 - Y = **0.12**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.47

Total Fm (in/hr) = **0.12**

Offsite Area																
									Low Loss Rate, Ybar				Max. Loss Rate, F_m			
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	52	9.23	1.85	0.20	0.000	0.10	0.40	0.04	0.001
					Impervious	6.81	0.022	100	0.00	0.00	1.00	0.022				
2	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	91	0.99	0.20	0.82	0.001	0.10	0.20	0.02	0.000
					Impervious	2.39	0.008	100	0.00	0.00	1.00	0.008				
3	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.029	52	9.23	1.85	0.20	0.006	0.20	0.40	0.08	0.011
					Impervious	36.22	0.115	100	0.00	0.00	1.00	0.115				
4	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.020	76	3.16	0.63	0.54	0.011	0.20	0.30	0.06	0.006
					Impervious	25.47	0.081	100	0.00	0.00	1.00	0.081				
5	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.017	91	0.99	0.20	0.82	0.014	0.20	0.20	0.04	0.003
					Impervious	21.21	0.067	100	0.00	0.00	1.00	0.067				
6	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.010	91	0.99	0.20	0.82	0.008	0.10	0.20	0.02	0.002
					Impervious	28.72	0.091	100	0.00	0.00	1.00	0.091				
7	Oil Operations	100%	4.70	D	Pervious	4.70	0.015	99	0.10	0.02	0.98	0.015	1.00	0.20	0.20	0.003
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
8	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.053	66	5.15	1.03	0.39	0.020	1.00	0.40	0.40	0.021
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
9	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	93	0.75	0.15	0.86	0.002	0.10	0.40	0.04	0.001
					Impervious	5.90	0.019	100	0.00	0.00	1.00	0.019				

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

Onsite Area																	
No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	15.02	D	Pervious	1.50	0.005	91	0.99	0.20	0.82	0.004	0.10	0.20	0.02	0.001
					Impervious	13.52	0.043	100	0.00	0.00	1.00	0.043				
2	Single Family Residential (Condominium)	35%	4.22	B	Pervious	1.48	0.005	76	3.16	0.63	0.54	0.003	0.35	0.30	0.11	0.001
					Impervious	2.74	0.009	100	0.00	0.00	1.00	0.009				
3	Single Family Residential (Condominium)	35%	34.29	D	Pervious	12.00	0.038	91	0.99	0.20	0.82	0.031	0.35	0.20	0.07	0.008
					Impervious	22.29	0.071	100	0.00	0.00	1.00	0.071				
4	Public Park	85%	12.22	B	Pervious	10.39	0.033	76	3.16	0.63	0.54	0.018	0.85	0.30	0.26	0.010
					Impervious	1.83	0.006	100	0.00	0.00	1.00	0.006				
5	Public Park	85%	10.74	D	Pervious	9.13	0.029	91	0.99	0.20	0.82	0.024	0.85	0.20	0.17	0.006
					Impervious	1.61	0.005	100	0.00	0.00	1.00	0.005				
6	Oil Operations	100%	4.78	A	Pervious	4.78	0.015	93	0.75	0.15	0.86	0.013	1.00	0.40	0.40	0.006
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
7	Open Space / Habitat Area	100%	61.07	D	Pervious	61.07	0.193	96	0.42	0.08	0.92	0.177	1.00	0.20	0.20	0.039
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
		Total Area =	**315.98**								Y =	**0.88**			Total F_m =	**0.12**
											Ybar = 1 - Y =	**0.12**				

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 127.93

Y = 0.96

Ybar = 1 - Y = **0.04**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.32

Total Fm (in/hr) = **0.06**

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
Offsite Area																
1	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	91	0.99	0.20	0.82	0.003	0.10	0.20	0.02	0.001
					Impervious	4.82	0.038	100	0.00	0.00	1.00	0.038				
2	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	91	0.99	0.20	0.82	0.008	0.20	0.20	0.04	0.002
					Impervious	4.75	0.037	100	0.00	0.00	1.00	0.037				
3	Commercial / Industrial	10%	78.14	D	Pervious	7.81	0.061	91	0.99	0.20	0.82	0.050	0.10	0.20	0.02	0.012
					Impervious	70.33	0.550	100	0.00	0.00	1.00	0.550				
4	School	60%	9.91	D	Pervious	5.95	0.046	91	0.99	0.20	0.82	0.038	0.60	0.20	0.12	0.009
					Impervious	3.96	0.031	100	0.00	0.00	1.00	0.031				
Onsite Area																
1	Single Family Residential (Condominium)	35%	4.43	D	Pervious	1.55	0.012	91	0.99	0.20	0.82	0.010	0.35	0.20	0.07	0.002
					Impervious	2.88	0.023	100	0.00	0.00	1.00	0.023				
2	Open Space / Habitat Area	100%	24.16	D	Pervious	24.16	0.189	96	0.42	0.08	0.92	0.173	1.00	0.20	0.20	0.038
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
		Total Area =	**127.93**								Y =	**0.96**			Total F_m =	**0.06**
											Ybar = 1 - Y =	**0.04**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m} \qquad Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}} \qquad Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j \qquad F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 100-Year Storm Event for Non-Mountainous Area (in) = 5.63

P24, 100-Year Storm Event for Mountainous Area (in) = 11.27

Total Area (ac) = 104.35

Y = 0.94

Ybar = 1 - Y = **0.06**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.61

Total Fm (in/hr) = **0.12**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Commercial / Industrial	10%	1.95	D	Pervious	0.20	0.002	91	0.99	0.20	0.82	0.002	0.10	0.20	0.02	0.000
					Impervious	1.76	0.017	100	0.00	0.00	1.00	0.017				
2	Oil Operations	100%	6.26	D	Pervious	6.26	0.060	99	0.10	0.02	0.98	0.059	1.00	0.20	0.20	0.012
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC III	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	11.35	D	Pervious	1.14	0.011	91	0.99	0.20	0.82	0.009	0.10	0.20	0.02	0.002
					Impervious	10.22	0.098	100	0.00	0.00	1.00	0.098				
2	Single Family Residential (Condominium)	35%	41.68	D	Pervious	14.59	0.140	91	0.99	0.20	0.82	0.114	0.35	0.20	0.07	0.028
					Impervious	27.09	0.260	100	0.00	0.00	1.00	0.260				
3	Public Park	85%	9.61	D	Pervious	8.17	0.078	91	0.99	0.20	0.82	0.064	0.85	0.20	0.17	0.016
					Impervious	1.44	0.014	100	0.00	0.00	1.00	0.014				
4	Oil Operations	100%	9.76	D	Pervious	9.76	0.094	99	0.10	0.02	0.98	0.092	1.00	0.20	0.20	0.019
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				
5	Open Space / Habitat Area	100%	23.74	D	Pervious	23.74	0.228	96	0.42	0.08	0.92	0.208	1.00	0.20	0.20	0.046
					Impervious	0.00	0.000	100	0.00	0.00	1.00	0.000				

Total Area = **104.35**

Y = **0.94**

Ybar = 1 - Y = **0.06**

Total F_m = **0.12**

INFILTRATION RATE CALCULATION SUMMARY

PROPOSED NEWPORT BANNING RANCH PROJECT
25-YEAR HIGH-CONFIDENCE EVENT

Proposed Condition			
Node	**A**	**B**	**C**
Total Area (ac)	315.98	127.93	104.35
Y	0.70	0.82	0.74
Ybar	0.30	0.18	0.26
Average a_p	0.47	0.32	0.61
Total Fm (in/hr)	0.12	0.06	0.12

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

25-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + ... + Y_mA_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 315.98

Y = 0.70

Ybar = 1 - Y = **0.30**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.47

Total Fm (in/hr) = **0.12**

Offsite Area										Low Loss Rate, Ybar				Max. Loss Rate, F_m				
No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.00	0.000	0.10	0.40	0.04	0.001	0.002
						Impervious	6.81	0.022	98	0.20	0.04	0.95	0.020					
2	9	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.45	0.000	0.10	0.20	0.02	0.000	0.001
						Impervious	2.39	0.008	98	0.20	0.04	0.95	0.007					
3	9	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.029	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.011	0.029
						Impervious	36.22	0.115	98	0.20	0.04	0.95	0.109					
4	9	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.020	56	7.86	1.57	0.18	0.004	0.20	0.30	0.06	0.006	0.020
						Impervious	25.47	0.081	98	0.20	0.04	0.95	0.076					
5	9	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.017	75	3.33	0.67	0.45	0.008	0.20	0.20	0.04	0.003	0.017
						Impervious	21.21	0.067	98	0.20	0.04	0.95	0.064					
6	9	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.010	75	3.33	0.67	0.45	0.005	0.10	0.20	0.02	0.002	0.010
						Impervious	28.72	0.091	98	0.20	0.04	0.95	0.086					
7	1	Oil Operations	100%	4.70	D	Pervious	4.70	0.015	93	0.75	0.15	0.82	0.012	1.00	0.20	0.20	0.003	0.015
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
8	6	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.053	46	11.74	2.35	0.07	0.004	1.00	0.40	0.40	0.021	0.053
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
9	1	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.51	0.001	0.10	0.40	0.04	0.001	0.002
						Impervious	5.90	0.019	98	0.20	0.04	0.95	0.018					

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

25-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

Onsite Area										Low Loss Rate, Ybar				Max. Loss Rate, F_m				
No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Urban Cover - Roadway	10%	15.02	D	Pervious	1.50	0.005	75	3.33	0.67	0.45	0.002	0.10	0.20	0.02	0.001	0.005
						Impervious	13.52	0.043	98	0.20	0.04	0.95	0.041					
2	9	Single Family Residential (Condominium)	35%	4.22	B	Pervious	1.48	0.005	56	7.86	1.57	0.18	0.001	0.35	0.30	0.11	0.001	0.005
						Impervious	2.74	0.009	98	0.20	0.04	0.95	0.008					
3	9	Single Family Residential (Condominium)	35%	34.29	D	Pervious	12.00	0.038	75	3.33	0.67	0.45	0.017	0.35	0.20	0.07	0.008	0.038
						Impervious	22.29	0.071	98	0.20	0.04	0.95	0.067					
4	9	Public Park	85%	12.22	B	Pervious	10.39	0.033	56	7.86	1.57	0.18	0.006	0.85	0.30	0.26	0.010	0.033
						Impervious	1.83	0.006	98	0.20	0.04	0.95	0.005					
5	9	Public Park	85%	10.74	D	Pervious	9.13	0.029	75	3.33	0.67	0.45	0.013	0.85	0.20	0.17	0.006	0.029
						Impervious	1.61	0.005	98	0.20	0.04	0.95	0.005					
6	1	Oil Operations	100%	4.78	A	Pervious	4.78	0.015	78	2.82	0.56	0.51	0.008	1.00	0.40	0.40	0.006	0.015
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
7	6	Open Space / Habitat Area	100%	61.07	D	Pervious	61.07	0.193	83	2.05	0.41	0.61	0.117	1.00	0.20	0.20	0.039	0.193
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**315.98**								Y =	**0.70**			Total F_m =	**0.12**	**0.47**
												Ybar = 1 - Y =	**0.30**					

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
25-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49
P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 127.93
Y = 0.82
Ybar = 1 - Y = **0.18**

ap - See Figure C-4
Fp - See Table C-2
Average a_p = 0.32
Total Fm (in/hr) = **0.06**

Offsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.45	0.002	0.10	0.20	0.02	0.001	0.004
						Impervious	4.82	0.038	98	0.20	0.04	0.95	0.036					
2	9	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.45	0.004	0.20	0.20	0.04	0.002	0.009
						Impervious	4.75	0.037	98	0.20	0.04	0.95	0.035					
3	9	Commercial / Industrial	10%	78.14	D	Pervious	7.81	0.061	75	3.33	0.67	0.45	0.028	0.10	0.20	0.02	0.012	0.061
						Impervious	70.33	0.550	98	0.20	0.04	0.95	0.521					
4	9	School	60%	9.91	D	Pervious	5.95	0.046	75	3.33	0.67	0.45	0.021	0.60	0.20	0.12	0.009	0.046
						Impervious	3.96	0.031	98	0.20	0.04	0.95	0.029					

Onsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (Condominium)	35%	4.43	D	Pervious	1.55	0.012	75	3.33	0.67	0.45	0.006	0.35	0.20	0.07	0.002	0.012
						Impervious	2.88	0.023	98	0.20	0.04	0.95	0.021					
2	6	Open Space / Habitat Area	100%	24.16	D	Pervious	24.16	0.189	83	2.05	0.41	0.61	0.114	1.00	0.20	0.20	0.038	0.189
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**127.93**								Y =	**0.82**			Total F_m =	**0.06**	**0.32**
												Ybar = 1 - Y =	**0.18**					

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

25-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 104.35

Y = 0.74

Ybar = 1 - Y = **0.26**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.61

Total Fm (in/hr) = **0.12**

Offsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Commercial / Industrial	10%	1.95	D	Pervious	0.20	0.002	75	3.33	0.67	0.45	0.001	0.10	0.20	0.02	0.000	0.002
						Impervious	1.76	0.017	98	0.20	0.04	0.95	0.016					
2	1	Oil Operations	100%	6.26	D	Pervious	6.26	0.060	93	0.75	0.15	0.82	0.049	1.00	0.20	0.20	0.012	0.060
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					

Onsite Area

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Urban Cover - Roadway	10%	11.35	D	Pervious	1.14	0.011	75	3.33	0.67	0.45	0.005	0.10	0.20	0.02	0.002	0.011
						Impervious	10.22	0.098	98	0.20	0.04	0.95	0.093					
2	9	Single Family Residential (Condominium)	35%	41.68	D	Pervious	14.59	0.140	75	3.33	0.67	0.45	0.064	0.35	0.20	0.07	0.028	0.140
						Impervious	27.09	0.260	98	0.20	0.04	0.95	0.246					
3	9	Public Park	85%	9.61	D	Pervious	8.17	0.078	75	3.33	0.67	0.45	0.036	0.85	0.20	0.17	0.016	0.078
						Impervious	1.44	0.014	98	0.20	0.04	0.95	0.013					
4	1	Oil Operations	100%	9.76	D	Pervious	9.76	0.094	93	0.75	0.15	0.82	0.077	1.00	0.20	0.20	0.019	0.094
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
5	6	Open Space / Habitat Area	100%	23.74	D	Pervious	23.74	0.228	83	2.05	0.41	0.61	0.138	1.00	0.20	0.20	0.046	0.228
						Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000					
			Total Area =	**104.35**								Y =	**0.74**			Total F_m =	**0.12**	**0.61**
												Ybar = 1 - Y =	**0.26**					

INFILTRATION RATE CALCULATION SUMMARY
PROPOSED NEWPORT BANNING RANCH PROJECT
10-YEAR HIGH-CONFIDENCE EVENT

Proposed Condition			
Node	**A**	**B**	**C**
Total Area (ac)	315.98	127.93	104.35
Y	0.67	0.79	0.70
Ybar	0.33	0.21	0.30
Average a_p	0.47	0.32	0.61
Total Fm (in/hr)	0.12	0.06	0.12

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

10-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 10-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 10-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 315.98

Y = 0.67

Ybar = 1 - Y = **0.33**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.47

Total Fm (in/hr) = **0.12**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.00	0.000	0.10	0.40	0.04	0.001
					Impervious	6.81	0.022	98	0.20	0.04	0.94	0.020				
2	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.39	0.000	0.10	0.20	0.02	0.000
					Impervious	2.39	0.008	98	0.20	0.04	0.94	0.007				
3	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.029	32	21.25	4.25	0.00	0.000	0.20	0.40	0.08	0.011
					Impervious	36.22	0.115	98	0.20	0.04	0.94	0.107				
4	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.020	56	7.86	1.57	0.12	0.002	0.20	0.30	0.06	0.006
					Impervious	25.47	0.081	98	0.20	0.04	0.94	0.075				
5	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.017	75	3.33	0.67	0.39	0.007	0.20	0.20	0.04	0.003
					Impervious	21.21	0.067	98	0.20	0.04	0.94	0.063				
6	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.010	75	3.33	0.67	0.39	0.004	0.10	0.20	0.02	0.002
					Impervious	28.72	0.091	98	0.20	0.04	0.94	0.085				
7	Oil Operations	100%	4.70	D	Pervious	4.70	0.015	93	0.75	0.15	0.79	0.012	1.00	0.20	0.20	0.003
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
8	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.053	46	11.74	2.35	0.04	0.002	1.00	0.40	0.40	0.021
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
9	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.44	0.001	0.10	0.40	0.04	0.001
					Impervious	5.90	0.019	98	0.20	0.04	0.94	0.017				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
10-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA A

Onsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	15.02	D	Pervious	1.50	0.005	75	3.33	0.67	0.39	0.002	0.10	0.20	0.02	0.001
					Impervious	13.52	0.043	98	0.20	0.04	0.94	0.040				
2	Single Family Residential (Condominiums)	35%	4.22	B	Pervious	1.48	0.005	56	7.86	1.57	0.12	0.001	0.35	0.30	0.11	0.001
					Impervious	2.74	0.009	98	0.20	0.04	0.94	0.008				
3	Single Family Residential (Condominiums)	35%	34.29	D	Pervious	12.00	0.038	75	3.33	0.67	0.39	0.015	0.35	0.20	0.07	0.008
					Impervious	22.29	0.071	98	0.20	0.04	0.94	0.066				
4	Public Park	85%	12.22	B	Pervious	10.39	0.033	56	7.86	1.57	0.12	0.004	0.85	0.30	0.26	0.010
					Impervious	1.83	0.006	98	0.20	0.04	0.94	0.005				
5	Public Park	85%	10.74	D	Pervious	9.13	0.029	75	3.33	0.67	0.39	0.011	0.85	0.20	0.17	0.006
					Impervious	1.61	0.005	98	0.20	0.04	0.94	0.005				
6	Oil Operations	100%	4.78	A	Pervious	4.78	0.015	78	2.82	0.56	0.44	0.007	1.00	0.40	0.40	0.006
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
7	Open Space / Habitat Area	100%	61.07	D	Pervious	61.07	0.193	83	2.05	0.41	0.55	0.106	1.00	0.20	0.20	0.039
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
		Total Area =	**315.98**								Y =	**0.67**			Total F_m =	**0.12**
											Ybar = 1 - Y =	**0.33**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
10-YEAR HIGH-CONFIDENCE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m} \qquad Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}} \qquad Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j \qquad F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 10-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 10-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 127.93

Y = 0.79

Ybar = 1 - Y = **0.21**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.32

Total Fm (in/hr) = **0.06**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.39	0.002	0.10	0.20	0.02	0.001
					Impervious	4.82	0.038	98	0.20	0.04	0.94	0.035				
2	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.39	0.004	0.20	0.20	0.04	0.002
					Impervious	4.75	0.037	98	0.20	0.04	0.94	0.035				
3	Commercial / Industrial	10%	78.14	D	Pervious	7.81	0.061	75	3.33	0.67	0.39	0.024	0.10	0.20	0.02	0.012
					Impervious	70.33	0.550	98	0.20	0.04	0.94	0.515				
4	School	60%	9.91	D	Pervious	5.95	0.046	75	3.33	0.67	0.39	0.018	0.60	0.20	0.12	0.009
					Impervious	3.96	0.031	98	0.20	0.04	0.94	0.029				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (Condominiums)	35%	4.43	D	Pervious	1.55	0.012	75	3.33	0.67	0.39	0.005	0.35	0.20	0.07	0.002
					Impervious	2.88	0.023	98	0.20	0.04	0.94	0.021				
2	Open Space / Habitat Area	100%	24.16	D	Pervious	24.16	0.189	83	2.05	0.41	0.55	0.103	1.00	0.20	0.20	0.038
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
		Total Area =	**127.93**								Y =	**0.79**			Total F_m =	**0.06**
											Ybar = 1 - Y =	**0.21**				

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

10-YEAR HIGH-CONFIDENCE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 10-Year Storm Event for Non-Mountainous Area (in) = 3.68

P24, 10-Year Storm Event for Mountainous Area (in) = 7.05

Total Area (ac) = 104.35

Y = 0.70

Ybar = 1 - Y = **0.30**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.61

Total Fm (in/hr) = **0.12**

Offsite Area																
									Low Loss Rate, Ybar				Max. Loss Rate, F_m			
No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Commercial / Industrial	10%	1.95	D	Pervious	0.20	0.002	75	3.33	0.67	0.39	0.001	0.10	0.20	0.02	0.000
					Impervious	1.76	0.017	98	0.20	0.04	0.94	0.016				
2	Oil Operations	100%	6.26	D	Pervious	6.26	0.060	93	0.75	0.15	0.79	0.047	1.00	0.20	0.20	0.012
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
Onsite Area																
									Low Loss Rate, Ybar				Max. Loss Rate, F_m			
No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	11.35	D	Pervious	1.14	0.011	75	3.33	0.67	0.39	0.004	0.10	0.20	0.02	0.002
					Impervious	10.22	0.098	98	0.20	0.04	0.94	0.092				
2	Single Family Residential (Condominiums)	35%	41.68	D	Pervious	14.59	0.140	75	3.33	0.67	0.39	0.054	0.35	0.20	0.07	0.028
					Impervious	27.09	0.260	98	0.20	0.04	0.94	0.243				
3	Public Park	85%	9.61	D	Pervious	8.17	0.078	75	3.33	0.67	0.39	0.030	0.85	0.20	0.17	0.016
					Impervious	1.44	0.014	98	0.20	0.04	0.94	0.013				
4	Oil Operations	100%	9.76	D	Pervious	9.76	0.094	93	0.75	0.15	0.79	0.074	1.00	0.20	0.20	0.019
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
5	Open Space / Habitat Area	100%	23.74	D	Pervious	23.74	0.228	83	2.05	0.41	0.55	0.124	1.00	0.20	0.20	0.046
					Impervious	0.00	0.000	98	0.20	0.04	0.94	0.000				
		Total Area =	**104.35**								Y =	**0.70**		Total F_m =	**0.12**	
											Ybar = 1 - Y =	**0.30**				

ii. HC 100-Year Storm Event

Drainage A

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                          Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  316.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.120
    TIME OF CONCENTRATION(MIN.) = 25.42
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =   118.31
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    29.95

****************************************************************************
  TIME     VOLUME       Q     0.      162.5     325.0     487.5     650.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.32      0.2940     21.94  .Q         .         .         .         .
  0.75      1.0658     22.14  .Q         .         .         .         .
  1.17      1.8501     22.66  .Q         .         .         .         .
  1.60      2.6482     22.93  .Q         .         .         .         .
  2.02      3.4609     23.49  .Q         .         .         .         .
  2.44      4.2888     23.79  .Q         .         .         .         .
  2.87      5.1327     24.42  .Q         .         .         .         .
  3.29      5.9934     24.74  .Q         .         .         .         .
  3.71      6.8719     25.44  .Q         .         .         .         .
  4.14      7.7689     25.80  .Q         .         .         .         .
  4.56      8.6858     26.57  .Q         .         .         .         .
  4.98      9.6235     26.99  .Q         .         .         .         .
  5.41     10.5836     27.86  .Q         .         .         .         .
  5.83     11.5671     28.32  .Q         .         .         .         .
  6.26     12.5761     29.31  .Q         .         .         .         .
  6.68     13.6117     29.84  .Q         .         .         .         .
  7.10     14.6766     30.98  .Q         .         .         .         .
  7.53     15.7721     31.60  .Q         .         .         .         .
  7.95     16.9017     32.92  . Q        .         .         .         .
  8.37     18.0671     33.65  . Q        .         .         .         .
  8.80     19.2727     35.22  . Q        .         .         .         .
  9.22     20.5209     36.08  . Q        .         .         .         .
  9.65     21.8174     37.98  . Q        .         .         .         .
 10.07     23.1655     39.03  . Q        .         .         .         .
 10.49     24.5732     41.38  . Q        .         .         .         .
 10.92     26.0450     42.70  . Q        .         .         .         .
 11.34     27.5926     45.70  . Q        .         .         .         .
 11.76     29.2228     47.42  . Q        .         .         .         .
 12.19     30.9912     53.59  .  Q       .         .         .         .
 12.61     33.1063     67.23  .    Q     .         .         .         .
 13.03     35.5652     73.22  .    Q     .         .         .         .
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 13.46     38.1927     76.86  .   Q     .         .         .         .
 13.88     41.0444     86.03  .    Q    .         .         .         .
 14.31     44.1614     92.01  .    Q    .         .         .         .
 14.73     47.6813    109.05  .     Q   .         .         .         .
 15.15     51.7150    121.36  .      Q  .         .         .         .
 15.58     56.6173    158.66  .        Q.         .         .         .
 16.00     62.8749    198.77  .         . Q       .         .         .
 16.42     77.7198    649.18  .         .         .         .        Q.
 16.85     91.5148    138.80  .       Q .         .         .         .
 17.27     95.6916     99.78  .     Q   .         .         .         .
 17.69     98.8577     81.07  .   Q     .         .         .         .
 18.12    101.5033     70.04  .   Q     .         .         .         .
 18.54    103.5929     49.32  .  Q      .         .         .         .
 18.97    105.2289     44.13  . Q       .         .         .         .
 19.39    106.7046     40.16  . Q       .         .         .         .
 19.81    108.0553     37.00  . Q       .         .         .         .
 20.24    109.3054     34.41  . Q       .         .         .         .
 20.66    110.4722     32.24  .Q        .         .         .         .
 21.08    111.5689     30.40  .Q        .         .         .         .
 21.51    112.6054     28.81  .Q        .         .         .         .
 21.93    113.5896     27.41  .Q        .         .         .         .
 22.36    114.5279     26.18  .Q        .         .         .         .
 22.78    115.4254     25.08  .Q        .         .         .         .
 23.20    116.2864     24.10  .Q        .         .         .         .
 23.63    117.1146     23.21  .Q        .         .         .         .
 24.05    117.9130     22.40  .Q        .         .         .         .
 24.47    118.3051      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
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Drainage B

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****************************************************************************
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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  127.90
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.040
    TIME OF CONCENTRATION(MIN.) = 29.40
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    51.56
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     8.45

****************************************************************************
  TIME     VOLUME       Q    0.       62.5     125.0     187.5     250.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.32      0.0000      0.00  Q        .         .         .         .
  0.81      0.1992      9.84  .Q       .         .         .         .
  1.30      0.6004      9.97  .Q       .         .         .         .
  1.79      1.0099     10.25  .Q       .         .         .         .
  2.28      1.4280     10.40  .Q       .         .         .         .
  2.77      1.8554     10.71  .Q       .         .         .         .
  3.26      2.2925     10.88  .Q       .         .         .         .
  3.75      2.7400     11.23  .Q       .         .         .         .
  4.24      3.1984     11.41  .Q       .         .         .         .
  4.73      3.6687     11.81  .Q       .         .         .         .
  5.22      4.1514     12.03  .Q       .         .         .         .
  5.71      4.6478     12.49  .Q       .         .         .         .
  6.20      5.1584     12.73  . Q      .         .         .         .
  6.69      5.6850     13.27  . Q      .         .         .         .
  7.18      6.2282     13.56  . Q      .         .         .         .
  7.67      6.7901     14.19  . Q      .         .         .         .
  8.16      7.3719     14.54  . Q      .         .         .         .
  8.65      7.9762     15.31  . Q      .         .         .         .
  9.14      8.6046     15.73  . Q      .         .         .         .
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  9.63      9.2607     16.68  . Q       .         .         .         .
 10.12      9.9468     17.21  . Q       .         .         .         .
 10.61     10.6681     18.42  . Q       .         .         .         .
 11.10     11.4280     19.11  .  Q      .         .         .         .
 11.59     12.2346     20.73  .  Q      .         .         .         .
 12.08     13.0932     21.68  .  Q      .         .         .         .
 12.57     14.1380     29.92  .   Q     .         .         .         .
 13.06     15.3798     31.41  .    Q    .         .         .         .
 13.55     16.7275     35.15  .    Q    .         .         .         .
 14.04     18.2003     37.58  .     Q   .         .         .         .
 14.53     19.8639     44.58  .      Q  .         .         .         .
 15.02     21.7709     49.61  .      Q  .         .         .         .
 15.51     24.1445     67.62  .         Q         .         .         .
 16.00     27.1440     80.52  .         . Q       .         .         .
 16.49     33.7762    247.03  .         .         .         .        Q.
 16.98     39.9268     56.74  .        Q.         .         .         .
 17.47     41.8976     40.59  .     Q   .         .         .         .
 17.96     43.3903     33.13  .    Q    .         .         .         .
 18.45     44.5511     24.20  .  Q      .         .         .         .
 18.94     45.4434     19.88  .  Q      .         .         .         .
 19.43     46.2060     17.79  . Q       .         .         .         .
 19.92     46.8938     16.18  . Q       .         .         .         .
 20.41     47.5234     14.91  . Q       .         .         .         .
 20.90     48.1061     13.87  . Q       .         .         .         .
 21.39     48.6500     12.99  . Q       .         .         .         .
 21.88     49.1612     12.25  .Q        .         .         .         .
 22.37     49.6443     11.61  .Q        .         .         .         .
 22.86     50.1031     11.05  .Q        .         .         .         .
 23.35     50.5404     10.55  .Q        .         .         .         .
 23.84     50.9587     10.11  .Q        .         .         .         .
 24.33     51.3601      9.71  .Q        .         .         .         .
 24.82     51.5567      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage C

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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  104.40
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.060
    TIME OF CONCENTRATION(MIN.) = 14.82
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    41.38
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     7.60

****************************************************************************
  TIME     VOLUME       Q    0.       75.0     150.0     225.0     300.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.19      0.0788      7.72  .Q         .         .         .         .
  0.44      0.2371      7.80  .Q         .         .         .         .
  0.69      0.3969      7.85  .Q         .         .         .         .
  0.93      0.5582      7.96  .Q         .         .         .         .
  1.18      0.7212      8.01  .Q         .         .         .         .
  1.43      0.8858      8.12  .Q         .         .         .         .
  1.67      1.0522      8.18  .Q         .         .         .         .
  1.92      1.2204      8.30  .Q         .         .         .         .
  2.17      1.3904      8.36  .Q         .         .         .         .
  2.42      1.5624      8.48  .Q         .         .         .         .
  2.66      1.7362      8.55  .Q         .         .         .         .
  2.91      1.9121      8.68  .Q         .         .         .         .
  3.16      2.0900      8.75  .Q         .         .         .         .
  3.40      2.2700      8.89  .Q         .         .         .         .
  3.65      2.4523      8.96  .Q         .         .         .         .
  3.90      2.6368      9.11  .Q         .         .         .         .
  4.14      2.8236      9.19  .Q         .         .         .         .
  4.39      3.0129      9.35  .Q         .         .         .         .
  4.64      3.2047      9.44  .Q         .         .         .         .
```

```
  4.89      3.3990      9.61  .Q        .         .         .         .
  5.13      3.5960      9.70  .Q        .         .         .         .
  5.38      3.7959      9.88  .Q        .         .         .         .
  5.63      3.9986      9.98  .Q        .         .         .         .
  5.87      4.2043     10.18  .Q        .         .         .         .
  6.12      4.4130     10.28  .Q        .         .         .         .
  6.37      4.6251     10.50  .Q        .         .         .         .
  6.61      4.8405     10.61  .Q        .         .         .         .
  6.86      5.0594     10.84  .Q        .         .         .         .
  7.11      5.2820     10.96  .Q        .         .         .         .
  7.36      5.5084     11.22  .Q        .         .         .         .
  7.60      5.7388     11.35  .Q        .         .         .         .
  7.85      5.9734     11.63  .Q        .         .         .         .
  8.10      6.2124     11.78  .Q        .         .         .         .
  8.34      6.4560     12.09  .Q        .         .         .         .
  8.59      6.7044     12.25  .Q        .         .         .         .
  8.84      6.9580     12.59  .Q        .         .         .         .
  9.08      7.2170     12.78  .Q        .         .         .         .
  9.33      7.4817     13.16  .Q        .         .         .         .
  9.58      7.7524     13.36  .Q        .         .         .         .
  9.82      8.0295     13.79  .Q        .         .         .         .
 10.07      8.3135     14.02  .Q        .         .         .         .
 10.32      8.6047     14.51  .Q        .         .         .         .
 10.57      8.9037     14.78  .Q        .         .         .         .
 10.81      9.2111     15.34  . Q       .         .         .         .
 11.06      9.5273     15.65  . Q       .         .         .         .
 11.31      9.8534     16.30  . Q       .         .         .         .
 11.55     10.1899     16.66  . Q       .         .         .         .
 11.80     10.5379     17.44  . Q       .         .         .         .
 12.05     10.8982     17.86  . Q       .         .         .         .
 12.30     11.3208     23.54  .  Q      .         .         .         .
 12.54     11.8068     24.09  .  Q      .         .         .         .
 12.79     12.3110     25.31  .  Q      .         .         .         .
 13.04     12.8347     26.00  .  Q      .         .         .         .
 13.28     13.3811     27.54  .  Q      .         .         .         .
 13.53     13.9522     28.41  .  Q      .         .         .         .
 13.78     14.5529     30.44  .   Q     .         .         .         .
 14.02     15.1863     31.62  .   Q     .         .         .         .
 14.27     15.8624     34.62  .   Q     .         .         .         .
 14.52     16.5866     36.33  .   Q     .         .         .         .
 14.77     17.3722     40.64  .    Q    .         .         .         .
 15.01     18.2304     43.44  .    Q    .         .         .         .
 15.26     19.1966     51.23  .     Q   .         .         .         .
 15.51     20.2976     56.64  .      Q  .         .         .         .
 15.75     21.5949     70.47  .        Q.         .         .         .
 16.00     23.2997     96.56  .         . Q       .         .         .
 16.25     27.3328    298.58  .         .         .         .        Q.
 16.49     30.9685     57.63  .      Q  .         .         .         .
 16.74     32.0350     46.87  .     Q   .         .         .         .
 16.99     32.9045     38.31  .    Q    .         .         .         .
 17.23     33.6320     32.97  .   Q     .         .         .         .
 17.48     34.2684     29.38  .  Q      .         .         .         .
 17.73     34.8411     26.73  .  Q      .         .         .         .
 17.98     35.3659     24.68  .  Q      .         .         .         .
 18.22     35.8187     19.69  . Q       .         .         .         .
 18.47     36.1936     17.04  . Q       .         .         .         .
 18.72     36.5305     15.97  . Q       .         .         .         .
 18.96     36.8470     15.05  . Q       .         .         .         .
 19.21     37.1463     14.26  .Q        .         .         .         .
 19.46     37.4304     13.57  .Q        .         .         .         .
 19.70     37.7012     12.96  .Q        .         .         .         .
 19.95     37.9603     12.42  .Q        .         .         .         .
 20.20     38.2089     11.93  .Q        .         .         .         .
 20.45     38.4479     11.49  .Q        .         .         .         .
 20.69     38.6784     11.09  .Q        .         .         .         .
 20.94     38.9010     10.72  .Q        .         .         .         .
 21.19     39.1165     10.39  .Q        .         .         .         .
```

```
 21.43     39.3253     10.08  .Q         .         .         .         .
 21.68     39.5281      9.79  .Q         .         .         .         .
 21.93     39.7251      9.52  .Q         .         .         .         .
 22.17     39.9169      9.27  .Q         .         .         .         .
 22.42     40.1038      9.04  .Q         .         .         .         .
 22.67     40.2861      8.82  .Q         .         .         .         .
 22.92     40.4640      8.61  .Q         .         .         .         .
 23.16     40.6379      8.42  .Q         .         .         .         .
 23.41     40.8079      8.24  .Q         .         .         .         .
 23.66     40.9744      8.07  .Q         .         .         .         .
 23.90     41.1374      7.90  .Q         .         .         .         .
 24.15     41.2971      7.75  .Q         .         .         .         .
 24.40     41.3762      0.00  Q          .         .         .         .
----------------------------------------------------------------------------
```

iii. HC 25-Year Storm Event

Drainage A

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                          Analysis prepared by:




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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  316.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.300
    TIME OF CONCENTRATION(MIN.) = 26.88
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    79.67
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    38.57

****************************************************************************
  TIME     VOLUME       Q    0.      125.0     250.0     375.0     500.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.32      0.1800     13.61  .Q         .         .         .         .
  0.77      0.6863     13.74  .Q         .         .         .         .
  1.22      1.2014     14.08  .Q         .         .         .         .
  1.66      1.7262     14.26  .Q         .         .         .         .
  2.11      2.2614     14.64  .Q         .         .         .         .
  2.56      2.8072     14.84  .Q         .         .         .         .
  3.01      3.3646     15.26  .Q         .         .         .         .
  3.46      3.9338     15.49  .Q         .         .         .         .
  3.90      4.5159     15.96  .Q         .         .         .         .
  4.35      5.1113     16.21  .Q         .         .         .         .
  4.80      5.7211     16.74  .Q         .         .         .         .
  5.25      6.3460     17.02  .Q         .         .         .         .
  5.70      6.9872     17.62  .Q         .         .         .         .
  6.14      7.6457     17.94  .Q         .         .         .         .
  6.59      8.3229     18.64  .Q         .         .         .         .
  7.04      9.0200     19.01  .Q         .         .         .         .
  7.49      9.7389     19.82  .Q         .         .         .         .
  7.94     10.4810     20.26  .Q         .         .         .         .
  8.38     11.2490     21.22  .Q         .         .         .         .
```

```
         8.83     12.0445     21.75  .Q        .         .         .         .
         9.28     12.8712     22.91  .Q        .         .         .         .
         9.73     13.7312     23.55  .Q        .         .         .         .
        10.18     14.6298     24.99  .Q        .         .         .         .
        10.62     15.5698     25.79  . Q       .         .         .         .
        11.07     16.5588     27.63  . Q       .         .         .         .
        11.52     17.6014     28.69  . Q       .         .         .         .
        11.97     18.7089     31.14  . Q       .         .         .         .
        12.42     19.9662     36.77  . Q       .         .         .         .
        12.86     21.5157     46.93  .  Q      .         .         .         .
        13.31     23.2953     49.20  .  Q      .         .         .         .
        13.76     25.2224     54.90  .   Q     .         .         .         .
        14.21     27.3230     58.58  .   Q     .         .         .         .
        14.66     29.6665     68.01  .    Q    .         .         .         .
        15.10     32.3249     75.59  .     Q   .         .         .         .
        15.55     35.7192    107.76  .       Q .         .         .         .
        16.00     40.2639    137.74  .         .Q        .         .         .
        16.45     51.9308    492.48  .         .         .         .        Q.
        16.90     62.6990     89.20  .      Q  .         .         .         .
        17.34     65.5079     62.53  .    Q    .         .         .         .
        17.79     67.6249     51.82  .   Q     .         .         .         .
        18.24     69.4163     44.95  .  Q      .         .         .         .
        18.69     70.8010     29.85  . Q       .         .         .         .
        19.14     71.8473     26.67  . Q       .         .         .         .
        19.58     72.7898     24.24  .Q        .         .         .         .
        20.03     73.6515     22.31  .Q        .         .         .         .
        20.48     74.4482     20.73  .Q        .         .         .         .
        20.93     75.1913     19.41  .Q        .         .         .         .
        21.38     75.8890     18.28  .Q        .         .         .         .
        21.82     76.5480     17.31  .Q        .         .         .         .
        22.27     77.1733     16.47  .Q        .         .         .         .
        22.72     77.7691     15.72  .Q        .         .         .         .
        23.17     78.3386     15.05  .Q        .         .         .         .
        23.62     78.8847     14.45  .Q        .         .         .         .
        24.06     79.4097     13.91  .Q        .         .         .         .
        24.51     79.6672      0.00  Q         .         .         .         .
       -----------------------------------------------------------------------------
```

Drainage B

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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  127.90
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.180
    TIME OF CONCENTRATION(MIN.) = 30.94
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    36.77
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    11.08

****************************************************************************
  TIME     VOLUME       Q    0.        47.5      95.0     142.5     190.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.01      0.0000      0.00  Q         .         .         .         .
  0.53      0.1376      6.46  .Q        .         .         .         .
  1.05      0.4161      6.62  .Q        .         .         .         .
  1.56      0.7002      6.71  .Q        .         .         .         .
  2.08      0.9907      6.92  .Q        .         .         .         .
  2.59      1.2878      7.03  .Q        .         .         .         .
  3.11      1.5922      7.26  .Q        .         .         .         .
  3.62      1.9040      7.38  .Q        .         .         .         .
  4.14      2.2240      7.64  .Q        .         .         .         .
  4.66      2.5526      7.78  .Q        .         .         .         .
  5.17      2.8906      8.08  .Q        .         .         .         .
  5.69      3.2385      8.24  .Q        .         .         .         .
  6.20      3.5973      8.59  .Q        .         .         .         .
  6.72      3.9676      8.79  .Q        .         .         .         .
  7.23      4.3509      9.20  .Q        .         .         .         .
  7.75      4.7479      9.43  .Q        .         .         .         .
  8.27      5.1605      9.93  . Q       .         .         .         .
  8.78      5.5897     10.21  . Q       .         .         .         .
  9.30      6.0381     10.83  . Q       .         .         .         .
```

```
  9.81      6.5072     11.18  . Q       .         .         .         .
 10.33      7.0008     11.98  . Q       .         .         .         .
 10.84      7.5211     12.44  . Q       .         .         .         .
 11.36      8.0738     13.50  . Q       .         .         .         .
 11.87      8.6626     14.13  . Q       .         .         .         .
 12.39      9.3656     18.86  .  Q      .         .         .         .
 12.91     10.2296     21.69  .   Q     .         .         .         .
 13.42     11.2074     24.20  .    Q    .         .         .         .
 13.94     12.2733     25.82  .    Q    .         .         .         .
 14.45     13.4633     30.02  .     Q   .         .         .         .
 14.97     14.8211     33.70  .      Q  .         .         .         .
 15.48     16.5736     48.55  .         Q         .         .         .
 16.00     18.8221     56.97  .         .Q        .         .         .
 16.52     24.0787    189.73  .         .         .         .        Q.
 17.03     28.9624     39.46  .       Q .         .         .         .
 17.55     30.3960     27.81  .    Q    .         .         .         .
 18.06     31.4754     22.84  .   Q     .         .         .         .
 18.58     32.2784     14.84  .  Q      .         .         .         .
 19.09     32.8704     12.94  . Q       .         .         .         .
 19.61     33.3925     11.56  . Q       .         .         .         .
 20.13     33.8629     10.51  . Q       .         .         .         .
 20.64     34.2930      9.67  . Q       .         .         .         .
 21.16     34.6906      8.99  .Q        .         .         .         .
 21.67     35.0614      8.41  .Q        .         .         .         .
 22.19     35.4096      7.93  .Q        .         .         .         .
 22.70     35.7385      7.51  .Q        .         .         .         .
 23.22     36.0505      7.14  .Q        .         .         .         .
 23.73     36.3478      6.81  .Q        .         .         .         .
 24.25     36.6321      6.52  .Q        .         .         .         .
 24.77     36.7711      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage C

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****************************************************************************
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 Problem Descriptions:




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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  104.40
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) = 15.18
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    27.23
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    11.83

****************************************************************************
  TIME     VOLUME       Q    0.       57.5     115.0     172.5     230.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.06      0.0000      0.00  Q         .         .         .         .
  0.31      0.0497      4.75  Q         .         .         .         .
  0.57      0.1497      4.81  Q         .         .         .         .
  0.82      0.2507      4.85  Q         .         .         .         .
  1.07      0.3528      4.92  Q         .         .         .         .
  1.33      0.4559      4.95  Q         .         .         .         .
  1.58      0.5602      5.02  Q         .         .         .         .
  1.83      0.6656      5.06  Q         .         .         .         .
  2.08      0.7723      5.14  Q         .         .         .         .
  2.34      0.8801      5.18  Q         .         .         .         .
  2.59      0.9892      5.26  Q         .         .         .         .
  2.84      1.0996      5.30  Q         .         .         .         .
  3.10      1.2114      5.39  Q         .         .         .         .
  3.35      1.3245      5.43  Q         .         .         .         .
  3.60      1.4390      5.52  Q         .         .         .         .
  3.86      1.5550      5.57  Q         .         .         .         .
  4.11      1.6726      5.67  Q         .         .         .         .
  4.36      1.7917      5.72  Q         .         .         .         .
  4.61      1.9124      5.83  .Q        .         .         .         .
```

```
 4.87      2.0348      5.88  .Q        .         .         .         .
 5.12      2.1590      6.00  .Q        .         .         .         .
 5.37      2.2850      6.05  .Q        .         .         .         .
 5.63      2.4129      6.18  .Q        .         .         .         .
 5.88      2.5427      6.24  .Q        .         .         .         .
 6.13      2.6745      6.37  .Q        .         .         .         .
 6.39      2.8085      6.44  .Q        .         .         .         .
 6.64      2.9447      6.59  .Q        .         .         .         .
 6.89      3.0832      6.66  .Q        .         .         .         .
 7.14      3.2242      6.82  .Q        .         .         .         .
 7.40      3.3676      6.90  .Q        .         .         .         .
 7.65      3.5137      7.07  .Q        .         .         .         .
 7.90      3.6626      7.16  .Q        .         .         .         .
 8.16      3.8143      7.35  .Q        .         .         .         .
 8.41      3.9692      7.45  .Q        .         .         .         .
 8.66      4.1273      7.67  .Q        .         .         .         .
 8.92      4.2887      7.78  .Q        .         .         .         .
 9.17      4.4538      8.01  .Q        .         .         .         .
 9.42      4.6227      8.14  .Q        .         .         .         .
 9.68      4.7957      8.41  .Q        .         .         .         .
 9.93      4.9729      8.55  .Q        .         .         .         .
10.18      5.1548      8.85  .Q        .         .         .         .
10.43      5.3415      9.01  .Q        .         .         .         .
10.69      5.5336      9.36  .Q        .         .         .         .
10.94      5.7313      9.55  .Q        .         .         .         .
11.19      5.9353      9.96  .Q        .         .         .         .
11.45      6.1458     10.18  .Q        .         .         .         .
11.70      6.3636     10.66  .Q        .         .         .         .
11.95      6.5892     10.92  .Q        .         .         .         .
12.20      6.8515     14.16  . Q       .         .         .         .
12.46      7.1623     15.56  . Q       .         .         .         .
12.71      7.4957     16.33  . Q       .         .         .         .
12.96      7.8417     16.76  . Q       .         .         .         .
13.22      8.2023     17.73  .  Q      .         .         .         .
13.47      8.5786     18.28  .  Q      .         .         .         .
13.72      8.9740     19.54  .  Q      .         .         .         .
13.98      9.3903     20.28  .  Q      .         .         .         .
14.23      9.8301     21.79  .  Q      .         .         .         .
14.48     10.2965     22.82  .  Q      .         .         .         .
14.73     10.8016     25.49  .   Q     .         .         .         .
14.99     11.3527     27.22  .   Q     .         .         .         .
15.24     11.9723     32.05  .    Q    .         .         .         .
15.49     12.6927     36.86  .     Q   .         .         .         .
15.75     13.5619     46.28  .       Q .         .         .         .
16.00     14.8082     72.92  .         . Q       .         .         .
16.25     17.9666    229.18  .         .         .         .        Q.
16.51     20.7392     36.03  .     Q   .         .         .         .
16.76     21.4227     29.35  .    Q    .         .         .         .
17.01     21.9810     24.05  .   Q     .         .         .         .
17.27     22.4530     21.10  .  Q      .         .         .         .
17.52     22.8710     18.88  .  Q      .         .         .         .
17.77     23.2484     17.22  . Q       .         .         .         .
18.02     23.5951     15.93  . Q       .         .         .         .
18.28     23.8788     11.20  .Q        .         .         .         .
18.53     24.1048     10.41  .Q        .         .         .         .
18.78     24.3155      9.75  .Q        .         .         .         .
19.04     24.5134      9.18  .Q        .         .         .         .
19.29     24.7003      8.70  .Q        .         .         .         .
19.54     24.8777      8.27  .Q        .         .         .         .
19.80     25.0467      7.89  .Q        .         .         .         .
20.05     25.2082      7.56  .Q        .         .         .         .
20.30     25.3631      7.26  .Q        .         .         .         .
20.55     25.5120      6.99  .Q        .         .         .         .
20.81     25.6555      6.74  .Q        .         .         .         .
21.06     25.7941      6.51  .Q        .         .         .         .
21.31     25.9281      6.31  .Q        .         .         .         .
21.57     26.0580      6.12  .Q        .         .         .         .
```

```
 21.82     26.1840      5.94  .Q         .         .         .         .
 22.07     26.3064      5.77  .Q         .         .         .         .
 22.33     26.4255      5.62  Q          .         .         .         .
 22.58     26.5416      5.48  Q          .         .         .         .
 22.83     26.6547      5.34  Q          .         .         .         .
 23.08     26.7651      5.22  Q          .         .         .         .
 23.34     26.8730      5.10  Q          .         .         .         .
 23.59     26.9784      4.99  Q          .         .         .         .
 23.84     27.0816      4.88  Q          .         .         .         .
 24.10     27.1826      4.78  Q          .         .         .         .
 24.35     27.2326      0.00  Q          .         .         .         .
----------------------------------------------------------------------------
```

iv. HC 10-Year Storm Event

Drainage A

****

SMALL AREA UNIT HYDROGRAPH MODEL

==

Ver. 14.0 Release Date: 06/01/2007 License ID 1355

Analysis prepared by:

****

Problem Descriptions:

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 316.00
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.120
LOW LOSS FRACTION = 0.330
TIME OF CONCENTRATION(MIN.) = 28.16
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 10
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.34
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.72
1-HOUR   POINT RAINFALL VALUE(INCHES) = 0.95
3-HOUR   POINT RAINFALL VALUE(INCHES) = 1.59
6-HOUR   POINT RAINFALL VALUE(INCHES) = 2.20
24-HOUR   POINT RAINFALL VALUE(INCHES) = 3.68

TOTAL CATCHMENT   RUNOFF VOLUME(ACRE-FEET) =   62.99
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =   33.91

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	100.0	200.0	300.0	400.0
0.04	0.0000	0.00	Q	.	.	.	.
0.51	0.2119	10.93	.Q	.	.	.	.
0.98	0.6385	11.07	.Q	.	.	.	.
1.45	1.0734	11.36	.Q	.	.	.	.
1.92	1.5169	11.51	.Q	.	.	.	.
2.39	1.9697	11.83	.Q	.	.	.	.
2.86	2.4320	12.00	.Q	.	.	.	.
3.33	2.9046	12.36	.Q	.	.	.	.
3.80	3.3879	12.56	.Q	.	.	.	.
4.27	3.8827	12.96	.Q	.	.	.	.
4.74	4.3897	13.18	.Q	.	.	.	.
5.21	4.9098	13.64	.Q	.	.	.	.
5.67	5.4437	13.89	.Q	.	.	.	.
6.14	5.9927	14.42	.Q	.	.	.	.
6.61	6.5575	14.71	.Q	.	.	.	.
7.08	7.1400	15.32	.Q	.	.	.	.
7.55	7.7409	15.66	.Q	.	.	.	.
8.02	8.3626	16.39	.Q	.	.	.	.
8.49	9.0063	16.80	.Q	.	.	.	.

```
  8.96      9.6749     17.68  .Q        .         .         .         .
  9.43     10.3703     18.17  .Q        .         .         .         .
  9.90     11.0964     19.27  .Q        .         .         .         .
 10.37     11.8557     19.88  .Q        .         .         .         .
 10.84     12.6541     21.28  . Q       .         .         .         .
 11.31     13.4953     22.09  . Q       .         .         .         .
 11.78     14.3883     23.96  . Q       .         .         .         .
 12.25     15.3390     25.06  . Q       .         .         .         .
 12.71     16.4967     34.63  .  Q      .         .         .         .
 13.18     17.8734     36.35  .  Q      .         .         .         .
 13.65     19.3674     40.68  .   Q     .         .         .         .
 14.12     20.9996     43.48  .   Q     .         .         .         .
 14.59     22.8386     51.34  .    Q    .         .         .         .
 15.06     24.9424     57.14  .    Q    .         .         .         .
 15.53     27.6104     80.42  .       Q .         .         .         .
 16.00     31.1534    102.27  .         Q         .         .         .
 16.47     40.7151    390.76  .         .         .         .        Q.
 16.94     49.5613     65.38  .     Q   .         .         .         .
 17.41     51.7396     46.94  .   Q     .         .         .         .
 17.88     53.3936     38.34  .  Q      .         .         .         .
 18.35     54.7513     31.66  .  Q      .         .         .         .
 18.82     55.8110     22.97  . Q       .         .         .         .
 19.29     56.6551     20.55  . Q       .         .         .         .
 19.75     57.4164     18.70  .Q        .         .         .         .
 20.22     58.1131     17.22  .Q        .         .         .         .
 20.69     58.7577     16.02  .Q        .         .         .         .
 21.16     59.3594     15.01  .Q        .         .         .         .
 21.63     59.9248     14.15  .Q        .         .         .         .
 22.10     60.4592     13.40  .Q        .         .         .         .
 22.57     60.9665     12.75  .Q        .         .         .         .
 23.04     61.4501     12.18  .Q        .         .         .         .
 23.51     61.9126     11.67  .Q        .         .         .         .
 23.98     62.3563     11.21  .Q        .         .         .         .
 24.45     62.7842     10.85  .Q        .         .         .         .
 24.92     62.9946      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage B

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:





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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  127.90
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.210
    TIME OF CONCENTRATION(MIN.) = 32.10
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    29.17
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    10.05

****************************************************************************
  TIME     VOLUME       Q    0.       40.0      80.0     120.0     160.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.49      0.1043      5.21  .Q        .         .         .         .
  1.02      0.3361      5.28  .Q        .         .         .         .
  1.56      0.5728      5.43  .Q        .         .         .         .
  2.09      0.8150      5.52  .Q        .         .         .         .
  2.63      1.0629      5.70  .Q        .         .         .         .
  3.16      1.3169      5.79  .Q        .         .         .         .
  3.70      1.5775      6.00  .Q        .         .         .         .
  4.23      1.8450      6.10  .Q        .         .         .         .
  4.77      2.1200      6.34  .Q        .         .         .         .
  5.30      2.4030      6.46  .Q        .         .         .         .
  5.84      2.6948      6.74  .Q        .         .         .         .
  6.37      2.9959      6.88  .Q        .         .         .         .
  6.91      3.3073      7.21  .Q        .         .         .         .
  7.44      3.6298      7.38  .Q        .         .         .         .
  7.98      3.9648      7.77  .Q        .         .         .         .
  8.51      4.3132      7.99  .Q        .         .         .         .
  9.05      4.6770      8.47  . Q       .         .         .         .
  9.58      5.0574      8.74  . Q       .         .         .         .
 10.12      5.4574      9.35  . Q       .         .         .         .
```

```
 10.65      5.8788      9.71  . Q       .         .         .         .
 11.19      6.3262     10.53  . Q       .         .         .         .
 11.72      6.8025     11.01  . Q       .         .         .         .
 12.26      7.3308     12.88  .  Q      .         .         .         .
 12.79      7.9734     16.18  .   Q     .         .         .         .
 13.32      8.7315     18.11  .   Q     .         .         .         .
 13.86      9.5597     19.36  .   Q     .         .         .         .
 14.40     10.4928     22.85  .    Q    .         .         .         .
 14.93     11.5603     25.44  .     Q   .         .         .         .
 15.47     12.9464     37.26  .        Q.         .         .         .
 16.00     14.7633     44.92  .         .Q        .         .         .
 16.53     19.1223    152.26  .         .         .         .       Q .
 17.07     23.1500     29.93  .      Q  .         .         .         .
 17.61     24.2736     20.89  .    Q    .         .         .         .
 18.14     25.1128     17.07  .   Q     .         .         .         .
 18.67     25.7457     11.56  . Q       .         .         .         .
 19.21     26.2245     10.10  . Q       .         .         .         .
 19.74     26.6474      9.03  . Q       .         .         .         .
 20.28     27.0288      8.22  . Q       .         .         .         .
 20.82     27.3779      7.57  .Q        .         .         .         .
 21.35     27.7009      7.04  .Q        .         .         .         .
 21.89     28.0023      6.60  .Q        .         .         .         .
 22.42     28.2856      6.22  .Q        .         .         .         .
 22.95     28.5533      5.89  .Q        .         .         .         .
 23.49     28.8075      5.61  .Q        .         .         .         .
 24.02     29.0497      5.35  .Q        .         .         .         .
 24.56     29.1681      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
```

Drainage C

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:




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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  104.40
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.300
    TIME OF CONCENTRATION(MIN.) = 15.44
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    21.35
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    10.66

****************************************************************************
  TIME     VOLUME        Q    0.       47.5      95.0     142.5     190.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.05      0.0000      0.00  Q         .         .         .         .
  0.30      0.0400      3.76  Q         .         .         .         .
  0.56      0.1203      3.79  Q         .         .         .         .
  0.82      0.2014      3.84  Q         .         .         .         .
  1.07      0.2834      3.87  Q         .         .         .         .
  1.33      0.3662      3.92  Q         .         .         .         .
  1.59      0.4500      3.95  Q         .         .         .         .
  1.85      0.5347      4.01  Q         .         .         .         .
  2.10      0.6203      4.04  Q         .         .         .         .
  2.36      0.7070      4.11  Q         .         .         .         .
  2.62      0.7947      4.14  Q         .         .         .         .
  2.88      0.8834      4.20  Q         .         .         .         .
  3.13      0.9732      4.24  Q         .         .         .         .
  3.39      1.0641      4.31  Q         .         .         .         .
  3.65      1.1561      4.35  Q         .         .         .         .
  3.91      1.2494      4.42  Q         .         .         .         .
  4.16      1.3439      4.46  Q         .         .         .         .
  4.42      1.4397      4.54  Q         .         .         .         .
  4.68      1.5368      4.59  Q         .         .         .         .
```

```
 4.93      1.6352      4.67  Q         .         .         .         .
 5.19      1.7351      4.72  Q         .         .         .         .
 5.45      1.8365      4.81  .Q        .         .         .         .
 5.71      1.9394      4.86  .Q        .         .         .         .
 5.96      2.0439      4.97  .Q        .         .         .         .
 6.22      2.1501      5.02  .Q        .         .         .         .
 6.48      2.2580      5.13  .Q        .         .         .         .
 6.74      2.3677      5.19  .Q        .         .         .         .
 6.99      2.4793      5.31  .Q        .         .         .         .
 7.25      2.5928      5.37  .Q        .         .         .         .
 7.51      2.7085      5.50  .Q        .         .         .         .
 7.77      2.8263      5.57  .Q        .         .         .         .
 8.02      2.9464      5.72  .Q        .         .         .         .
 8.28      3.0689      5.80  .Q        .         .         .         .
 8.54      3.1939      5.96  .Q        .         .         .         .
 8.79      3.3216      6.05  .Q        .         .         .         .
 9.05      3.4521      6.23  .Q        .         .         .         .
 9.31      3.5856      6.32  .Q        .         .         .         .
 9.57      3.7223      6.53  .Q        .         .         .         .
 9.82      3.8623      6.64  .Q        .         .         .         .
10.08      4.0059      6.87  .Q        .         .         .         .
10.34      4.1534      7.00  .Q        .         .         .         .
10.60      4.3050      7.26  .Q        .         .         .         .
10.85      4.4610      7.41  .Q        .         .         .         .
11.11      4.6218      7.72  .Q        .         .         .         .
11.37      4.7878      7.89  .Q        .         .         .         .
11.63      4.9595      8.26  .Q        .         .         .         .
11.88      5.1373      8.46  .Q        .         .         .         .
12.14      5.3298      9.65  . Q       .         .         .         .
12.40      5.5549     11.51  . Q       .         .         .         .
12.65      5.8060     12.10  . Q       .         .         .         .
12.91      6.0668     12.42  . Q       .         .         .         .
13.17      6.3388     13.16  . Q       .         .         .         .
13.43      6.6232     13.58  . Q       .         .         .         .
13.68      6.9222     14.55  .  Q      .         .         .         .
13.94      7.2376     15.11  .  Q      .         .         .         .
14.20      7.5733     16.46  .  Q      .         .         .         .
14.46      7.9321     17.28  .  Q      .         .         .         .
14.71      8.3215     19.34  .   Q     .         .         .         .
14.97      8.7469     20.67  .   Q     .         .         .         .
15.23      9.2259     24.38  .    Q    .         .         .         .
15.49      9.7776     27.50  .    Q    .         .         .         .
15.74     10.4480     35.54  .      Q  .         .         .         .
16.00     11.4174     55.62  .         .Q        .         .         .
16.26     14.0056    187.78  .         .         .         .        Q.
16.51     16.2955     27.56  .    Q    .         .         .         .
16.77     16.8258     22.31  .   Q     .         .         .         .
17.03     17.2568     18.23  .  Q      .         .         .         .
17.29     17.6180     15.74  .  Q      .         .         .         .
17.54     17.9346     14.04  . Q       .         .         .         .
17.80     18.2198     12.78  . Q       .         .         .         .
18.06     18.4811     11.80  . Q       .         .         .         .
18.32     18.6988      8.68  .Q        .         .         .         .
18.57     18.8768      8.07  .Q        .         .         .         .
18.83     19.0430      7.56  .Q        .         .         .         .
19.09     19.1991      7.13  .Q        .         .         .         .
19.35     19.3467      6.75  .Q        .         .         .         .
19.60     19.4868      6.42  .Q        .         .         .         .
19.86     19.6204      6.14  .Q        .         .         .         .
20.12     19.7481      5.88  .Q        .         .         .         .
20.37     19.8707      5.65  .Q        .         .         .         .
20.63     19.9885      5.44  .Q        .         .         .         .
20.89     20.1021      5.25  .Q        .         .         .         .
21.15     20.2119      5.07  .Q        .         .         .         .
21.40     20.3181      4.91  .Q        .         .         .         .
21.66     20.4210      4.77  .Q        .         .         .         .
21.92     20.5209      4.63  Q         .         .         .         .
```

```
 22.18     20.6180      4.50  Q         .         .         .         .
 22.43     20.7125      4.38  Q         .         .         .         .
 22.69     20.8046      4.27  Q         .         .         .         .
 22.95     20.8944      4.17  Q         .         .         .         .
 23.21     20.9821      4.07  Q         .         .         .         .
 23.46     21.0677      3.98  Q         .         .         .         .
 23.72     21.1515      3.90  Q         .         .         .         .
 23.98     21.2335      3.81  Q         .         .         .         .
 24.23     21.3139      3.75  Q         .         .         .         .
 24.49     21.3537      0.00  Q         .         .         .         .
-----------------------------------------------------------------------
```

b) Expected Value (50% Confidence) Events (

i. Infiltration Analysis

INFILTRATION RATE CALCULATION SUMMARY

PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR EXPECTED VALUE EVENT

Proposed Condition			
Node	**A**	**B**	**C**
Total Area (ac)	315.98	127.93	104.35
Y	0.70	0.82	0.74
Ybar	0.30	0.18	0.26
Average a_p	0.47	0.32	0.61
Total Fm (in/hr)	0.14	0.10	0.18

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 315.98

Y = 0.70

Ybar = 1 - Y = **0.30**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.47

Total Fm (in/hr) = **0.14**

Offsite Area																	
									Low Loss Rate, Ybar				Max. Loss Rate, F_m				
No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.00	0.000	0.10	0.30	0.03	0.001
					Impervious	6.81	0.022	98	0.20	0.04	0.95	0.020				
2	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.45	0.000	0.10	0.30	0.03	0.000
					Impervious	2.39	0.008	98	0.20	0.04	0.95	0.007				
3	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.029	32	21.25	4.25	0.00	0.000	0.20	0.30	0.06	0.009
					Impervious	36.22	0.115	98	0.20	0.04	0.95	0.109				
4	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.020	56	7.86	1.57	0.18	0.004	0.20	0.30	0.06	0.006
					Impervious	25.47	0.081	98	0.20	0.04	0.95	0.076				
5	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.017	75	3.33	0.67	0.45	0.008	0.20	0.30	0.06	0.005
					Impervious	21.21	0.067	98	0.20	0.04	0.95	0.064				
6	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.010	75	3.33	0.67	0.45	0.005	0.10	0.30	0.03	0.003
					Impervious	28.72	0.091	98	0.20	0.04	0.95	0.086				
7	Oil Operations	100%	4.70	D	Pervious	4.70	0.015	93	0.75	0.15	0.82	0.012	1.00	0.30	0.30	0.004
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
8	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.053	46	11.74	2.35	0.07	0.004	1.00	0.30	0.30	0.016
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
9	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.51	0.001	0.10	0.30	0.03	0.001
					Impervious	5.90	0.019	98	0.20	0.04	0.95	0.018				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA A

Onsite Area																	
No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m			
									S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	15.02	D	Pervious	1.50	0.005	75	3.33	0.67	0.45	0.002	0.10	0.30	0.03	0.001
					Impervious	13.52	0.043	98	0.20	0.04	0.95	0.041				
2	Single Family Residential (Condominiums)	35%	4.22	B	Pervious	1.48	0.005	56	7.86	1.57	0.18	0.001	0.35	0.30	0.11	0.001
					Impervious	2.74	0.009	98	0.20	0.04	0.95	0.008				
3	Single Family Residential (Condominiums)	35%	34.29	D	Pervious	12.00	0.038	75	3.33	0.67	0.45	0.017	0.35	0.30	0.11	0.011
					Impervious	22.29	0.071	98	0.20	0.04	0.95	0.067				
4	Public Park	85%	12.22	B	Pervious	10.39	0.033	56	7.86	1.57	0.18	0.006	0.85	0.30	0.26	0.010
					Impervious	1.83	0.006	98	0.20	0.04	0.95	0.005				
5	Public Park	85%	10.74	D	Pervious	9.13	0.029	75	3.33	0.67	0.45	0.013	0.85	0.30	0.26	0.009
					Impervious	1.61	0.005	98	0.20	0.04	0.95	0.005				
6	Oil Operations	100%	4.78	A	Pervious	4.78	0.015	78	2.82	0.56	0.51	0.008	1.00	0.30	0.30	0.005
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
7	Open Space / Habitat Area	100%	61.07	D	Pervious	61.07	0.193	83	2.05	0.41	0.61	0.117	1.00	0.30	0.30	0.058
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
		Total Area =	**315.98**								Y =	**0.70**			Total F_m =	**0.14**
											Ybar = 1 - Y =	**0.30**				

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
100-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + \ldots + Y_mA_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 127.93

Y = 0.82

Ybar = 1 - Y = **0.18**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.32

Total Fm (in/hr) = **0.10**

Offsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.45	0.002	0.10	0.30	0.03	0.001
					Impervious	4.82	0.038	98	0.20	0.04	0.95	0.036				
2	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.45	0.004	0.20	0.30	0.06	0.003
					Impervious	4.75	0.037	98	0.20	0.04	0.95	0.035				
3	Commercial / Industrial	10%	78.14	D	Pervious	7.81	0.061	75	3.33	0.67	0.45	0.028	0.10	0.30	0.03	0.018
					Impervious	70.33	0.550	98	0.20	0.04	0.95	0.521				
4	School	60%	9.91	D	Pervious	5.95	0.046	75	3.33	0.67	0.45	0.021	0.60	0.30	0.18	0.014
					Impervious	3.96	0.031	98	0.20	0.04	0.95	0.029				

Onsite Area

No.	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Single Family Residential (Condominiums)	35%	4.43	D	Pervious	1.55	0.012	75	3.33	0.67	0.45	0.006	0.35	0.30	0.11	0.004
					Impervious	2.88	0.023	98	0.20	0.04	0.95	0.021				
2	Open Space / Habitat Area	100%	24.16	D	Pervious	24.16	0.189	83	2.05	0.41	0.61	0.114	1.00	0.30	0.30	0.057
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				

Total Area = **127.93**

Y = **0.82**

Ybar = 1 - Y = **0.18**

Total F_m = **0.10**

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

100-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 25-Year Storm Event for Non-Mountainous Area (in) = 4.49

P24, 25-Year Storm Event for Mountainous Area (in) = 8.76

Total Area (ac) = 104.35

Y = 0.74

Ybar = 1 - Y = **0.26**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.61

Total Fm (in/hr) = **0.18**

Offsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Commercial / Industrial	10%	1.95	D	Pervious	0.20	0.002	75	3.33	0.67	0.45	0.001	0.10	0.30	0.03	0.001
					Impervious	1.76	0.017	98	0.20	0.04	0.95	0.016				
2	Oil Operations	100%	6.26	D	Pervious	6.26	0.060	93	0.75	0.15	0.82	0.049	1.00	0.30	0.30	0.018
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				

Onsite Area

No.	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)
1	Urban Cover - Roadway	10%	11.35	D	Pervious	1.14	0.011	75	3.33	0.67	0.45	0.005	0.10	0.30	0.03	0.003
					Impervious	10.22	0.098	98	0.20	0.04	0.95	0.093				
2	Single Family Residential (Condominiums)	35%	41.68	D	Pervious	14.59	0.140	75	3.33	0.67	0.45	0.064	0.35	0.30	0.11	0.042
					Impervious	27.09	0.260	98	0.20	0.04	0.95	0.246				
3	Public Park	85%	9.61	D	Pervious	8.17	0.078	75	3.33	0.67	0.45	0.036	0.85	0.30	0.26	0.023
					Impervious	1.44	0.014	98	0.20	0.04	0.95	0.013				
4	Oil Operations	100%	9.76	D	Pervious	9.76	0.094	93	0.75	0.15	0.82	0.077	1.00	0.30	0.30	0.028
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
5	Open Space / Habitat Area	100%	23.74	D	Pervious	23.74	0.228	83	2.05	0.41	0.61	0.138	1.00	0.30	0.30	0.068
					Impervious	0.00	0.000	98	0.20	0.04	0.95	0.000				
		Total Area =	**104.35**								Y =	**0.74**			Total F_m =	**0.18**
											Ybar = 1 - Y =	**0.26**				

INFILTRATION RATE CALCULATION SUMMARY
PROPOSED NEWPORT BANNING RANCH PROJECT
2-YEAR EXPECTED VALUE EVENT

Proposed Condition			
Node	**A**	**B**	**C**
Total Area (ac)	315.98	127.93	104.35
Y	0.53	0.63	0.49
Ybar	0.47	0.37	0.51
Average a_p	0.47	0.32	0.61
Total Fm (in/hr)	0.28	0.19	0.37

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

2-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA A

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + ... + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1A_1 + Y_2A_2 + ... + Y_mA_m}{A_1 + A_2 + ... + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 315.98

Y = 0.53

Ybar = 1 - Y = **0.47**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.47

Total Fm (in/hr) = **0.28**

Offsite Area										Low Loss Rate, Ybar				Max. Loss Rate, F_m				
No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Urban Cover - Roadway	10%	7.57	A	Pervious	0.76	0.002	32	21.25	4.25	0.30	0.001	0.10	0.60	0.06	0.001	0.002
						Impervious	6.81	0.022	98	0.20	0.04	0.85	0.018					
2	9	Urban Cover - Roadway	10%	2.65	D	Pervious	0.27	0.001	75	3.33	0.67	0.10	0.000	0.10	0.60	0.06	0.001	0.001
						Impervious	2.39	0.008	98	0.20	0.04	0.85	0.006					
3	9	Single Family Residential (>10 dwellings/acre)	20%	45.27	A	Pervious	9.05	0.029	32	21.25	4.25	0.30	0.009	0.20	0.60	0.12	0.017	0.029
						Impervious	36.22	0.115	98	0.20	0.04	0.85	0.097					
4	9	Single Family Residential (>10 dwellings/acre)	20%	31.84	B	Pervious	6.37	0.020	56	7.86	1.57	0.00	0.000	0.20	0.60	0.12	0.012	0.020
						Impervious	25.47	0.081	98	0.20	0.04	0.85	0.068					
5	9	Single Family Residential (>10 dwellings/acre)	20%	26.51	D	Pervious	5.30	0.017	75	3.33	0.67	0.10	0.002	0.20	0.60	0.12	0.010	0.017
						Impervious	21.21	0.067	98	0.20	0.04	0.85	0.057					
6	9	Commercial / Industrial	10%	31.91	D	Pervious	3.19	0.010	75	3.33	0.67	0.10	0.001	0.10	0.60	0.06	0.006	0.010
						Impervious	28.72	0.091	98	0.20	0.04	0.85	0.077					
7	1	Oil Operations	100%	4.70	D	Pervious	4.70	0.015	93	0.75	0.15	0.56	0.008	1.00	0.60	0.60	0.009	0.015
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
8	6	Open Space / Habitat Area	100%	16.64	A	Pervious	16.64	0.053	46	11.74	2.35	0.05	0.003	1.00	0.60	0.60	0.032	0.053
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
9	1	Oxbow Loop Channel	10%	6.55	A	Pervious	0.66	0.002	78	2.82	0.56	0.14	0.000	0.10	0.60	0.06	0.001	0.002
						Impervious	5.90	0.019	98	0.20	0.04	0.85	0.016					

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT
2-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA A

Onsite Area																				
No.	Infil. Class	Land Use	Pervious-ness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar				Max. Loss Rate, F_m				
										S	I_a	Y_j	Y_j*A_j	a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Urban Cover - Roadway	10%	15.02	D	Pervious	1.50	0.005	75	3.33	0.67	0.10	0.000	0.10	0.60	0.06	0.003	0.005
						Impervious	13.52	0.043	98	0.20	0.04	0.85	0.036					
2	9	Single Family Residential (Condominium)	35%	4.22	B	Pervious	1.48	0.005	56	7.86	1.57	0.00	0.000	0.35	0.60	0.21	0.003	0.005
						Impervious	2.74	0.009	98	0.20	0.04	0.85	0.007					
3	9	Single Family Residential (Condominium)	35%	34.29	D	Pervious	12.00	0.038	75	3.33	0.67	0.10	0.004	0.35	0.60	0.21	0.023	0.038
						Impervious	22.29	0.071	98	0.20	0.04	0.85	0.060					
4	9	Public Park	85%	12.22	B	Pervious	10.39	0.033	56	7.86	1.57	0.00	0.000	0.85	0.60	0.51	0.020	0.033
						Impervious	1.83	0.006	98	0.20	0.04	0.85	0.005					
5	9	Public Park	85%	10.74	D	Pervious	9.13	0.029	75	3.33	0.67	0.10	0.003	0.85	0.60	0.51	0.017	0.029
						Impervious	1.61	0.005	98	0.20	0.04	0.85	0.004					
6	1	Oil Operations	100%	4.78	A	Pervious	4.78	0.015	78	2.82	0.56	0.14	0.002	1.00	0.60	0.60	0.009	0.015
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
7	6	Open Space / Habitat Area	100%	61.07	D	Pervious	61.07	0.193	83	2.05	0.41	0.24	0.046	1.00	0.60	0.60	0.116	0.193
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
			Total Area =	**315.98**								Y =	**0.53**				Total F_m = **0.28**	**0.47**
												Ybar = 1 - Y =	**0.47**					

INFILTRATION RATE CALCULATION SPREADSHEET
PROPOSED NEWPORT BANNING RANCH PROJECT
2-YEAR EXPECTED VALUE EVENT
Single Area Unit Hydrograph Designation: DRAINAGE AREA B

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m}$$

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

$$Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j$$

$$F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 127.93

Y = 0.63

Ybar = 1 - Y = **0.37**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.32

Total Fm (in/hr) = **0.19**

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
Offsite Area																		
1	9	Urban Cover - Roadway	10%	5.35	D	Pervious	0.54	0.004	75	3.33	0.67	0.10	0.000	0.10	0.60	0.06	0.003	0.004
						Impervious	4.82	0.038	98	0.20	0.04	0.85	0.032					
2	9	Single Family Residential (>10 dwellings/acre)	20%	5.94	D	Pervious	1.19	0.009	75	3.33	0.67	0.10	0.001	0.20	0.60	0.12	0.006	0.009
						Impervious	4.75	0.037	98	0.20	0.04	0.85	0.031					
3	9	Commercial / Industrial	10%	78.14	D	Pervious	7.81	0.061	75	3.33	0.67	0.10	0.006	0.10	0.60	0.06	0.037	0.061
						Impervious	70.33	0.550	98	0.20	0.04	0.85	0.466					
4	9	School	60%	9.91	D	Pervious	5.95	0.046	75	3.33	0.67	0.10	0.005	0.60	0.60	0.36	0.028	0.046
						Impervious	3.96	0.031	98	0.20	0.04	0.85	0.026					
Onsite Area																		
No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
1	9	Single Family Residential (Condominium)	35%	4.43	D	Pervious	1.55	0.012	75	3.33	0.67	0.10	0.001	0.35	0.60	0.21	0.007	0.012
						Impervious	2.88	0.023	98	0.20	0.04	0.85	0.019					
2	6	Open Space / Habitat Area	100%	24.16	D	Pervious	24.16	0.189	83	2.05	0.41	0.24	0.045	1.00	0.60	0.60	0.113	0.189
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
			Total Area =	**127.93**								Y =	**0.63**			Total F_m =	**0.19**	**0.32**
												Ybar = 1 - Y =	**0.37**					

INFILTRATION RATE CALCULATION SPREADSHEET

PROPOSED NEWPORT BANNING RANCH PROJECT

2-YEAR EXPECTED VALUE EVENT

Single Area Unit Hydrograph Designation: DRAINAGE AREA C

1) Loss Rate Calculation - Area-Averaged Low Loss Rate Fraction, Ybar and Area-Averaged maximum Loss Rate, F_m (inch/hour), equations taken from Orange County Hydrology Manual, Section C

$$A_j = \frac{A_i}{A_1 + A_2 + \ldots + A_m} \qquad Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}} \qquad Y = \frac{Y_1 A_1 + Y_2 A_2 + \ldots + Y_m A_m}{A_1 + A_2 + \ldots + A_m} = \sum Y_j A_j \qquad F_m = a_p F_p$$

$$S = \frac{1000}{CN} - 10 \qquad I_a = 0.2S$$

CN - See Figure C-1 and C-3

P24, 2-Year Storm Event for Non-Mountainous Area (in) = 1.44

P24, 2-Year Storm Event for Mountainous Area (in) = 2.67

Total Area (ac) = 104.35

Y = 0.49

Ybar = 1 - Y = **0.51**

ap - See Figure C-4

Fp - See Table C-2

Average a_p = 0.61

Total Fm (in/hr) = **0.37**

No.	Infil. Class	Land Use	Perviousness (%)	Area (ac)	Soil Group	Pervious/ Impervious	Area (ac)	A_j (Area Fraction)	CN AMC II	Low Loss Rate, Ybar: S	I_a	Y_j	Y_j*A_j	Max. Loss Rate, F_m: a_p	F_p (in/hr)	F_m (in/hr)	F_m*A_j (in/hr)	a_p*A_j
Offsite Area																		
1	9	Commercial / Industrial	10%	1.95	D	Pervious	0.20	0.002	75	3.33	0.67	0.10	0.000	0.10	0.60	0.06	0.001	0.002
						Impervious	1.76	0.017	98	0.20	0.04	0.85	0.014					
2	1	Oil Operations	100%	6.26	D	Pervious	6.26	0.060	93	0.75	0.15	0.56	0.034	1.00	0.60	0.60	0.036	0.060
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
Onsite Area																		
1	9	Urban Cover - Roadway	10%	11.35	D	Pervious	1.14	0.011	75	3.33	0.67	0.10	0.001	0.10	0.60	0.06	0.007	0.011
						Impervious	10.22	0.098	98	0.20	0.04	0.85	0.083					
2	9	Single Family Residential (Condominium)	35%	41.68	D	Pervious	14.59	0.140	75	3.33	0.67	0.10	0.014	0.35	0.60	0.21	0.084	0.140
						Impervious	27.09	0.260	98	0.20	0.04	0.85	0.220					
3	9	Public Park	85%	9.61	D	Pervious	8.17	0.078	75	3.33	0.67	0.10	0.008	0.85	0.60	0.51	0.047	0.078
						Impervious	1.44	0.014	98	0.20	0.04	0.85	0.012					
4	1	Oil Operations	100%	9.76	D	Pervious	9.76	0.094	93	0.75	0.15	0.56	0.053	1.00	0.60	0.60	0.056	0.094
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
5	6	Open Space / Habitat Area	100%	23.74	D	Pervious	23.74	0.228	83	2.05	0.41	0.24	0.054	1.00	0.60	0.60	0.137	0.228
						Impervious	0.00	0.000	98	0.20	0.04	0.85	0.000					
			Total Area =	**104.35**								Y =	**0.49**			Total F_m =	**0.37**	**0.61**
												Ybar = 1 - Y =	**0.51**					

ii. EV 100-Year Storm Event

Drainage A

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****************************************************************************
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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  316.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.300
    TIME OF CONCENTRATION(MIN.) = 26.88
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    79.67
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    38.57

****************************************************************************
  TIME     VOLUME      Q    0.      125.0     250.0     375.0     500.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.32     0.1800    13.61  .Q        .         .         .         .
  0.77     0.6863    13.74  .Q        .         .         .         .
  1.22     1.2014    14.08  .Q        .         .         .         .
  1.66     1.7262    14.26  .Q        .         .         .         .
  2.11     2.2614    14.64  .Q        .         .         .         .
  2.56     2.8072    14.84  .Q        .         .         .         .
  3.01     3.3646    15.26  .Q        .         .         .         .
  3.46     3.9338    15.49  .Q        .         .         .         .
  3.90     4.5159    15.96  .Q        .         .         .         .
  4.35     5.1113    16.21  .Q        .         .         .         .
  4.80     5.7211    16.74  .Q        .         .         .         .
  5.25     6.3460    17.02  .Q        .         .         .         .
  5.70     6.9872    17.62  .Q        .         .         .         .
  6.14     7.6457    17.94  .Q        .         .         .         .
  6.59     8.3229    18.64  .Q        .         .         .         .
  7.04     9.0200    19.01  .Q        .         .         .         .
  7.49     9.7389    19.82  .Q        .         .         .         .
  7.94    10.4810    20.26  .Q        .         .         .         .
  8.38    11.2490    21.22  .Q        .         .         .         .
```

```
  8.83     12.0445     21.75  .Q        .         .         .         .
  9.28     12.8712     22.91  .Q        .         .         .         .
  9.73     13.7312     23.55  .Q        .         .         .         .
 10.18     14.6298     24.99  .Q        .         .         .         .
 10.62     15.5698     25.79  . Q       .         .         .         .
 11.07     16.5588     27.63  . Q       .         .         .         .
 11.52     17.6014     28.69  . Q       .         .         .         .
 11.97     18.7089     31.14  . Q       .         .         .         .
 12.42     19.9662     36.77  . Q       .         .         .         .
 12.86     21.5157     46.93  .  Q      .         .         .         .
 13.31     23.2953     49.20  .  Q      .         .         .         .
 13.76     25.2224     54.90  .   Q     .         .         .         .
 14.21     27.3230     58.58  .   Q     .         .         .         .
 14.66     29.6665     68.01  .    Q    .         .         .         .
 15.10     32.3249     75.59  .     Q   .         .         .         .
 15.55     35.7192    107.76  .       Q .         .         .         .
 16.00     40.2639    137.74  .         .Q        .         .         .
 16.45     51.9308    492.48  .         .         .         .        Q.
 16.90     62.6990     89.20  .      Q  .         .         .         .
 17.34     65.5079     62.53  .    Q    .         .         .         .
 17.79     67.6249     51.82  .   Q     .         .         .         .
 18.24     69.4163     44.95  .  Q      .         .         .         .
 18.69     70.8010     29.85  . Q       .         .         .         .
 19.14     71.8473     26.67  . Q       .         .         .         .
 19.58     72.7898     24.24  .Q        .         .         .         .
 20.03     73.6515     22.31  .Q        .         .         .         .
 20.48     74.4482     20.73  .Q        .         .         .         .
 20.93     75.1913     19.41  .Q        .         .         .         .
 21.38     75.8890     18.28  .Q        .         .         .         .
 21.82     76.5480     17.31  .Q        .         .         .         .
 22.27     77.1733     16.47  .Q        .         .         .         .
 22.72     77.7691     15.72  .Q        .         .         .         .
 23.17     78.3386     15.05  .Q        .         .         .         .
 23.62     78.8847     14.45  .Q        .         .         .         .
 24.06     79.4097     13.91  .Q        .         .         .         .
 24.51     79.6672      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage B

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 Problem Descriptions:



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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  127.90
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.060
    LOW LOSS FRACTION = 0.180
    TIME OF CONCENTRATION(MIN.) = 30.94
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    36.77
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    11.08

****************************************************************************
  TIME     VOLUME       Q    0.       47.5      95.0     142.5     190.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.01      0.0000      0.00  Q         .         .         .         .
  0.53      0.1376      6.46  .Q        .         .         .         .
  1.05      0.4161      6.62  .Q        .         .         .         .
  1.56      0.7002      6.71  .Q        .         .         .         .
  2.08      0.9907      6.92  .Q        .         .         .         .
  2.59      1.2878      7.03  .Q        .         .         .         .
  3.11      1.5922      7.26  .Q        .         .         .         .
  3.62      1.9040      7.38  .Q        .         .         .         .
  4.14      2.2240      7.64  .Q        .         .         .         .
  4.66      2.5526      7.78  .Q        .         .         .         .
  5.17      2.8906      8.08  .Q        .         .         .         .
  5.69      3.2385      8.24  .Q        .         .         .         .
  6.20      3.5973      8.59  .Q        .         .         .         .
  6.72      3.9676      8.79  .Q        .         .         .         .
  7.23      4.3509      9.20  .Q        .         .         .         .
  7.75      4.7479      9.43  .Q        .         .         .         .
  8.27      5.1605      9.93  . Q       .         .         .         .
  8.78      5.5897     10.21  . Q       .         .         .         .
  9.30      6.0381     10.83  . Q       .         .         .         .
```

```
  9.81      6.5072     11.18  . Q       .         .         .         .
 10.33      7.0008     11.98  . Q       .         .         .         .
 10.84      7.5211     12.44  . Q       .         .         .         .
 11.36      8.0738     13.50  . Q       .         .         .         .
 11.87      8.6626     14.13  . Q       .         .         .         .
 12.39      9.3656     18.86  .  Q      .         .         .         .
 12.91     10.2296     21.69  .   Q     .         .         .         .
 13.42     11.2074     24.20  .    Q    .         .         .         .
 13.94     12.2733     25.82  .    Q    .         .         .         .
 14.45     13.4633     30.02  .     Q   .         .         .         .
 14.97     14.8211     33.70  .      Q  .         .         .         .
 15.48     16.5736     48.55  .         Q         .         .         .
 16.00     18.8221     56.97  .         .Q        .         .         .
 16.52     24.0787    189.73  .         .         .         .        Q.
 17.03     28.9624     39.46  .       Q .         .         .         .
 17.55     30.3960     27.81  .    Q    .         .         .         .
 18.06     31.4754     22.84  .   Q     .         .         .         .
 18.58     32.2784     14.84  .  Q      .         .         .         .
 19.09     32.8704     12.94  . Q       .         .         .         .
 19.61     33.3925     11.56  . Q       .         .         .         .
 20.13     33.8629     10.51  . Q       .         .         .         .
 20.64     34.2930      9.67  . Q       .         .         .         .
 21.16     34.6906      8.99  .Q        .         .         .         .
 21.67     35.0614      8.41  .Q        .         .         .         .
 22.19     35.4096      7.93  .Q        .         .         .         .
 22.70     35.7385      7.51  .Q        .         .         .         .
 23.22     36.0505      7.14  .Q        .         .         .         .
 23.73     36.3478      6.81  .Q        .         .         .         .
 24.25     36.6321      6.52  .Q        .         .         .         .
 24.77     36.7711      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage C

```
****************************************************************************
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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  104.40
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.120
    LOW LOSS FRACTION = 0.260
    TIME OF CONCENTRATION(MIN.) = 15.18
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    27.23
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    11.83

****************************************************************************
  TIME     VOLUME       Q    0.       57.5     115.0     172.5     230.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.06      0.0000     0.00  Q         .         .         .         .
  0.31      0.0497     4.75  Q         .         .         .         .
  0.57      0.1497     4.81  Q         .         .         .         .
  0.82      0.2507     4.85  Q         .         .         .         .
  1.07      0.3528     4.92  Q         .         .         .         .
  1.33      0.4559     4.95  Q         .         .         .         .
  1.58      0.5602     5.02  Q         .         .         .         .
  1.83      0.6656     5.06  Q         .         .         .         .
  2.08      0.7723     5.14  Q         .         .         .         .
  2.34      0.8801     5.18  Q         .         .         .         .
  2.59      0.9892     5.26  Q         .         .         .         .
  2.84      1.0996     5.30  Q         .         .         .         .
  3.10      1.2114     5.39  Q         .         .         .         .
  3.35      1.3245     5.43  Q         .         .         .         .
  3.60      1.4390     5.52  Q         .         .         .         .
  3.86      1.5550     5.57  Q         .         .         .         .
  4.11      1.6726     5.67  Q         .         .         .         .
  4.36      1.7917     5.72  Q         .         .         .         .
  4.61      1.9124     5.83  .Q        .         .         .         .
  4.87      2.0348     5.88  .Q        .         .         .         .
  5.12      2.1590     6.00  .Q        .         .         .         .
  5.37      2.2850     6.05  .Q        .         .         .         .
  5.63      2.4129     6.18  .Q        .         .         .         .
  5.88      2.5427     6.24  .Q        .         .         .         .
  6.13      2.6745     6.37  .Q        .         .         .         .
  6.39      2.8085     6.44  .Q        .         .         .         .
  6.64      2.9447     6.59  .Q        .         .         .         .
  6.89      3.0832     6.66  .Q        .         .         .         .
  7.14      3.2242     6.82  .Q        .         .         .         .
  7.40      3.3676     6.90  .Q        .         .         .         .
  7.65      3.5137     7.07  .Q        .         .         .         .
```

```
  7.90      3.6626      7.16  .Q        .         .         .         .
  8.16      3.8143      7.35  .Q        .         .         .         .
  8.41      3.9692      7.45  .Q        .         .         .         .
  8.66      4.1273      7.67  .Q        .         .         .         .
  8.92      4.2887      7.78  .Q        .         .         .         .
  9.17      4.4538      8.01  .Q        .         .         .         .
  9.42      4.6227      8.14  .Q        .         .         .         .
  9.68      4.7957      8.41  .Q        .         .         .         .
  9.93      4.9729      8.55  .Q        .         .         .         .
 10.18      5.1548      8.85  .Q        .         .         .         .
 10.43      5.3415      9.01  .Q        .         .         .         .
 10.69      5.5336      9.36  .Q        .         .         .         .
 10.94      5.7313      9.55  .Q        .         .         .         .
 11.19      5.9353      9.96  .Q        .         .         .         .
 11.45      6.1458     10.18  .Q        .         .         .         .
 11.70      6.3636     10.66  .Q        .         .         .         .
 11.95      6.5892     10.92  .Q        .         .         .         .
 12.20      6.8515     14.16  . Q       .         .         .         .
 12.46      7.1623     15.56  . Q       .         .         .         .
 12.71      7.4957     16.33  . Q       .         .         .         .
 12.96      7.8417     16.76  . Q       .         .         .         .
 13.22      8.2023     17.73  .  Q      .         .         .         .
 13.47      8.5786     18.28  .  Q      .         .         .         .
 13.72      8.9740     19.54  .  Q      .         .         .         .
 13.98      9.3903     20.28  .  Q      .         .         .         .
 14.23      9.8301     21.79  .  Q      .         .         .         .
 14.48     10.2965     22.82  .  Q      .         .         .         .
 14.73     10.8016     25.49  .   Q     .         .         .         .
 14.99     11.3527     27.22  .   Q     .         .         .         .
 15.24     11.9723     32.05  .    Q    .         .         .         .
 15.49     12.6927     36.86  .     Q   .         .         .         .
 15.75     13.5619     46.28  .       Q .         .         .         .
 16.00     14.8082     72.92  .         . Q       .         .         .
 16.25     17.9666    229.18  .         .         .         .        Q.
 16.51     20.7392     36.03  .     Q   .         .         .         .
 16.76     21.4227     29.35  .    Q    .         .         .         .
 17.01     21.9810     24.05  .   Q     .         .         .         .
 17.27     22.4530     21.10  .  Q      .         .         .         .
 17.52     22.8710     18.88  .  Q      .         .         .         .
 17.77     23.2484     17.22  . Q       .         .         .         .
 18.02     23.5951     15.93  . Q       .         .         .         .
 18.28     23.8788     11.20  .Q        .         .         .         .
 18.53     24.1048     10.41  .Q        .         .         .         .
 18.78     24.3155      9.75  .Q        .         .         .         .
 19.04     24.5134      9.18  .Q        .         .         .         .
 19.29     24.7003      8.70  .Q        .         .         .         .
 19.54     24.8777      8.27  .Q        .         .         .         .
 19.80     25.0467      7.89  .Q        .         .         .         .
 20.05     25.2082      7.56  .Q        .         .         .         .
 20.30     25.3631      7.26  .Q        .         .         .         .
 20.55     25.5120      6.99  .Q        .         .         .         .
 20.81     25.6555      6.74  .Q        .         .         .         .
 21.06     25.7941      6.51  .Q        .         .         .         .
 21.31     25.9281      6.31  .Q        .         .         .         .
 21.57     26.0580      6.12  .Q        .         .         .         .
 21.82     26.1840      5.94  .Q        .         .         .         .
 22.07     26.3064      5.77  .Q        .         .         .         .
 22.33     26.4255      5.62  Q         .         .         .         .
 22.58     26.5416      5.48  Q         .         .         .         .
 22.83     26.6547      5.34  Q         .         .         .         .
 23.08     26.7651      5.22  Q         .         .         .         .
 23.34     26.8730      5.10  Q         .         .         .         .
 23.59     26.9784      4.99  Q         .         .         .         .
 23.84     27.0816      4.88  Q         .         .         .         .
 24.10     27.1826      4.78  Q         .         .         .         .
 24.35     27.2326      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

iii. EV 2-Year Storm Event

Drainage A

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 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  316.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.280
    LOW LOSS FRACTION = 0.470
    TIME OF CONCENTRATION(MIN.) = 37.17
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    17.97
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    19.95

****************************************************************************
  TIME     VOLUME       Q    0.       20.0      40.0      60.0      80.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.51      0.0733      3.46  .Q        .         .         .         .
  1.13      0.2517      3.51  .Q        .         .         .         .
  1.75      0.4344      3.63  .Q        .         .         .         .
  2.37      0.6220      3.70  .Q        .         .         .         .
  2.99      0.8148      3.83  .Q        .         .         .         .
  3.61      1.0130      3.91  .Q        .         .         .         .
  4.23      1.2173      4.07  . Q       .         .         .         .
  4.85      1.4281      4.16  . Q       .         .         .         .
  5.47      1.6460      4.35  . Q       .         .         .         .
  6.09      1.8715      4.46  . Q       .         .         .         .
  6.71      2.1056      4.69  . Q       .         .         .         .
  7.33      2.3489      4.82  . Q       .         .         .         .
  7.95      2.6028      5.10  . Q       .         .         .         .
  8.57      2.8682      5.26  . Q       .         .         .         .
  9.19      3.1470      5.63  . Q       .         .         .         .
  9.81      3.4405      5.84  . Q       .         .         .         .
 10.42      3.7519      6.32  .  Q      .         .         .         .
 11.04      4.0830      6.61  .  Q      .         .         .         .
 11.66      4.4392      7.30  .  Q      .         .         .         .
```

```
 12.28      4.8239      7.73  .  Q      .         .         .         .
 12.90      5.2890     10.44  .    Q    .         .         .         .
 13.52      5.8425     11.18  .    Q    .         .         .         .
 14.14      6.4678     13.25  .     Q   .         .         .         .
 14.76      7.1952     15.17  .      Q  .         .         .         .
 15.38      8.1185     20.90  .         Q         .         .         .
 16.00      9.3012     25.30  .         . Q       .         .         .
 16.62     11.8500     74.26  .         .         .         .      Q  .
 17.24     14.1972     17.44  .       Q .         .         .         .
 17.86     14.9530     12.09  .     Q   .         .         .         .
 18.48     15.5012      9.32  .   Q     .         .         .         .
 19.10     15.9174      6.93  .  Q      .         .         .         .
 19.72     16.2503      6.07  .  Q      .         .         .         .
 20.34     16.5448      5.44  . Q       .         .         .         .
 20.96     16.8109      4.95  . Q       .         .         .         .
 21.58     17.0546      4.57  . Q       .         .         .         .
 22.19     17.2805      4.25  . Q       .         .         .         .
 22.81     17.4915      3.99  .Q        .         .         .         .
 23.43     17.6899      3.76  .Q        .         .         .         .
 24.05     17.8776      3.57  .Q        .         .         .         .
 24.67     17.9689      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage B

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:





****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  127.90
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.190
    LOW LOSS FRACTION = 0.370
    TIME OF CONCENTRATION(MIN.) = 37.45
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     8.66
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     6.69

****************************************************************************
  TIME     VOLUME       Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.40      0.0272      1.66  .Q        .         .         .         .
  1.02      0.1133      1.68  .Q        .         .         .         .
  1.64      0.2015      1.74  .Q        .         .         .         .
  2.27      0.2920      1.77  .Q        .         .         .         .
  2.89      0.3850      1.84  .Q        .         .         .         .
  3.52      0.4807      1.87  .Q        .         .         .         .
  4.14      0.5793      1.95  .Q        .         .         .         .
  4.76      0.6809      1.99  .Q        .         .         .         .
  5.39      0.7861      2.08  . Q       .         .         .         .
  6.01      0.8949      2.13  . Q       .         .         .         .
  6.64      1.0078      2.25  . Q       .         .         .         .
  7.26      1.1252      2.31  . Q       .         .         .         .
  7.89      1.2477      2.44  . Q       .         .         .         .
  8.51      1.3758      2.52  . Q       .         .         .         .
  9.13      1.5103      2.70  . Q       .         .         .         .
  9.76      1.6519      2.80  . Q       .         .         .         .
 10.38      1.8021      3.03  .  Q      .         .         .         .
 11.01      1.9619      3.17  .  Q      .         .         .         .
 11.63      2.1338      3.50  .  Q      .         .         .         .
```

```
12.26      2.3194      3.70  .  Q      .         .         .         .
12.88      2.5439      5.00  .    Q    .         .         .         .
13.50      2.8111      5.36  .    Q    .         .         .         .
14.13      3.1129      6.35  .     Q   .         .         .         .
14.75      3.4639      7.26  .      Q  .         .         .         .
15.38      3.9095     10.01  .         Q         .         .         .
16.00      4.4810     12.14  .         . Q       .         .         .
16.62      5.7116     35.57  .         .         .         .    Q    .
17.25      6.8444      8.35  .       Q .         .         .         .
17.87      7.2093      5.79  .    Q    .         .         .         .
18.50      7.4725      4.41  .   Q     .         .         .         .
19.12      7.6719      3.32  .  Q      .         .         .         .
19.74      7.8325      2.91  . Q       .         .         .         .
20.37      7.9746      2.60  . Q       .         .         .         .
20.99      8.1030      2.37  . Q       .         .         .         .
21.62      8.2206      2.19  . Q       .         .         .         .
22.24      8.3295      2.04  . Q       .         .         .         .
22.87      8.4313      1.91  .Q        .         .         .         .
23.49      8.5271      1.80  .Q        .         .         .         .
24.11      8.6177      1.71  .Q        .         .         .         .
24.74      8.6617      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
```

Drainage C

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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             Ver. 14.0  Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:




****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:



----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =  104.40
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.370
    LOW LOSS FRACTION = 0.510
    TIME OF CONCENTRATION(MIN.) = 16.80
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.13
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.28
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.37
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.62
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  0.85
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  1.44

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     5.55
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     6.98

****************************************************************************
  TIME     VOLUME       Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.04      0.0000      0.00  Q         .         .         .         .
  0.32      0.0122      1.05  .Q        .         .         .         .
  0.60      0.0367      1.07  .Q        .         .         .         .
  0.88      0.0615      1.08  .Q        .         .         .         .
  1.16      0.0866      1.09  .Q        .         .         .         .
  1.44      0.1120      1.10  .Q        .         .         .         .
  1.72      0.1376      1.12  .Q        .         .         .         .
  2.00      0.1636      1.13  .Q        .         .         .         .
  2.28      0.1899      1.15  .Q        .         .         .         .
  2.56      0.2166      1.16  .Q        .         .         .         .
  2.84      0.2435      1.18  .Q        .         .         .         .
  3.12      0.2708      1.19  .Q        .         .         .         .
  3.40      0.2985      1.21  .Q        .         .         .         .
  3.68      0.3266      1.22  .Q        .         .         .         .
  3.96      0.3550      1.24  .Q        .         .         .         .
  4.24      0.3839      1.25  .Q        .         .         .         .
  4.52      0.4132      1.28  .Q        .         .         .         .
  4.80      0.4429      1.29  .Q        .         .         .         .
  5.08      0.4731      1.32  .Q        .         .         .         .
```

```
 5.36      0.5037      1.33  .Q        .         .         .         .
 5.64      0.5348      1.36  .Q        .         .         .         .
 5.92      0.5665      1.38  .Q        .         .         .         .
 6.20      0.5987      1.41  .Q        .         .         .         .
 6.48      0.6314      1.42  .Q        .         .         .         .
 6.76      0.6648      1.46  .Q        .         .         .         .
 7.04      0.6987      1.48  .Q        .         .         .         .
 7.32      0.7333      1.51  .Q        .         .         .         .
 7.60      0.7686      1.53  .Q        .         .         .         .
 7.88      0.8046      1.58  .Q        .         .         .         .
 8.16      0.8413      1.60  .Q        .         .         .         .
 8.44      0.8789      1.65  .Q        .         .         .         .
 8.72      0.9173      1.67  .Q        .         .         .         .
 9.00      0.9566      1.73  .Q        .         .         .         .
 9.28      0.9968      1.75  .Q        .         .         .         .
 9.56      1.0381      1.81  .Q        .         .         .         .
 9.84      1.0805      1.85  .Q        .         .         .         .
10.12      1.1240      1.92  .Q        .         .         .         .
10.40      1.1688      1.95  .Q        .         .         .         .
10.68      1.2149      2.03  . Q       .         .         .         .
10.96      1.2625      2.08  . Q       .         .         .         .
11.24      1.3117      2.17  . Q       .         .         .         .
11.52      1.3626      2.23  . Q       .         .         .         .
11.80      1.4155      2.34  . Q       .         .         .         .
12.08      1.4705      2.41  . Q       .         .         .         .
12.36      1.5335      3.04  .  Q      .         .         .         .
12.64      1.6049      3.13  .  Q      .         .         .         .
12.92      1.6794      3.32  .  Q      .         .         .         .
13.20      1.7574      3.42  .  Q      .         .         .         .
13.48      1.8395      3.67  .  Q      .         .         .         .
13.76      1.9262      3.82  .  Q      .         .         .         .
14.04      2.0186      4.17  .   Q     .         .         .         .
14.32      2.1187      4.48  .   Q     .         .         .         .
14.60      2.2290      5.06  .    Q    .         .         .         .
14.88      2.3501      5.40  .    Q    .         .         .         .
15.16      2.4864      6.37  .     Q   .         .         .         .
15.44      2.6422      7.09  .      Q  .         .         .         .
15.72      2.8230      8.53  .       Q .         .         .         .
16.00      3.0637     12.27  .         . Q       .         .         .
16.28      3.6515     38.54  .         .         .         .        Q .
16.56      4.1835      7.45  .      Q  .         .         .         .
16.84      4.3372      5.83  .    Q    .         .         .         .
17.12      4.4598      4.77  .   Q     .         .         .         .
17.40      4.5610      3.98  .  Q      .         .         .         .
17.68      4.6481      3.54  .  Q      .         .         .         .
17.96      4.7263      3.22  .  Q      .         .         .         .
18.24      4.7946      2.69  . Q       .         .         .         .
18.52      4.8521      2.28  . Q       .         .         .         .
18.80      4.9031      2.13  . Q       .         .         .         .
19.08      4.9507      1.99  .Q        .         .         .         .
19.36      4.9955      1.88  .Q        .         .         .         .
19.64      5.0379      1.78  .Q        .         .         .         .
19.92      5.0782      1.70  .Q        .         .         .         .
20.20      5.1166      1.62  .Q        .         .         .         .
20.48      5.1534      1.56  .Q        .         .         .         .
20.76      5.1887      1.50  .Q        .         .         .         .
21.04      5.2227      1.44  .Q        .         .         .         .
21.32      5.2554      1.39  .Q        .         .         .         .
21.60      5.2871      1.35  .Q        .         .         .         .
21.88      5.3177      1.30  .Q        .         .         .         .
22.16      5.3474      1.27  .Q        .         .         .         .
22.44      5.3763      1.23  .Q        .         .         .         .
22.72      5.4044      1.20  .Q        .         .         .         .
23.00      5.4317      1.17  .Q        .         .         .         .
23.28      5.4583      1.14  .Q        .         .         .         .
23.56      5.4843      1.11  .Q        .         .         .         .
23.84      5.5097      1.08  .Q        .         .         .         .
```

```
  24.12       5.5345      1.06  .Q         .         .         .         .
  24.40       5.5467      0.00  Q          .         .         .         .
-----------------------------------------------------------------------------
```

C HEC-RAS MODELING

C1 HEC-RAS Modeling Report for Northerly Arroyo Channel

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Newport Banning Ranch
Project File : ras82101.prj
Run Date and Time: 4/15/2008 11:14:38 AM

Project in English units

PLAN DATA

Plan Title: N Arroyo Run
Plan File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.p02

Geometry Title: Nouth Arroyo
Geometry File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.g02

Flow Title   : N_Arroyo Flows
Flow File   : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.f02

```
Plan Summary Information:
Number of:  Cross Sections =    6    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow
```

FLOW DATA

Flow Title: N_Arroyo Flows
Flow File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.f02

Flow Data (cfs)

River	Reach	RS	EV 2yr	EV 100yr
N_Arroyo	1	809	45	160

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
N_Arroyo	1	EV 2yr	Critical	Critical
N_Arroyo	1	EV 100yr	Critical	Critical

GEOMETRY DATA

Geometry Title: Nouth Arroyo
Geometry File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.g02

CROSS SECTION

RIVER: N_Arroyo
REACH: 1 RS: 809

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52.72	3.16	50.65	4.16	50	31.73	45	31.73	44.94
46.96	40	53.35	40	55.35	40.42	58.51	41	61.67	41.62
63.91	42	64.91	42.2	68.51	43	72.64	44	73.64	44.1
76.8	45	100.23	45.4						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	31.73	.06	76.8	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
31.73	76.8	121.96	124.01	131.23	.1	.3

CROSS SECTION OUTPUT Profile #EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	41.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.060	
W.S. Elev (ft)	41.69	Reach Len. (ft)	121.96	124.01	131.23
Crit W.S. (ft)	40.94	Flow Area (sq ft)		22.47	
E.G. Slope (ft/ft)	0.005884	Area (sq ft)		22.47	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	20.33	Top Width (ft)		20.33	
Vel Total (ft/s)	2.00	Avg. Vel. (ft/s)		2.00	
Max Chl Dpth (ft)	1.69	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	586.6	Conv. (cfs)		586.6	
Length Wtd. (ft)	124.01	Wetted Per. (ft)		20.76	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		0.80	
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)		0.22	
C & E Loss (ft)	0.02	Cum SA (acres)		0.26	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	42.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.060	
W.S. Elev (ft)	42.79	Reach Len. (ft)	121.96	124.01	131.23
Crit W.S. (ft)		Flow Area (sq ft)		49.94	
E.G. Slope (ft/ft)	0.008456	Area (sq ft)		49.94	
Q Total (cfs)	160.00	Flow (cfs)		160.00	
Top Width (ft)	29.22	Top Width (ft)		29.22	
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		1.71	
Conv. Total (cfs)	1740.0	Conv. (cfs)		1740.0	
Length Wtd. (ft)	124.04	Wetted Per. (ft)		29.93	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)		2.82	
Frctn Loss (ft)	2.14	Cum Volume (acre-ft)	0.00	0.55	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	0.37	0.02

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: N_Arroyo
REACH: 1 RS: 685

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	55.6	1	55	9.6	49.98	19.6	46.85	21.84	45.74
23.25	45.72	24.67	45	26.9	43.36	29.14	42.35	32.74	40
32.74	39.92	32.74	39.89	32.74	39.86	34.16	39.76	35.57	39.36
37.81	39.1	38.81	39	44.28	39	51.49	39.36	62.89	40
65.31	40	67.54	40.2	69.78	40.35	78.38	41	85.68	41
90.68	41.21	94.29	41.05	95.29	41	98.12	40.76	99.53	40.68
100.53	40.65	101.95	40.61	102.95	40.62	104.36	40.7	106.6	40.84
107.6	40.89	108.6	41	110.01	41.18	111.42	41.24	112.42	41.42
117.42	42.03								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	32.74	.06	65.31	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
32.74	65.31	161.18	166.09	167.39	.1	.3

CROSS SECTION OUTPUT Profile #EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	39.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.060	
W.S. Elev (ft)	39.74	Reach Len. (ft)	161.18	166.09	167.39
Crit W.S. (ft)	39.74	Flow Area (sq ft)		11.37	
E.G. Slope (ft/ft)	0.069249	Area (sq ft)		11.37	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	23.95	Top Width (ft)		23.95	
Vel Total (ft/s)	3.96	Avg. Vel. (ft/s)		3.96	
Max Chl Dpth (ft)	0.74	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	171.0	Conv. (cfs)		171.0	
Length Wtd. (ft)	166.09	Wetted Per. (ft)		24.05	
Min Ch El (ft)	39.00	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)		8.09	
Frctn Loss (ft)	7.97	Cum Volume (acre-ft)		0.17	
C & E Loss (ft)	0.01	Cum SA (acres)		0.20	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	40.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	40.34	Reach Len. (ft)	161.18	166.09	167.39
Crit W.S. (ft)	40.34	Flow Area (sq ft)	0.09	29.73	0.69
E.G. Slope (ft/ft)	0.053032	Area (sq ft)	0.09	29.73	0.69
Q Total (cfs)	160.00	Flow (cfs)	0.14	158.71	1.15
Top Width (ft)	37.44	Top Width (ft)	0.52	32.57	4.35
Vel Total (ft/s)	5.25	Avg. Vel. (ft/s)	1.56	5.34	1.67
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)	0.17	0.91	0.16
Conv. Total (cfs)	694.8	Conv. (cfs)	0.6	689.2	5.0
Length Wtd. (ft)	166.09	Wetted Per. (ft)	0.63	32.82	4.36
Min Ch El (ft)	39.00	Shear (lb/sq ft)	0.47	3.00	0.52
Alpha	1.03	Stream Power (lb/ft s)	0.74	16.01	0.87
Frctn Loss (ft)	8.69	Cum Volume (acre-ft)	0.00	0.44	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.28	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: N_Arroyo
REACH: 1 RS: 519

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	49.84	0	49.21	5	45	7.24	43.24	12.24	39.94
14.47	39.57	15.89	39.1	17.3	39	18.71	38.74	21.54	38.37
22.96	38.19	24.37	38	37.1	37.09	38.1	37	39.1	36.98
44.76	36.67	46.99	36.63	49.82	36.5	54.06	36.45	56.89	36.34
63.96	36.22	66.79	36.19	69.03	36.16	70.03	36.16	72.86	36.1
76.46	36.05	77.46	36.05	86.13	35.97	88.37	35.96	90.6	35.94
91.6	35.94	100.09	35.87	102.92	35.83	107.16	35.75	109.99	35.69
112.82	35.62	115.65	35.54	119.89	35.4	121.3	35.35	124.13	35.26
125.54	35.22	130.54	35.04	131.54	35	142.86	31.27	146.46	30
150.07	28.48	157.88	25	162.12	24.13	163.54	24	166.37	23.29
167.78	22.94	172.02	22	174.85	21.35	176.26	20.84	179.87	20.25
180.87	20.06	181.87	20	184.11	20	189.11	20.98	190.11	21.03
202.16	25	203.57	25.89	210.64	30	213.47	33.56	214.89	34.93

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	157.88	.06	202.16	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
157.88	202.16	129.98	119.28	109.74	.1	.3

CROSS SECTION OUTPUT Profile #EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	21.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.060	
W.S. Elev (ft)	21.24	Reach Len. (ft)	129.98	119.28	109.74
Crit W.S. (ft)	21.10	Flow Area (sq ft)		11.79	
E.G. Slope (ft/ft)	0.035202	Area (sq ft)		11.79	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	15.57	Top Width (ft)		15.57	
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)		3.82	
Max Chl Dpth (ft)	1.24	Hydr. Depth (ft)		0.76	
Conv. Total (cfs)	239.8	Conv. (cfs)		239.8	
Length Wtd. (ft)	119.28	Wetted Per. (ft)		15.84	
Min Ch El (ft)	20.00	Shear (lb/sq ft)		1.64	
Alpha	1.00	Stream Power (lb/ft s)		6.25	
Frctn Loss (ft)	2.31	Cum Volume (acre-ft)		0.13	
C & E Loss (ft)	0.03	Cum SA (acres)		0.12	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	22.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.060	
W.S. Elev (ft)	21.98	Reach Len. (ft)	129.98	119.28	109.74
Crit W.S. (ft)	21.98	Flow Area (sq ft)		25.38	
E.G. Slope (ft/ft)	0.051614	Area (sq ft)		25.38	
Q Total (cfs)	160.00	Flow (cfs)		160.00	
Top Width (ft)	20.91	Top Width (ft)		20.91	
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)		6.30	
Max Chl Dpth (ft)	1.98	Hydr. Depth (ft)		1.21	
Conv. Total (cfs)	704.3	Conv. (cfs)		704.3	
Length Wtd. (ft)	119.27	Wetted Per. (ft)		21.39	
Min Ch El (ft)	20.00	Shear (lb/sq ft)		3.82	
Alpha	1.00	Stream Power (lb/ft s)		24.10	
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)	0.00	0.33	0.00
C & E Loss (ft)	0.14	Cum SA (acres)	0.01	0.18	0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: N_Arroyo
REACH: 1 RS: 399

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	39.82	3.16	37.27	7.16	35	9.4	34.55	10.4	34
11.4	33.6	13.4	32.78	15.63	32	17.63	31	22.73	30.21
23.73	30	27.86	29.75	34.93	29.59	38.09	29.67	39.09	29.68
42.25	29.78	43.25	29.8	45.25	29.86	46.25	29.87	48.49	29.91
49.49	29.81	50.49	29.6	51.49	29.6	52.49	29.53	53.9	29
54.9	28.57	55.9	28	56.9	27.23	57.9	27	58.9	26.53
60.32	25.71	61.32	25	71.51	21.91	77.6	20	83.68	19
87.8	18.13	88.8	17.82	91.8	17	93.22	17.14	96.22	18
100.34	19	103.34	20	105.58	20.49	115.77	25.01	128.93	29.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	77.6	.06	103.34	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
77.6	103.34	133.51	133.65	129.63	.1	.3

CROSS SECTION OUTPUT Profile #EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	19.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.060	
W.S. Elev (ft)	19.00	Reach Len. (ft)	133.51	133.65	129.63
Crit W.S. (ft)		Flow Area (sq ft)		16.71	
E.G. Slope (ft/ft)	0.012262	Area (sq ft)		16.71	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	16.68	Top Width (ft)		16.68	
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)		2.69	
Max Chl Dpth (ft)	2.00	Hydr. Depth (ft)		1.00	
Conv. Total (cfs)	406.4	Conv. (cfs)		406.4	
Length Wtd. (ft)	133.65	Wetted Per. (ft)		17.17	
Min Ch El (ft)	17.00	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		2.01	
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)		0.09	
C & E Loss (ft)	0.00	Cum SA (acres)		0.08	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	20.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	20.60	Reach Len. (ft)	133.51	133.65	129.63
Crit W.S. (ft)		Flow Area (sq ft)	0.56	53.20	0.80
E.G. Slope (ft/ft)	0.005736	Area (sq ft)	0.56	53.20	0.80
Q Total (cfs)	160.00	Flow (cfs)	0.46	158.85	0.69
Top Width (ft)	30.11	Top Width (ft)	1.90	25.74	2.48
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	0.81	2.99	0.86
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)	0.30	2.07	0.32
Conv. Total (cfs)	2112.6	Conv. (cfs)	6.0	2097.5	9.1
Length Wtd. (ft)	133.64	Wetted Per. (ft)	1.99	26.48	2.55
Min Ch El (ft)	17.00	Shear (lb/sq ft)	0.10	0.72	0.11
Alpha	1.03	Stream Power (lb/ft s)	0.08	2.15	0.10
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	0.00	0.22	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.00	0.12	0.00

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: N_Arroyo
REACH: 1 RS: 266

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	23.08	4	23.2	16.04	24	21.04	24	22.04	23.6
24.04	23	25.04	22.48	26.04	22	28.04	21.17	29.04	21
30.04	20	32.04	18.98	37.04	15	40.46	15	41.46	16.5
45.46	20	48	24.233	48.46	25	50.46	26.53	52.46	30
53.46	30.1	67.49	35	71.49	37.33	76.49	40	79.49	41.38

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	21.04	.06	48	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
21.04	48	135.31	134.23	135.07	.1	.3

CROSS SECTION OUTPUT Profile #EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	17.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.060	
W.S. Elev (ft)	17.50	Reach Len. (ft)	135.31	134.23	135.07
Crit W.S. (ft)		Flow Area (sq ft)		14.77	
E.G. Slope (ft/ft)	0.009905	Area (sq ft)		14.77	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	8.70	Top Width (ft)		8.70	
Vel Total (ft/s)	3.05	Avg. Vel. (ft/s)		3.05	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		1.70	
Conv. Total (cfs)	452.2	Conv. (cfs)		452.2	
Length Wtd. (ft)	134.23	Wetted Per. (ft)		10.75	
Min Ch El (ft)	15.00	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)		2.59	
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)		0.04	
C & E Loss (ft)	0.01	Cum SA (acres)		0.04	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	19.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.060	
W.S. Elev (ft)	19.13	Reach Len. (ft)	135.31	134.23	135.07
Crit W.S. (ft)	18.04	Flow Area (sq ft)		32.20	
E.G. Slope (ft/ft)	0.015769	Area (sq ft)		32.20	
Q Total (cfs)	160.00	Flow (cfs)		160.00	
Top Width (ft)	12.72	Top Width (ft)		12.72	
Vel Total (ft/s)	4.97	Avg. Vel. (ft/s)		4.97	
Max Chl Dpth (ft)	4.13	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	1274.1	Conv. (cfs)		1274.1	
Length Wtd. (ft)	134.23	Wetted Per. (ft)		15.94	
Min Ch El (ft)	15.00	Shear (lb/sq ft)		1.99	
Alpha	1.00	Stream Power (lb/ft s)		9.88	
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)		0.09	
C & E Loss (ft)	0.01	Cum SA (acres)		0.06	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: N_Arroyo
REACH: 1 RS: 132

INPUT
Description:

Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	17.66	1	18	12	18	13	17.99	19.08	17
23.08	16	24.08	15.96	28.08	15	30.08	14.85	33.08	14.71
37.08	14.43	40.08	14.25	42.32	14.14	44.32	14	45.32	13.41
47.32	13	48.32	13	49.32	14	50.32	14.3	52.32	15
54.32	17.13	55	17.805	57.32	20.11	58.32	20.25	62.32	22.93
63.32	23.47	66.32	25	68.32	26.21	69.73	26.61	71.73	27.77
73.73	28.8	74.73	29.27	76.73	30	82.73	30		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	12	.06	55	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
12	55	11.17	131.59	25.19	.1	.3

CROSS SECTION OUTPUT Profile #EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	14.92	Wt. n-Val.		0.060	
Vel Head (ft)	0.29	Reach Len. (ft)			
W.S. Elev (ft)	14.63	Flow Area (sq ft)		10.41	
Crit W.S. (ft)	14.63	Area (sq ft)		10.41	
E.G. Slope (ft/ft)	0.062119	Flow (cfs)		45.00	
Q Total (cfs)	45.00	Top Width (ft)		17.03	
Top Width (ft)	17.03	Avg. Vel. (ft/s)		4.32	
Vel Total (ft/s)	4.32	Hydr. Depth (ft)		0.61	
Max Chl Dpth (ft)	1.63	Conv. (cfs)		180.6	
Conv. Total (cfs)	180.6	Wetted Per. (ft)		17.77	
Length Wtd. (ft)		Shear (lb/sq ft)		2.27	
Min Ch El (ft)	13.00	Stream Power (lb/ft s)		9.82	
Alpha	1.00	Cum Volume (acre-ft)			
Frctn Loss (ft)		Cum SA (acres)			
C & E Loss (ft)					

CROSS SECTION OUTPUT Profile #EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	15.90	Wt. n-Val.		0.060	
Vel Head (ft)	0.53	Reach Len. (ft)			
W.S. Elev (ft)	15.37	Flow Area (sq ft)		27.30	
Crit W.S. (ft)	15.37	Area (sq ft)		27.30	
E.G. Slope (ft/ft)	0.055499	Flow (cfs)		160.00	
Q Total (cfs)	160.00	Top Width (ft)		26.10	
Top Width (ft)	26.10	Avg. Vel. (ft/s)		5.86	
Vel Total (ft/s)	5.86	Hydr. Depth (ft)		1.05	
Max Chl Dpth (ft)	2.37	Conv. (cfs)		679.2	
Conv. Total (cfs)	679.2	Wetted Per. (ft)		27.12	
Length Wtd. (ft)		Shear (lb/sq ft)		3.49	
Min Ch El (ft)	13.00	Stream Power (lb/ft s)		20.44	
Alpha	1.00	Cum Volume (acre-ft)			
Frctn Loss (ft)		Cum SA (acres)			
C & E Loss (ft)					

SUMMARY OF MANNING'S N VALUES

River:N_Arroyo

Reach	River Sta.	n1	n2	n3
1	809	.06	.06	.06
1	685	.06	.06	.06
1	519	.06	.06	.06
1	399	.06	.06	.06
1	266	.06	.06	.06
1	132	.06	.06	.06

SUMMARY OF REACH LENGTHS

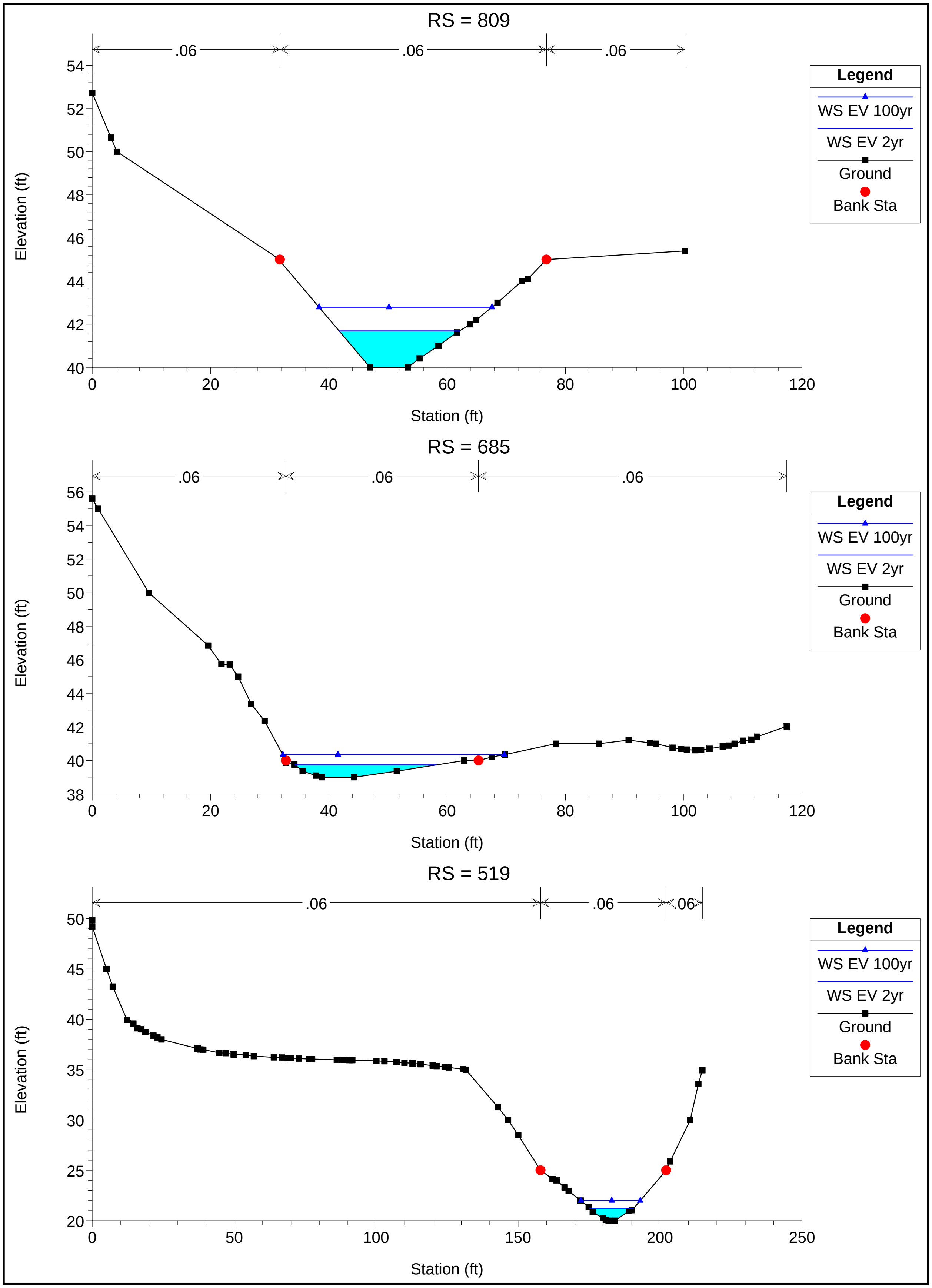
River: N_Arroyo

Reach	River Sta.	Left	Channel	Right

1	809	121.96	124.01	131.23
1	685	161.18	166.09	167.39
1	519	129.98	119.28	109.74
1	399	133.51	133.65	129.63
1	266	135.31	134.23	135.07
1	132	11.17	131.59	25.19

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: N_Arroyo

Reach	River Sta.	Contr.	Expan.
1	809	.1	.3
1	685	.1	.3
1	519	.1	.3
1	399	.1	.3
1	266	.1	.3
1	132	.1	.3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WS EV 100yr
WS EV 2yr
Ground
Bank Sta
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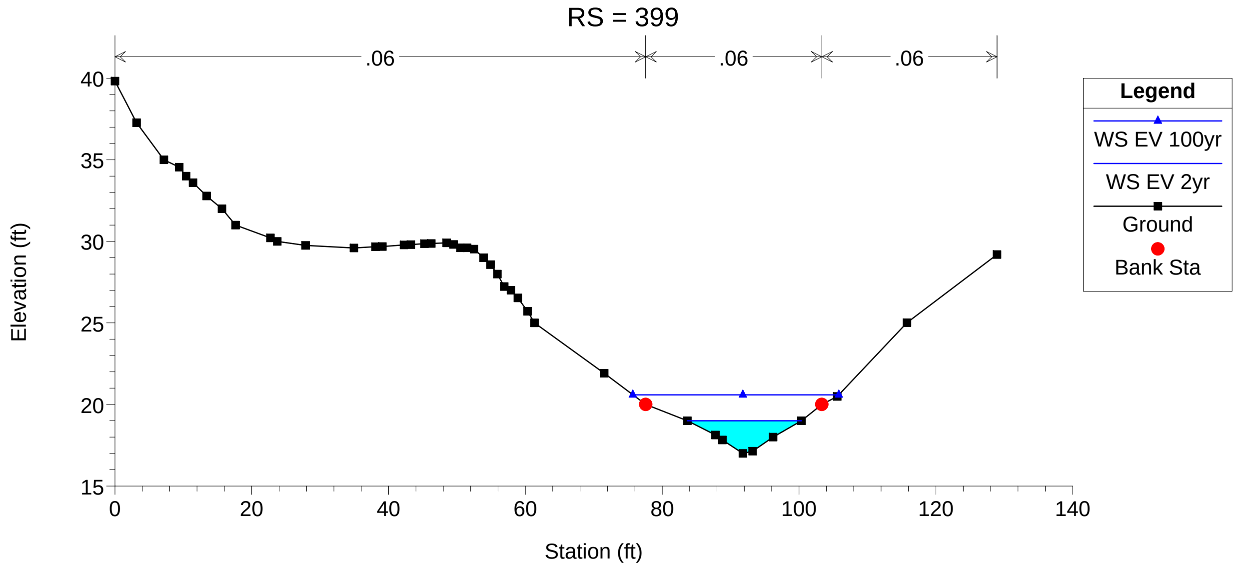
.06
.06
Elevation (ft)
Station (ft)
Legend
WS EV 100yr
WS EV 2yr
Ground
Bank Sta
RS = 519
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS EV 100yr
WS EV 2yr
Ground
Bank Sta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.06
.06
Legend
WS EV 100yr
WS EV 2yr
Ground
Bank Sta
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30
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15
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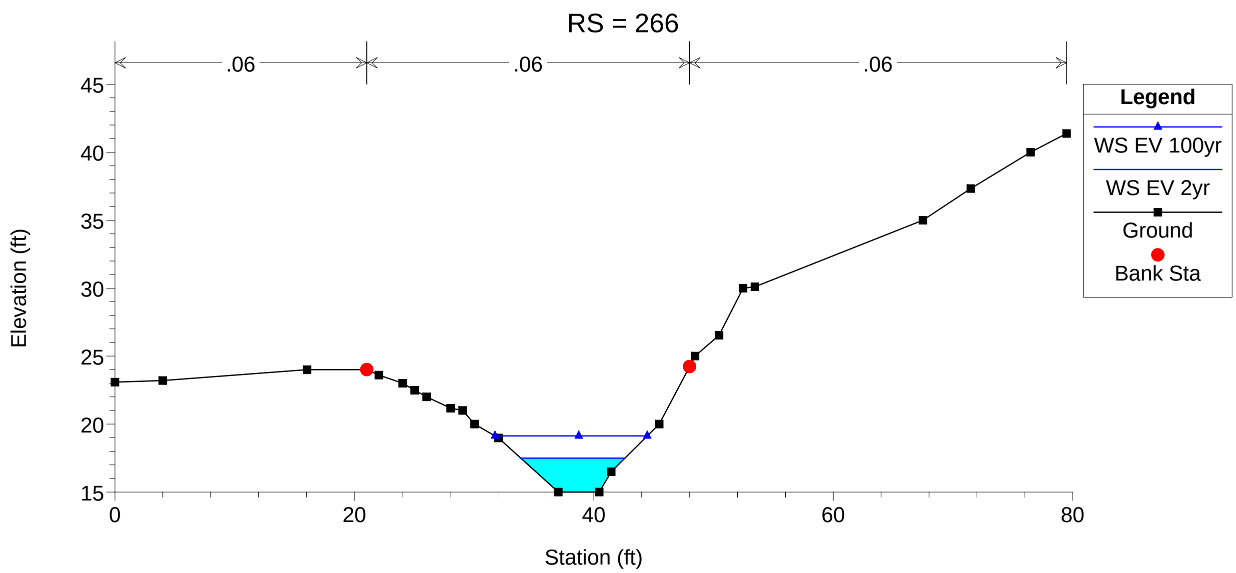
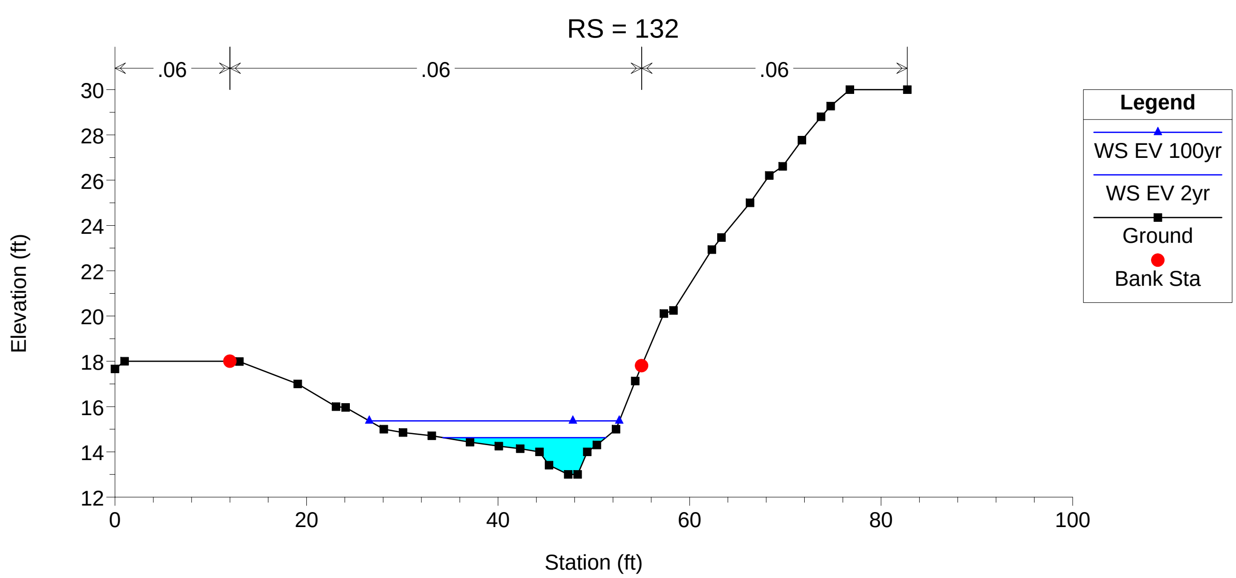
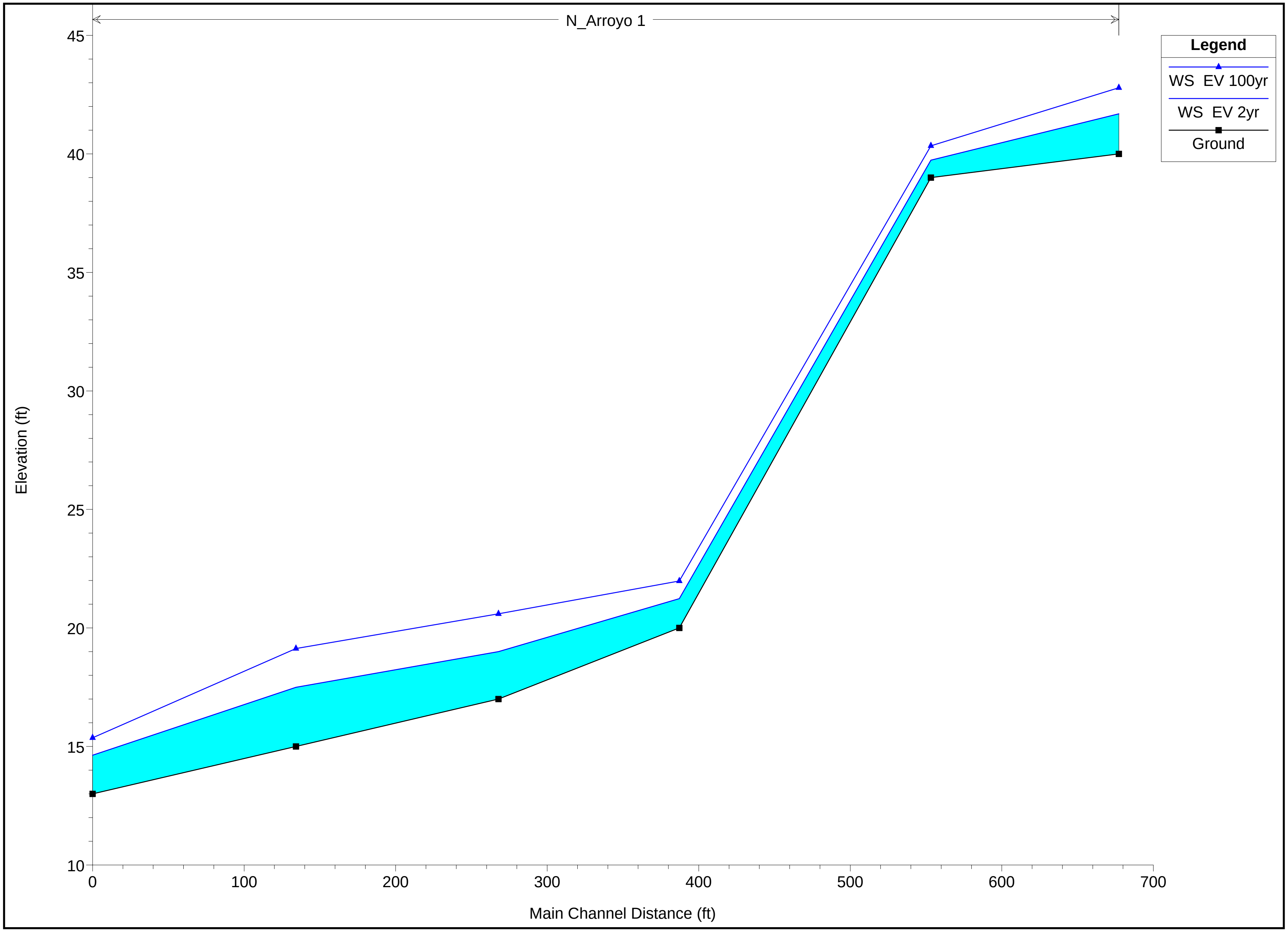
20
40
60
80
100
120
140
Station (ft)


RS = 266
.06
.06
.06
Legend
WS EV 100yr
WS EV 2yr
Ground
Bank Sta
Elevation (ft)
45
40
35
30
25
20
15
0
20
40
60
80
Station (ft)


RS = 132
.06
.06
.06
Legend
WS EV 100yr
WS EV 2yr
Ground
Bank Sta
Elevation (ft)
30
28
26
24
22
20
18
16
14
12
0
20
40
60
80
100
Station (ft)


N_Arroyo 1
Legend
WS EV 100yr
WS EV 2yr
Ground
Elevation (ft)
45
40
35
30
25
20
15
10
0
100
200
300
400
500
600
700
Main Channel Distance (ft)

C2 HEC-RAS Modeling Report for Southerly Arroyo Channel under Existing Condition

```
HEC-RAS Version 3.1.3 May 2005
 U.S. Army Corp of Engineers
Hydrologic Engineering Center
      609 Second Street
      Davis, California

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Newport Banning Ranch
Project File : ras82101.prj
Run Date and Time: 4/15/2008 3:54:07 PM

Project in English units

PLAN DATA

Plan Title: Ex. S Arroyo Run
Plan File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.p01

Geometry Title: X South Arroyo
Geometry File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.g01

Flow Title   : Ex. S_Arroyo Flows
Flow File   : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.f01

Plan Summary Information:

```
Number of:  Cross Sections =   12    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0
```

Computational Information

```
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001
```

Computation Options

```
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow
```

FLOW DATA

Flow Title: Ex. S_Arroyo Flows
Flow File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.f01

Flow Data (cfs)

River	Reach	RS	Ex EV 2yr	Ex EV 100yr
S_Arroyo	1	2256	27	95
S_Arroyo	1	1112	34	138
S_Arroyo	1	481	45	198

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
S_Arroyo	1	Ex EV 2yr	Critical	Critical
S_Arroyo	1	Ex EV 100yr	Critical	Critical

GEOMETRY DATA

Geometry Title: X South Arroyo
Geometry File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.g01

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 2256

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.65	4.47	71.39	5.47	71.06	9.08	70	14.91	67.75
21.23	65.41	22.23	65.24367	23.23	65	25.47	64.23	36.65	60
38.06	59.17	44.77	55	57.13	55	58.54	55.24	59.54	55.85
63.15	56.85	64.15	57.3	66.39	57.79	74.45	59.97	74.45	59.98
74.45	60	74.45	60.07	79.83	65	80.83	66.97	82.83	70
84.25	70.88	85.25	71.05	86.25	71	87.25	70.93	88.25	70.48
89.66	70.28	90.66	70.17	92.9	70.44	94.31	70.61	95.31	70.5
96.73	70	103.61	70	104.61	70.27	106.85	70.49	109.68	71
110.68	71								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	36.65	.06	74.45	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
36.65	74.45	193.64	193.64	193.64	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	56.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.060	
W.S. Elev (ft)	56.04	Reach Len. (ft)	193.64	193.64	193.64
Crit W.S. (ft)	55.50	Flow Area (sq ft)		15.61	
E.G. Slope (ft/ft)	0.005746	Area (sq ft)		15.61	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	17.14	Top Width (ft)		17.14	
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.73	
Max Chl Dpth (ft)	1.04	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	356.2	Conv. (cfs)		356.2	
Length Wtd. (ft)	193.64	Wetted Per. (ft)		17.65	
Min Ch El (ft)	55.00	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	2.43	Cum Volume (acre-ft)		0.86	
C & E Loss (ft)	0.02	Cum SA (acres)		1.52	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Ex EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	57.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.060	
W.S. Elev (ft)	57.07	Reach Len. (ft)	193.64	193.64	193.64
Crit W.S. (ft)		Flow Area (sq ft)		35.99	
E.G. Slope (ft/ft)	0.006317	Area (sq ft)		35.99	
Q Total (cfs)	95.00	Flow (cfs)		95.00	
Top Width (ft)	22.20	Top Width (ft)		22.20	
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)		2.64	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		1.62	
Conv. Total (cfs)	1195.3	Conv. (cfs)		1195.3	
Length Wtd. (ft)	193.64	Wetted Per. (ft)		23.17	
Min Ch El (ft)	55.00	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		1.62	
Frctn Loss (ft)	2.58	Cum Volume (acre-ft)	0.01	2.16	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	1.90	0.04

```
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: S_Arroyo
REACH: 1                  RS: 2062

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   65.75    2.83      65    5.66      64    8.49      64     9.9   64.71
   11.31   65.13   12.73   65.34   14.14   65.49   15.56   65.54   16.97   65.51
   18.38      65   21.21      65   22.63   64.16   24.04      64   25.46   63.38
   26.87   62.85   31.11   61.16   33.94    60.6   35.36   60.14   36.77      60
   38.18   59.67    39.6   59.43   41.01      59   45.25   56.16   46.67   54.82
   48.08      54   50.91   53.42   52.33   52.97   56.57   52.65   57.98   52.65
   62.23      53   63.64      53   65.05      55   67.88   56.47   73.54    59.7
   74.95      60   82.02    62.8   86.27    64.6   87.68      65   91.92   67.15
   97.58      70  107.48   72.65  111.72   73.52

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   36.77     .06   74.95     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         36.77   74.95          160.23  160.23  160.23             .1       .3

CROSS SECTION OUTPUT  Profile #Ex EV 2yr

  E.G. Elev (ft)              53.65    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.20    Wt. n-Val.                           0.060
  W.S. Elev (ft)              53.45    Reach Len. (ft)          160.23     160.23     160.23
  Crit W.S. (ft)              53.38    Flow Area (sq ft)                     7.52
  E.G. Slope (ft/ft)       0.045880    Area (sq ft)                          7.52
  Q Total (cfs)               27.00    Flow (cfs)                           27.00
  Top Width (ft)              13.17    Top Width (ft)                       13.17
  Vel Total (ft/s)             3.59    Avg. Vel. (ft/s)                      3.59
  Max Chl Dpth (ft)            0.80    Hydr. Depth (ft)                      0.57
  Conv. Total (cfs)           126.1    Conv. (cfs)                          126.1
  Length Wtd. (ft)           160.23    Wetted Per. (ft)                     13.50
  Min Ch El (ft)              52.65    Shear (lb/sq ft)                      1.60
  Alpha                        1.00    Stream Power (lb/ft s)                5.73
  Frctn Loss (ft)              2.89    Cum Volume (acre-ft)                  0.81
  C & E Loss (ft)              0.05    Cum SA (acres)                        1.45


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Ex EV 100yr

  E.G. Elev (ft)              54.57    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.44    Wt. n-Val.                           0.060
  W.S. Elev (ft)              54.13    Reach Len. (ft)          160.23     160.23     160.23
  Crit W.S. (ft)              54.05    Flow Area (sq ft)                    17.84
  E.G. Slope (ft/ft)       0.044582    Area (sq ft)                         17.84
  Q Total (cfs)               95.00    Flow (cfs)                           95.00
  Top Width (ft)              16.59    Top Width (ft)                       16.59
  Vel Total (ft/s)             5.32    Avg. Vel. (ft/s)                      5.32
  Max Chl Dpth (ft)            1.48    Hydr. Depth (ft)                      1.08
  Conv. Total (cfs)           449.9    Conv. (cfs)                          449.9
  Length Wtd. (ft)           160.23    Wetted Per. (ft)                     17.36
  Min Ch El (ft)              52.65    Shear (lb/sq ft)                      2.86
  Alpha                        1.00    Stream Power (lb/ft s)               15.23
  Frctn Loss (ft)              3.00    Cum Volume (acre-ft)        0.01      2.04       0.01
  C & E Loss (ft)              0.10    Cum SA (acres)              0.05      1.82       0.04


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 1902

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	64.29	2.24	62.79	6.71	60.14	7.71	59.78	18	55
22.48	53.97	31.08	52.07	36.91	50.9	37.91	50.54	40.74	50
61.11	50	65.59	51.14	66.59	51.33	71.06	52.74	73.3	53.66
77.77	55	82.77	57.7	87.77	60	92.24	61.4	102.54	65
103.95	65.27								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	18	.06	77.77	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
18	77.77	245.09	245.09	245.09	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	50.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.060	
W.S. Elev (ft)	50.67	Reach Len. (ft)	245.09	245.09	245.09
Crit W.S. (ft)		Flow Area (sq ft)		15.73	
E.G. Slope (ft/ft)	0.009555	Area (sq ft)		15.73	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	26.21	Top Width (ft)		26.21	
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	0.67	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	276.2	Conv. (cfs)		276.2	
Length Wtd. (ft)	245.09	Wetted Per. (ft)		26.36	
Min Ch El (ft)	50.00	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		0.61	
Frctn Loss (ft)	5.02	Cum Volume (acre-ft)		0.77	
C & E Loss (ft)	0.02	Cum SA (acres)		1.38	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Ex EV 100yr

E.G. Elev (ft)	51.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.060	
W.S. Elev (ft)	51.36	Reach Len. (ft)	245.09	245.09	245.09
Crit W.S. (ft)		Flow Area (sq ft)		35.56	
E.G. Slope (ft/ft)	0.010268	Area (sq ft)		35.56	
Q Total (cfs)	95.00	Flow (cfs)		95.00	
Top Width (ft)	32.05	Top Width (ft)		32.05	
Vel Total (ft/s)	2.67	Avg. Vel. (ft/s)		2.67	
Max Chl Dpth (ft)	1.36	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	937.5	Conv. (cfs)		937.5	
Length Wtd. (ft)	245.09	Wetted Per. (ft)		32.38	
Min Ch El (ft)	50.00	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)		1.88	
Frctn Loss (ft)	4.95	Cum Volume (acre-ft)	0.01	1.94	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	1.73	0.04

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 1657

INPUT

```
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   67.68       5   66.18    8.61      65   25.63   60.21   27.05   59.69
   33.45   56.22   35.69      55   42.09   52.76    49.9      50   52.14   48.53
   57.14      45    71.4      45   87.03   48.98   89.26   49.72   90.68      50
    99.9    53.9  102.13      55  112.13   59.43  113.55      60  115.78   60.32
  116.78   60.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    49.9     .06   90.68     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          49.9   90.68          193.82  193.82  193.82             .1        .3

CROSS SECTION OUTPUT  Profile #Ex EV 2yr

  E.G. Elev (ft)             45.68    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.22    Wt. n-Val.                          0.060
  W.S. Elev (ft)             45.47    Reach Len. (ft)         193.82     193.82     193.82
  Crit W.S. (ft)             45.47    Flow Area (sq ft)                    7.21
  E.G. Slope (ft/ft)      0.071442    Area (sq ft)                         7.21
  Q Total (cfs)              27.00    Flow (cfs)                          27.00
  Top Width (ft)             16.75    Top Width (ft)                      16.75
  Vel Total (ft/s)            3.74    Avg. Vel. (ft/s)                     3.74
  Max Chl Dpth (ft)           0.47    Hydr. Depth (ft)                     0.43
  Conv. Total (cfs)          101.0    Conv. (cfs)                         101.0
  Length Wtd. (ft)          193.82    Wetted Per. (ft)                    16.95
  Min Ch El (ft)             45.00    Shear (lb/sq ft)                     1.90
  Alpha                       1.00    Stream Power (lb/ft s)               7.10
  Frctn Loss (ft)             1.19    Cum Volume (acre-ft)                 0.70
  C & E Loss (ft)             0.06    Cum SA (acres)                       1.26


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #Ex EV 100yr

  E.G. Elev (ft)             46.49    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.45    Wt. n-Val.                          0.060
  W.S. Elev (ft)             46.04    Reach Len. (ft)         193.82     193.82     193.82
  Crit W.S. (ft)             46.04    Flow Area (sq ft)                   17.68
  E.G. Slope (ft/ft)      0.056464    Area (sq ft)                        17.68
  Q Total (cfs)              95.00    Flow (cfs)                          95.00
  Top Width (ft)             19.81    Top Width (ft)                      19.81
  Vel Total (ft/s)            5.37    Avg. Vel. (ft/s)                     5.37
  Max Chl Dpth (ft)           1.04    Hydr. Depth (ft)                     0.89
  Conv. Total (cfs)          399.8    Conv. (cfs)                         399.8
  Length Wtd. (ft)          193.82    Wetted Per. (ft)                    20.27
  Min Ch El (ft)             45.00    Shear (lb/sq ft)                     3.08
  Alpha                       1.00    Stream Power (lb/ft s)              16.52
  Frctn Loss (ft)             1.79    Cum Volume (acre-ft)       0.01      1.79       0.01
  C & E Loss (ft)             0.11    Cum SA (acres)             0.05      1.58       0.04


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: S_Arroyo
REACH: 1                  RS: 1463
```

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	59.42	0	59.38	14.87	55	21.94	52.69	29.75	50
41.06	45.83	43.3	45	46.13	43.98	56.76	40	66.66	40
68.07	40.44	75.14	45	85.77	49.14	87.18	50	88.6	50.37
91.43	51	92.84	51.5	94.26	52	97.91	53	98.91	53.26
101.14	54	102.56	55	103.97	55.22	106.8	55.7	107.8	55.81
108.8	55.91	110.8	56	112.21	56	113.21	56.09	114.21	56.16
115.21	56.45	116.63	56.72	118.04	57	119.46	57.45	122.28	58
123.7	58.49								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	43.3	.06	75.14	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
43.3	75.14	171.6	171.6	171.6	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	41.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.060	
W.S. Elev (ft)	41.54	Reach Len. (ft)	171.60	171.60	171.60
Crit W.S. (ft)		Flow Area (sq ft)		21.19	
E.G. Slope (ft/ft)	0.002097	Area (sq ft)		21.19	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	17.12	Top Width (ft)		17.12	
Vel Total (ft/s)	1.27	Avg. Vel. (ft/s)		1.27	
Max Chl Dpth (ft)	1.54	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	589.6	Conv. (cfs)		589.6	
Length Wtd. (ft)	171.60	Wetted Per. (ft)		17.79	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.20	
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)		0.64	
C & E Loss (ft)	0.01	Cum SA (acres)		1.18	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Ex EV 100yr

E.G. Elev (ft)	42.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.060	
W.S. Elev (ft)	42.63	Reach Len. (ft)	171.60	171.60	171.60
Crit W.S. (ft)		Flow Area (sq ft)		42.32	
E.G. Slope (ft/ft)	0.003624	Area (sq ft)		42.32	
Q Total (cfs)	95.00	Flow (cfs)		95.00	
Top Width (ft)	21.72	Top Width (ft)		21.72	
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)		2.24	
Max Chl Dpth (ft)	2.63	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	1578.2	Conv. (cfs)		1578.2	
Length Wtd. (ft)	171.60	Wetted Per. (ft)		22.90	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		0.94	
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)	0.01	1.66	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	1.49	0.04

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 1292

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	51.51	1	51.07	4.61	50	6.84	49.54	8.84	49.23
11.08	48.8	18.69	47.36	24.08	45.98	26.08	45.77	27.49	45.54
29.73	45	36.05	43.63	40.53	42.73	42.76	42.24	45	41.85
53.54	40	78.37	40	79.79	40.56	81.79	41	83.2	41.2
85.2	42	88.81	43	91.97	44	92.97	44.05	96.57	45
97.57	45.25	100.74	46	102.97	46.38	105.21	47	111.57	48
115.17	48.36	116.17	48.4	117.17	48.45	118.59	48.5	119.59	48.54
120.59	48.56	122	48.58	126.12	48.78	128.36	49	130.6	49.49

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	45	.06	85.2	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
45	85.2	179.73	179.73	179.73	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	40.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.060	
W.S. Elev (ft)	40.33	Reach Len. (ft)	179.73	179.73	179.73
Crit W.S. (ft)	40.33	Flow Area (sq ft)		8.48	
E.G. Slope (ft/ft)	0.078501	Area (sq ft)		8.48	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	27.16	Top Width (ft)		27.16	
Vel Total (ft/s)	3.19	Avg. Vel. (ft/s)		3.19	
Max Chl Dpth (ft)	0.33	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	96.4	Conv. (cfs)		96.4	
Length Wtd. (ft)	179.73	Wetted Per. (ft)		27.26	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		1.52	
Alpha	1.00	Stream Power (lb/ft s)		4.85	
Frctn Loss (ft)	1.44	Cum Volume (acre-ft)		0.58	
C & E Loss (ft)	0.04	Cum SA (acres)		1.10	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Ex EV 100yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	41.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.060	
W.S. Elev (ft)	40.74	Reach Len. (ft)	179.73	179.73	179.73
Crit W.S. (ft)	40.74	Flow Area (sq ft)		20.45	
E.G. Slope (ft/ft)	0.060563	Area (sq ft)		20.45	
Q Total (cfs)	95.00	Flow (cfs)		95.00	
Top Width (ft)	30.51	Top Width (ft)		30.51	
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)		4.65	
Max Chl Dpth (ft)	0.74	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	386.0	Conv. (cfs)		386.0	
Length Wtd. (ft)	179.73	Wetted Per. (ft)		30.71	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		2.52	
Alpha	1.00	Stream Power (lb/ft s)		11.69	
Frctn Loss (ft)	1.55	Cum Volume (acre-ft)	0.01	1.53	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.05	1.38	0.04

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 1112

```
INPUT
Description:
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   43.01   12.53      40   33.62   35.85    38.1      35   48.39      34
   65.89      34   68.13   34.15   70.36   34.41    72.6   34.65    76.2      35
   77.62   35.44   79.85      36   80.85   36.15   82.27   36.71   83.27      37
   86.87   37.93   87.87   38.02   91.48   39.01   96.48      40   97.48   40.24
  101.08   40.88  102.08      41  105.69   41.97  106.69      42  107.69   42.07
   111.3      43  113.53   43.42  115.77   44.02  120.24   44.67

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   33.62     .06   79.85     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         33.62   79.85           215.95  215.95  215.95             .1       .3

CROSS SECTION OUTPUT  Profile #Ex EV 2yr

  E.G. Elev (ft)            35.04    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.02    Wt. n-Val.                           0.060
  W.S. Elev (ft)            35.02    Reach Len. (ft)          215.95     215.95     215.95
  Crit W.S. (ft)            34.44    Flow Area (sq ft)                    28.72
  E.G. Slope (ft/ft)     0.003363    Area (sq ft)                         28.72
  Q Total (cfs)             34.00    Flow (cfs)                           34.00
  Top Width (ft)            38.26    Top Width (ft)                       38.26
  Vel Total (ft/s)           1.18    Avg. Vel. (ft/s)                      1.18
  Max Chl Dpth (ft)          1.02    Hydr. Depth (ft)                      0.75
  Conv. Total (cfs)         586.3    Conv. (cfs)                          586.3
  Length Wtd. (ft)         215.95    Wetted Per. (ft)                     38.36
  Min Ch El (ft)            34.00    Shear (lb/sq ft)                      0.16
  Alpha                      1.00    Stream Power (lb/ft s)                0.19
  Frctn Loss (ft)            1.99    Cum Volume (acre-ft)                  0.50
  C & E Loss (ft)            0.01    Cum SA (acres)                        0.96


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Ex EV 100yr

  E.G. Elev (ft)            35.99    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.07    Wt. n-Val.                0.060      0.060
  W.S. Elev (ft)            35.93    Reach Len. (ft)          215.95     215.95     215.95
  Crit W.S. (ft)                     Flow Area (sq ft)          0.01      66.97
  E.G. Slope (ft/ft)     0.004225    Area (sq ft)               0.01      66.97
  Q Total (cfs)            138.00    Flow (cfs)                 0.00     138.00
  Top Width (ft)            46.31    Top Width (ft)             0.38      45.93
  Vel Total (ft/s)           2.06    Avg. Vel. (ft/s)           0.18       2.06
  Max Chl Dpth (ft)          1.93    Hydr. Depth (ft)           0.04       1.46
  Conv. Total (cfs)        2123.1    Conv. (cfs)                 0.0     2123.0
  Length Wtd. (ft)         215.95    Wetted Per. (ft)           0.39      46.24
  Min Ch El (ft)            34.00    Shear (lb/sq ft)           0.01       0.38
  Alpha                      1.00    Stream Power (lb/ft s)     0.00       0.79
  Frctn Loss (ft)            2.29    Cum Volume (acre-ft)       0.01       1.35       0.01
  C & E Loss (ft)            0.03    Cum SA (acres)             0.05       1.23       0.04


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: S_Arroyo
REACH: 1                  RS: 896

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   43.13       1   42.74    11.2      40   27.32      35   30.32    34.3
   31.74      34   34.74   33.51   37.74      33    40.9   32.79    43.9   32.61
```

44.9	32.6	47.14	32.49	62.27	32.43	63.27	32.48	65.27	32.48
66.27	32.54	67.27	32.55	69.5	32.62	71.5	32.73	73.5	32.87
75.74	33	76.74	33.08	77.74	33.11	82.84	33.49	85.84	33.67
89.96	34	91.96	34.21	98.04	35	105.12	35.57	110.21	36
112.21	36.24	118.3	37	122.3	37.6	125.46	38	127.46	38.33
128.46	38.54	130.46	38.83	131.87	38.95	132.87	39	134.87	39.25

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	34.74	.06	82.84	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
34.74	82.84	240.26	240.26	240.26	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	33.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.060	
W.S. Elev (ft)	32.86	Reach Len. (ft)	240.26	240.26	240.26
Crit W.S. (ft)	32.86	Flow Area (sq ft)		10.59	
E.G. Slope (ft/ft)	0.078473	Area (sq ft)		10.59	
Q Total (cfs)	34.00	Flow (cfs)		34.00	
Top Width (ft)	33.62	Top Width (ft)		33.62	
Vel Total (ft/s)	3.21	Avg. Vel. (ft/s)		3.21	
Max Chl Dpth (ft)	0.43	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	121.4	Conv. (cfs)		121.4	
Length Wtd. (ft)	240.26	Wetted Per. (ft)		33.64	
Min Ch El (ft)	32.43	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)		4.95	
Frctn Loss (ft)	3.36	Cum Volume (acre-ft)		0.41	
C & E Loss (ft)	0.04	Cum SA (acres)		0.78	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Ex EV 100yr

E.G. Elev (ft)	33.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.060	
W.S. Elev (ft)	33.34	Reach Len. (ft)	240.26	240.26	240.26
Crit W.S. (ft)	33.34	Flow Area (sq ft)		29.77	
E.G. Slope (ft/ft)	0.061155	Area (sq ft)		29.77	
Q Total (cfs)	138.00	Flow (cfs)		138.00	
Top Width (ft)	45.15	Top Width (ft)		45.15	
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)		4.63	
Max Chl Dpth (ft)	0.91	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	558.0	Conv. (cfs)		558.0	
Length Wtd. (ft)	240.26	Wetted Per. (ft)		45.22	
Min Ch El (ft)	32.43	Shear (lb/sq ft)		2.51	
Alpha	1.00	Stream Power (lb/ft s)		11.65	
Frctn Loss (ft)	3.55	Cum Volume (acre-ft)	0.01	1.11	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.05	1.00	0.04

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 656

INPUT

```
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   32.18       1      32    5.47   31.11    6.47      31    7.47   30.75
   11.94      30   18.03   28.95   23.41      28   26.57   27.45   28.81      27
   30.81   26.67   34.93      26   39.41   25.32   41.41      25   79.35      25
   86.63    25.9   87.63      26   93.96   26.88   94.96      27   103.5   27.88
   104.5      28  105.92   28.13  106.92   28.25  112.31   28.73  115.31   28.95
  116.73      29  117.73   29.04  119.96   29.13  123.13    29.2  124.13   29.22
  127.29   29.29  128.29   29.32  132.76   29.38  136.88   29.41  139.12   29.45
  142.12   29.49  143.53    29.5  144.53   29.52  146.95   29.52  150.11   29.57
  151.11   29.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   34.93     .06   87.63     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         34.93   87.63           175.08  175.08  175.08             .1       .3

CROSS SECTION OUTPUT  Profile #Ex EV 2yr

  E.G. Elev (ft)              25.65    Element                    Left OB     Channel   Right OB
  Vel Head (ft)                0.03    Wt. n-Val.                              0.060
  W.S. Elev (ft)              25.63    Reach Len. (ft)            175.08      175.08     175.08
  Crit W.S. (ft)                       Flow Area (sq ft)                       26.74
  E.G. Slope (ft/ft)       0.005613    Area (sq ft)                            26.74
  Q Total (cfs)               34.00    Flow (cfs)                              34.00
  Top Width (ft)              47.07    Top Width (ft)                          47.07
  Vel Total (ft/s)             1.27    Avg. Vel. (ft/s)                         1.27
  Max Chl Dpth (ft)            0.63    Hydr. Depth (ft)                         0.57
  Conv. Total (cfs)           453.8    Conv. (cfs)                             453.8
  Length Wtd. (ft)           175.08    Wetted Per. (ft)                        47.16
  Min Ch El (ft)              25.00    Shear (lb/sq ft)                         0.20
  Alpha                        1.00    Stream Power (lb/ft s)                   0.25
  Frctn Loss (ft)              0.99    Cum Volume (acre-ft)                     0.30
  C & E Loss (ft)              0.00    Cum SA (acres)                           0.56


CROSS SECTION OUTPUT  Profile #Ex EV 100yr

  E.G. Elev (ft)              26.39    Element                    Left OB     Channel   Right OB
  Vel Head (ft)                0.08    Wt. n-Val.                  0.060       0.060      0.060
  W.S. Elev (ft)              26.32    Reach Len. (ft)            175.08      175.08     175.08
  Crit W.S. (ft)                       Flow Area (sq ft)            0.31       61.99       0.37
  E.G. Slope (ft/ft)       0.006492    Area (sq ft)                 0.31       61.99       0.37
  Q Total (cfs)              138.00    Flow (cfs)                   0.18      137.61       0.21
  Top Width (ft)              56.95    Top Width (ft)               1.96       52.70       2.29
  Vel Total (ft/s)             2.20    Avg. Vel. (ft/s)             0.58        2.22       0.58
  Max Chl Dpth (ft)            1.32    Hydr. Depth (ft)             0.16        1.18       0.16
  Conv. Total (cfs)          1712.7    Conv. (cfs)                   2.3      1707.8        2.6
  Length Wtd. (ft)           175.08    Wetted Per. (ft)             1.99       52.84       2.31
  Min Ch El (ft)              25.00    Shear (lb/sq ft)             0.06        0.48       0.06
  Alpha                        1.01    Stream Power (lb/ft s)       0.04        1.06       0.04
  Frctn Loss (ft)              0.75    Cum Volume (acre-ft)         0.01        0.86       0.01
  C & E Loss (ft)              0.01    Cum SA (acres)               0.04        0.73       0.04

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: S_Arroyo
REACH: 1                  RS: 481

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   37.91    3.16   37.28    4.16      37     6.4   36.61    9.56      36
   10.56   35.82   13.72      35   15.14   34.43   17.37      34   20.98      33
   24.58   32.09   25.58      32      27   31.62   29.23   30.96   31.47      30
   32.88   29.73   37.36      29   39.59      28   41.01   27.75   43.24      27
   47.72   26.76   57.15   26.27   71.09   25.53   80.53      25   86.36   24.73
  103.36      24  120.86      24  141.45   23.87  144.28      24  161.28      25
  168.49   25.51  176.55      26  183.26    26.6  186.87      27  190.47      28
  191.89   28.21  194.12      29  195.12   29.21  200.12      30  202.36   30.47
```

203.36	30.65	210.57	32.22	214.17	32.97	224.47	35	230.3	37.02
232.54	37.67								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	80.53	.06	161.28	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
80.53	161.28	149.6	149.6	149.6	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

E.G. Elev (ft)	24.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.060	
W.S. Elev (ft)	24.64	Reach Len. (ft)	149.60	149.60	149.60
Crit W.S. (ft)		Flow Area (sq ft)		36.24	
E.G. Slope (ft/ft)	0.005694	Area (sq ft)		36.24	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	66.87	Top Width (ft)		66.87	
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)		1.24	
Max Chl Dpth (ft)	0.77	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	596.3	Conv. (cfs)		596.3	
Length Wtd. (ft)	149.60	Wetted Per. (ft)		66.91	
Min Ch El (ft)	23.87	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.24	
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)		0.18	
C & E Loss (ft)	0.01	Cum SA (acres)		0.33	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Ex EV 100yr

E.G. Elev (ft)	25.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	25.59	Reach Len. (ft)	149.60	149.60	149.60
Crit W.S. (ft)		Flow Area (sq ft)	3.14	110.49	2.50
E.G. Slope (ft/ft)	0.003327	Area (sq ft)	3.14	110.49	2.50
Q Total (cfs)	198.00	Flow (cfs)	1.99	194.44	1.57
Top Width (ft)	99.99	Top Width (ft)	10.65	80.75	8.59
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)	0.63	1.76	0.63
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)	0.30	1.37	0.29
Conv. Total (cfs)	3432.6	Conv. (cfs)	34.5	3370.9	27.2
Length Wtd. (ft)	149.60	Wetted Per. (ft)	10.66	80.80	8.61
Min Ch El (ft)	23.87	Shear (lb/sq ft)	0.06	0.28	0.06
Alpha	1.05	Stream Power (lb/ft s)	0.04	0.50	0.04
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.01	0.51	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	0.46	0.01

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 331

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	28.1	1	28	2.41	27.82	3.83	27.75	6.06	27.53
7.48	27.45	9.71	27.28	10.71	27.21	12.95	27	15.19	26.87
18.79	26.71	28.23	26.6	31.05	26.69	33.29	26.74	34.29	26.72
35.29	26.68	38.9	26.91	41.13	27	66.24	27	67.65	26.94
69.07	26.64	72.67	26.17	74.08	26	75.08	25.87	84.52	24.98
88.76	24	95.47	23.17	96.88	23	100.49	22.18	101.49	22
107.15	22	111.62	22.74	113.85	23	121.07	24.01	126.07	24.46
132.47	25	135.63	25.23	138.46	25.53	139.46	25.64	140.46	25.72
141.46	25.81	143.7	26	146.52	26.73	147.52	27.1	151.13	28
152.13	28.05	153.13	28.14	155.96	29	159.56	29.84	160.56	30
161.56	30.21	162.98	30.64	173.79	33.57	178.79	35	182.4	35.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	84.52	.06	132.47	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
84.52	132.47	206.09	206.09	206.09	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	23.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.060	
W.S. Elev (ft)	23.40	Reach Len. (ft)	206.09	206.09	206.09
Crit W.S. (ft)	22.93	Flow Area (sq ft)		19.19	
E.G. Slope (ft/ft)	0.011637	Area (sq ft)		19.19	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	23.11	Top Width (ft)		23.11	
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)		2.34	
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)		0.83	
Conv. Total (cfs)	417.1	Conv. (cfs)		417.1	
Length Wtd. (ft)	206.09	Wetted Per. (ft)		23.35	
Min Ch El (ft)	22.00	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		1.40	
Frctn Loss (ft)	5.02	Cum Volume (acre-ft)		0.08	
C & E Loss (ft)	0.01	Cum SA (acres)		0.18	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Ex EV 100yr

E.G. Elev (ft)	24.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.060	
W.S. Elev (ft)	24.50	Reach Len. (ft)	206.09	206.09	206.09
Crit W.S. (ft)	23.93	Flow Area (sq ft)		53.67	
E.G. Slope (ft/ft)	0.015136	Area (sq ft)		53.67	
Q Total (cfs)	198.00	Flow (cfs)		198.00	
Top Width (ft)	39.89	Top Width (ft)		39.89	
Vel Total (ft/s)	3.69	Avg. Vel. (ft/s)		3.69	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	1609.4	Conv. (cfs)		1609.4	
Length Wtd. (ft)	206.09	Wetted Per. (ft)		40.29	
Min Ch El (ft)	22.00	Shear (lb/sq ft)		1.26	
Alpha	1.00	Stream Power (lb/ft s)		4.64	
Frctn Loss (ft)	5.58	Cum Volume (acre-ft)		0.23	
C & E Loss (ft)	0.01	Cum SA (acres)		0.26	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 125

INPUT
Description:
Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.23	0	32	2.24	31.31	3.65	30.94	6.89	30.68
8.3	30.57	14.13	30.45	15.13	30.46	16.55	30.46	18.78	30.49
21.02	30.48	22.02	30.47	23.43	30.45	27.04	30.26	29.27	30.12
30.27	30	31.69	29.72	33.92	29	35.34	28.4	36.34	27.69
38.57	27	40.81	26.14	41.81	26	42.81	25.65	45.05	25
47.28	24.46	48.7	23.83	51.86	23	53.27	22.59	55.51	22
58.34	21.23	59.34	21	62.94	20.18	63.94	20	65.36	20
69.83	19.53	74.3	19	78.77	18.76	83.25	18.51	89.08	18.17
90.49	18.11	92.73	18	132.94	18	137.94	18.3	143.77	18.63
149.6	19	152.76	19.31	158.59	20	159.59	20.52	161.01	21.17
163.24	23.08	166.85	25	167.85	26	169.26	26.58	170.26	27.22
171.68	28.27	173.09	29	175.33	29.59	176.33	29.78	178.56	30.08
179.98	30.15	184.45	30.63	185.45	30.77	188.28	31	191.44	31.27
192.85	31.31	193.85	31.39	195.27	31.43	196.27	31.49	199.1	31.59
202.26	32	203.67	32	207.28	32.66	208.28	33	209.69	33.19

211.93	34	212.93	34.53	214.34	35	214.34	35.09

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	63.94	.06	158.59	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
63.94	158.59	124.97	124.97	124.97	.1	.3

CROSS SECTION OUTPUT Profile #Ex EV 2yr

E.G. Elev (ft)	18.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.060	
W.S. Elev (ft)	18.32	Reach Len. (ft)			
Crit W.S. (ft)	18.32	Flow Area (sq ft)		14.82	
E.G. Slope (ft/ft)	0.079816	Area (sq ft)		14.82	
Q Total (cfs)	45.00	Flow (cfs)		45.00	
Top Width (ft)	51.83	Top Width (ft)		51.83	
Vel Total (ft/s)	3.04	Avg. Vel. (ft/s)		3.04	
Max Chl Dpth (ft)	0.32	Hydr. Depth (ft)		0.29	
Conv. Total (cfs)	159.3	Conv. (cfs)		159.3	
Length Wtd. (ft)		Wetted Per. (ft)		51.84	
Min Ch El (ft)	18.00	Shear (lb/sq ft)		1.42	
Alpha	1.00	Stream Power (lb/ft s)		4.33	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #Ex EV 100yr

E.G. Elev (ft)	19.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.060	
W.S. Elev (ft)	18.80	Reach Len. (ft)			
Crit W.S. (ft)	18.80	Flow Area (sq ft)		43.54	
E.G. Slope (ft/ft)	0.061593	Area (sq ft)		43.54	
Q Total (cfs)	198.00	Flow (cfs)		198.00	
Top Width (ft)	68.38	Top Width (ft)		68.38	
Vel Total (ft/s)	4.55	Avg. Vel. (ft/s)		4.55	
Max Chl Dpth (ft)	0.80	Hydr. Depth (ft)		0.64	
Conv. Total (cfs)	797.8	Conv. (cfs)		797.8	
Length Wtd. (ft)		Wetted Per. (ft)		68.42	
Min Ch El (ft)	18.00	Shear (lb/sq ft)		2.45	
Alpha	1.00	Stream Power (lb/ft s)		11.13	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:S_Arroyo

Reach	River Sta.	n1	n2	n3
1	2256	.06	.06	.06
1	2062	.06	.06	.06
1	1902	.06	.06	.06
1	1657	.06	.06	.06
1	1463	.06	.06	.06
1	1292	.06	.06	.06
1	1112	.06	.06	.06
1	896	.06	.06	.06
1	656	.06	.06	.06
1	481	.06	.06	.06
1	331	.06	.06	.06
1	125	.06	.06	.06

SUMMARY OF REACH LENGTHS

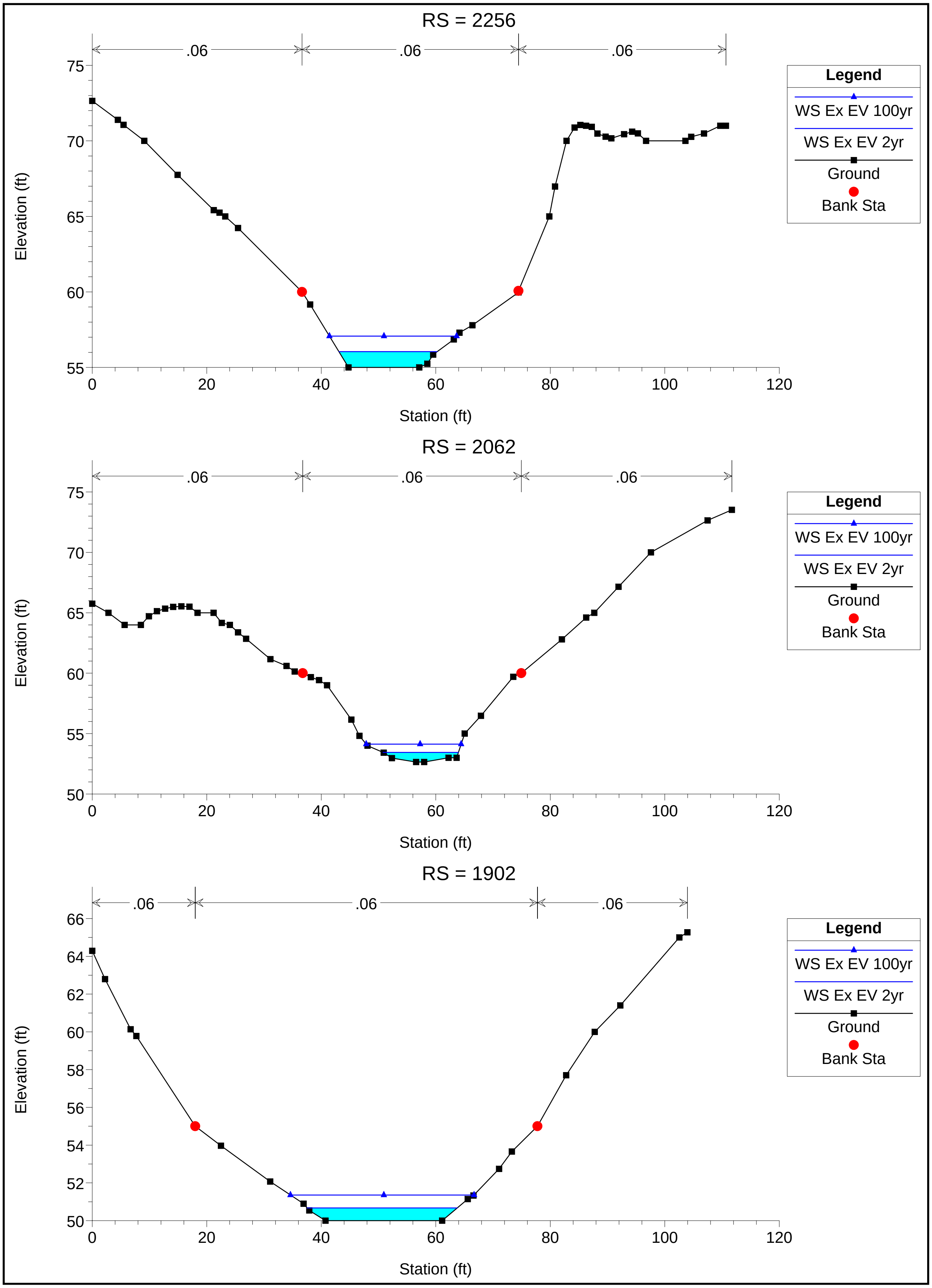
River: S_Arroyo

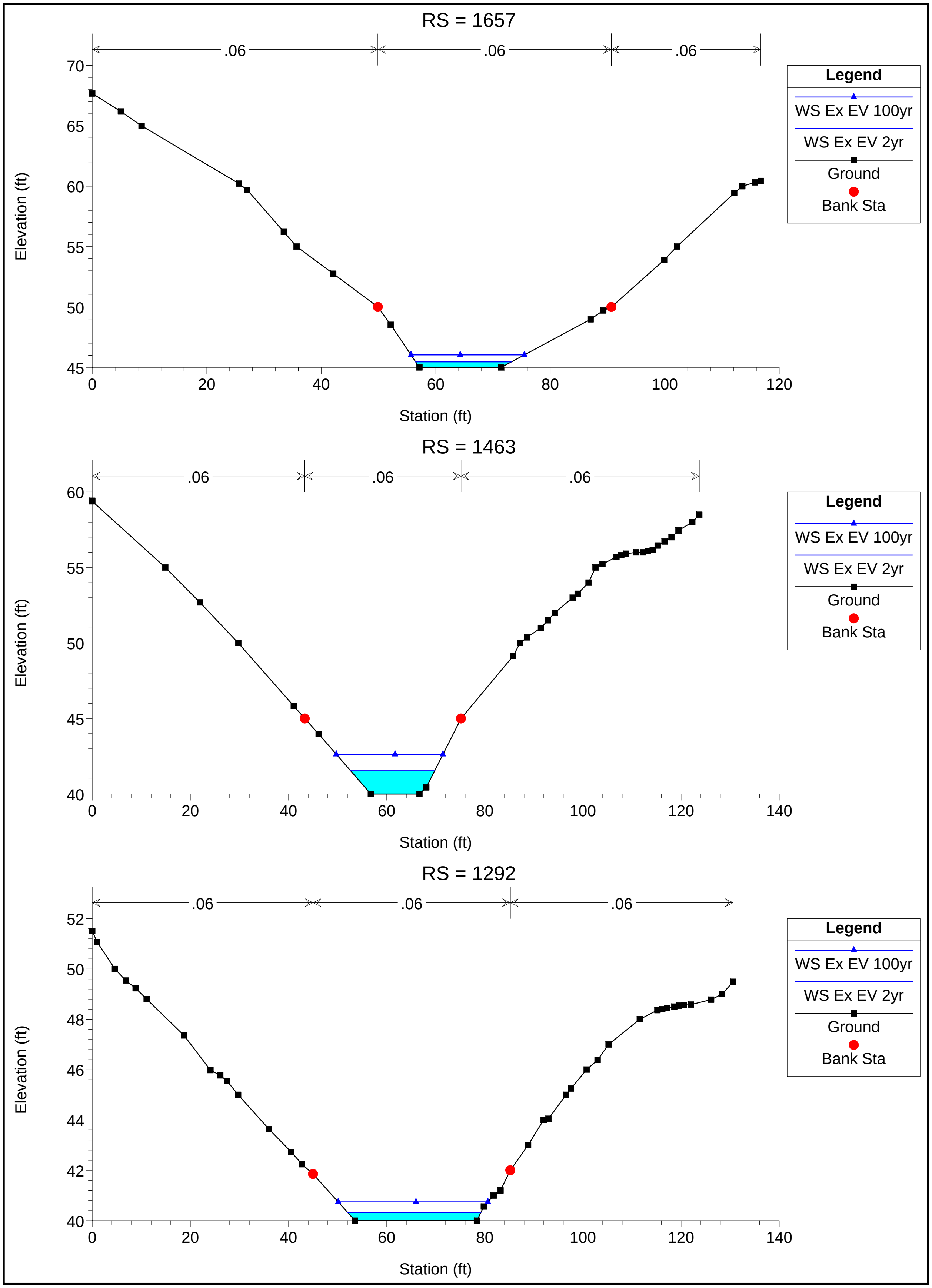
Reach	River Sta.	Left	Channel	Right
1	2256	193.64	193.64	193.64
1	2062	160.23	160.23	160.23

1	1902	245.09	245.09	245.09
1	1657	193.82	193.82	193.82
1	1463	171.6	171.6	171.6
1	1292	179.73	179.73	179.73
1	1112	215.95	215.95	215.95
1	896	240.26	240.26	240.26
1	656	175.08	175.08	175.08
1	481	149.6	149.6	149.6
1	331	206.09	206.09	206.09
1	125	124.97	124.97	124.97

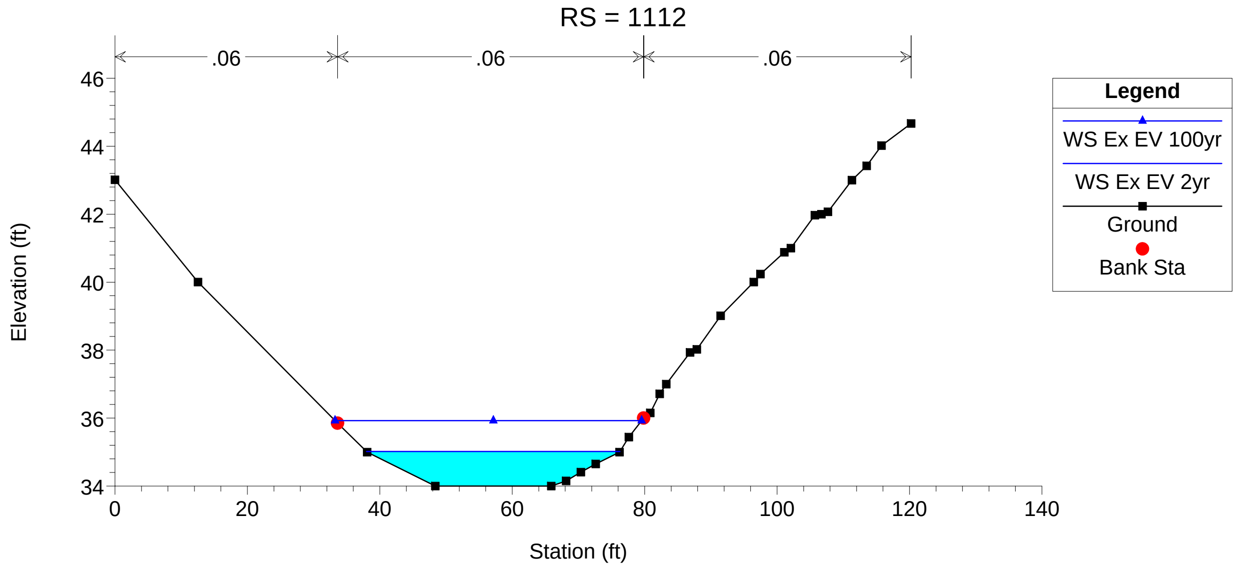
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: S_Arroyo

Reach	River Sta.	Contr.	Expan.
1	2256	.1	.3
1	2062	.1	.3
1	1902	.1	.3
1	1657	.1	.3
1	1463	.1	.3
1	1292	.1	.3
1	1112	.1	.3
1	896	.1	.3
1	656	.1	.3
1	481	.1	.3
1	331	.1	.3
1	125	.1	.3

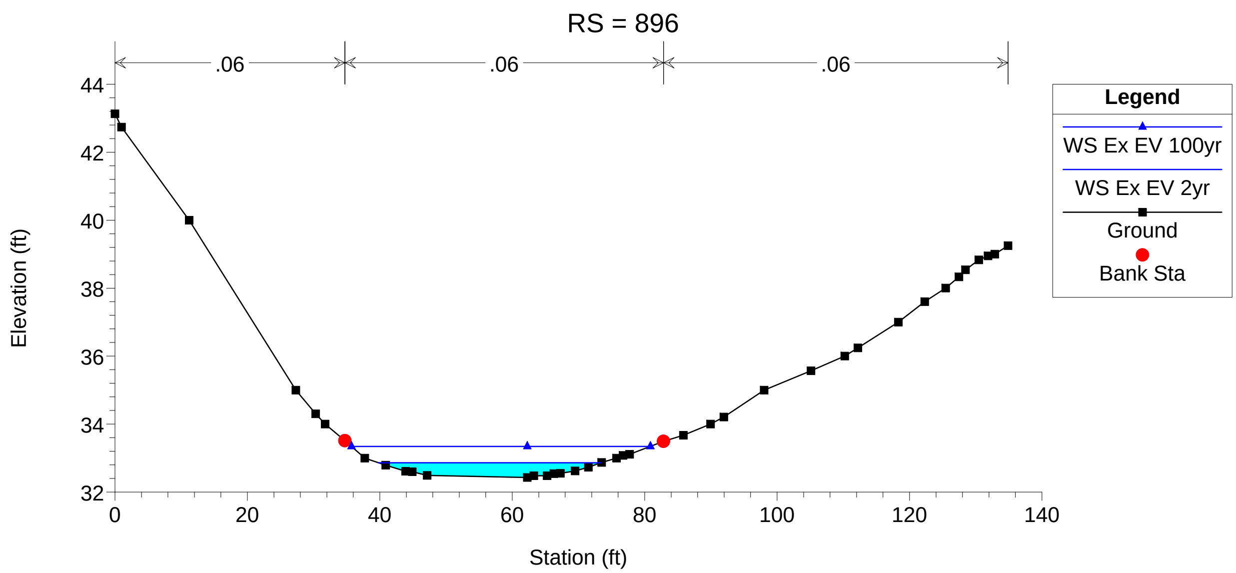

RS = 2256
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta
RS = 2062
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta
RS = 1902
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta



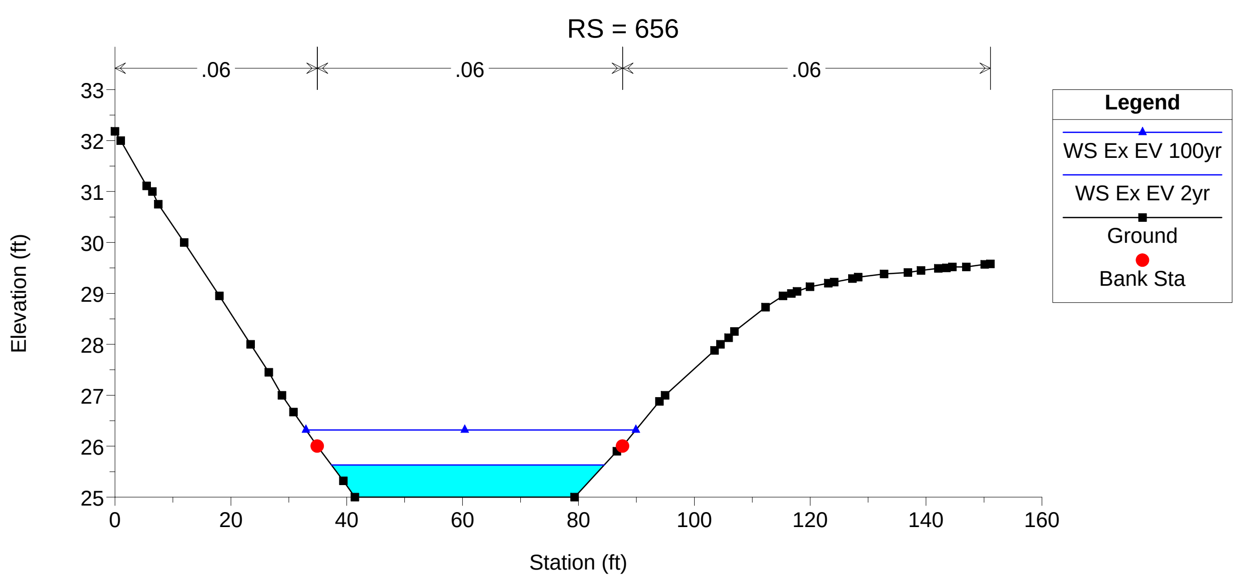
RS = 1657
.06
.06
.06
70
65
60
55
50
45
0
20
40
60
80
100
120
Elevation (ft)
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta
RS = 1463
.06
.06
.06
60
55
50
45
40
0
20
40
60
80
100
120
140
Elevation (ft)
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta
RS = 1292
.06
.06
.06
52
50
48
46
44
42
40
0
20
40
60
80
100
120
140
Elevation (ft)
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta



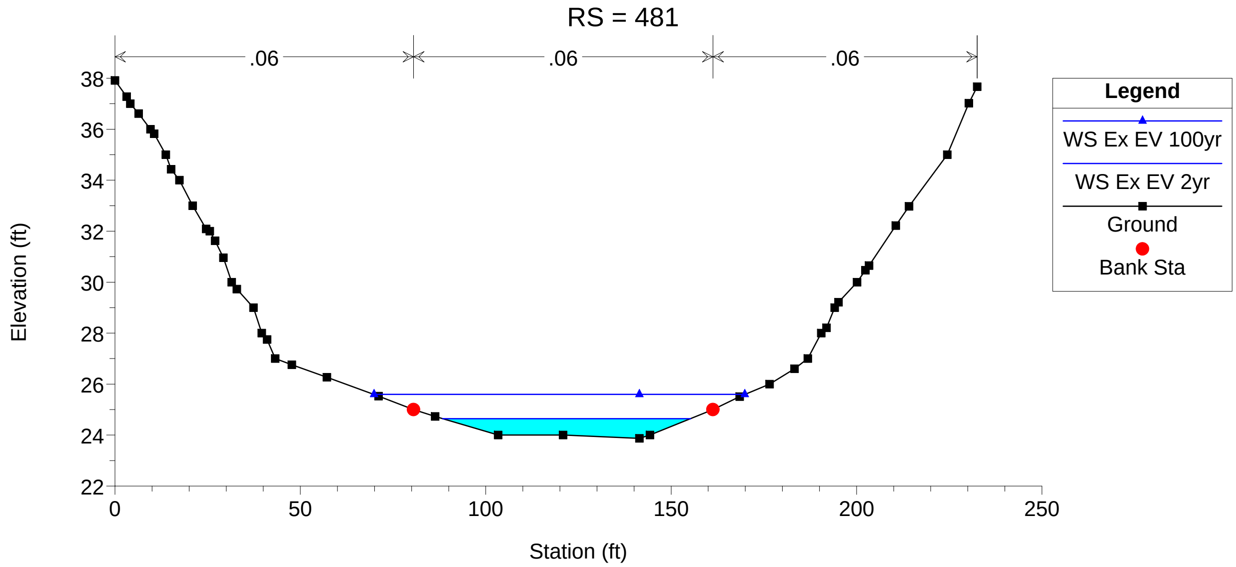
RS = 1112
.06
.06
.06
Elevation (ft)
Station (ft)
46
44
42
40
38
36
34
0
20
40
60
80
100
120
140
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta

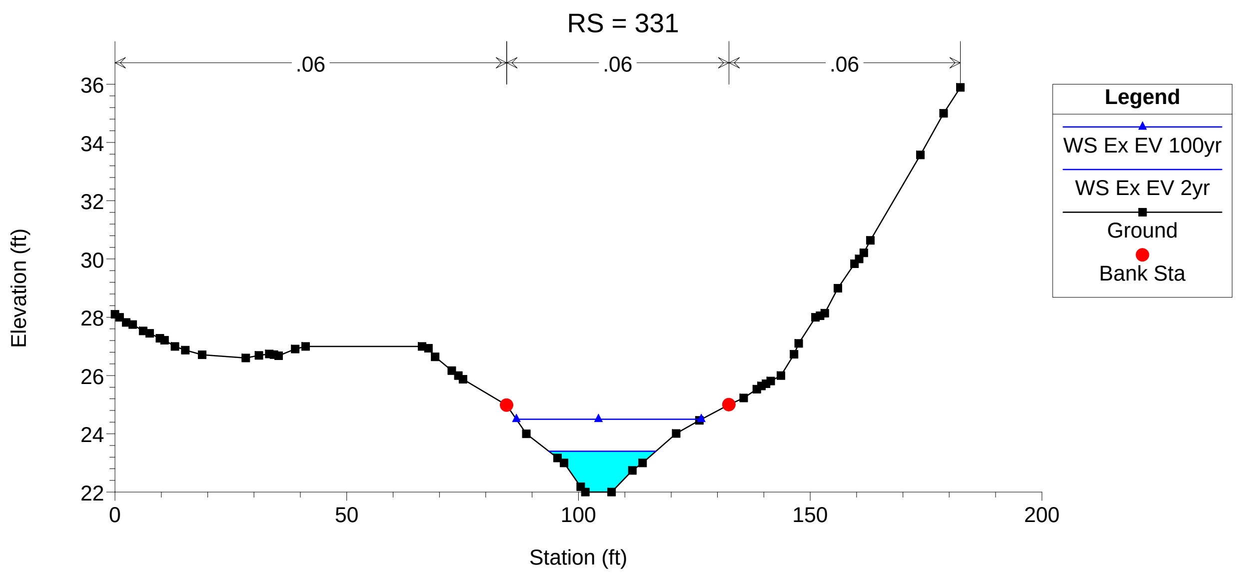


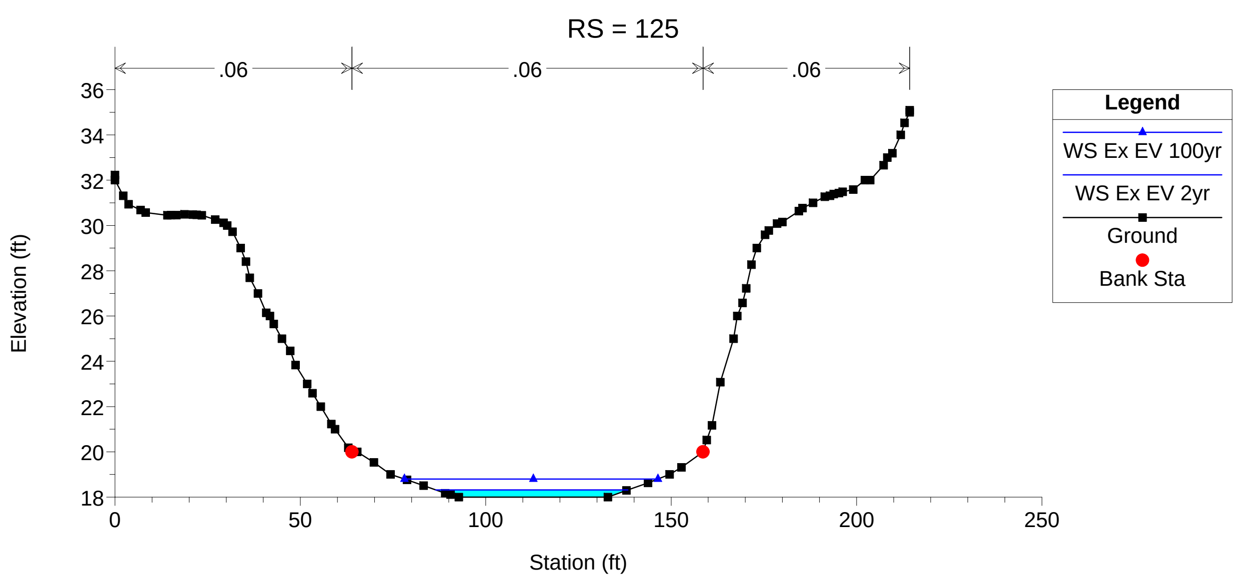
RS = 896
.06
.06
.06
Elevation (ft)
Station (ft)
44
42
40
38
36
34
32
0
20
40
60
80
100
120
140
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta

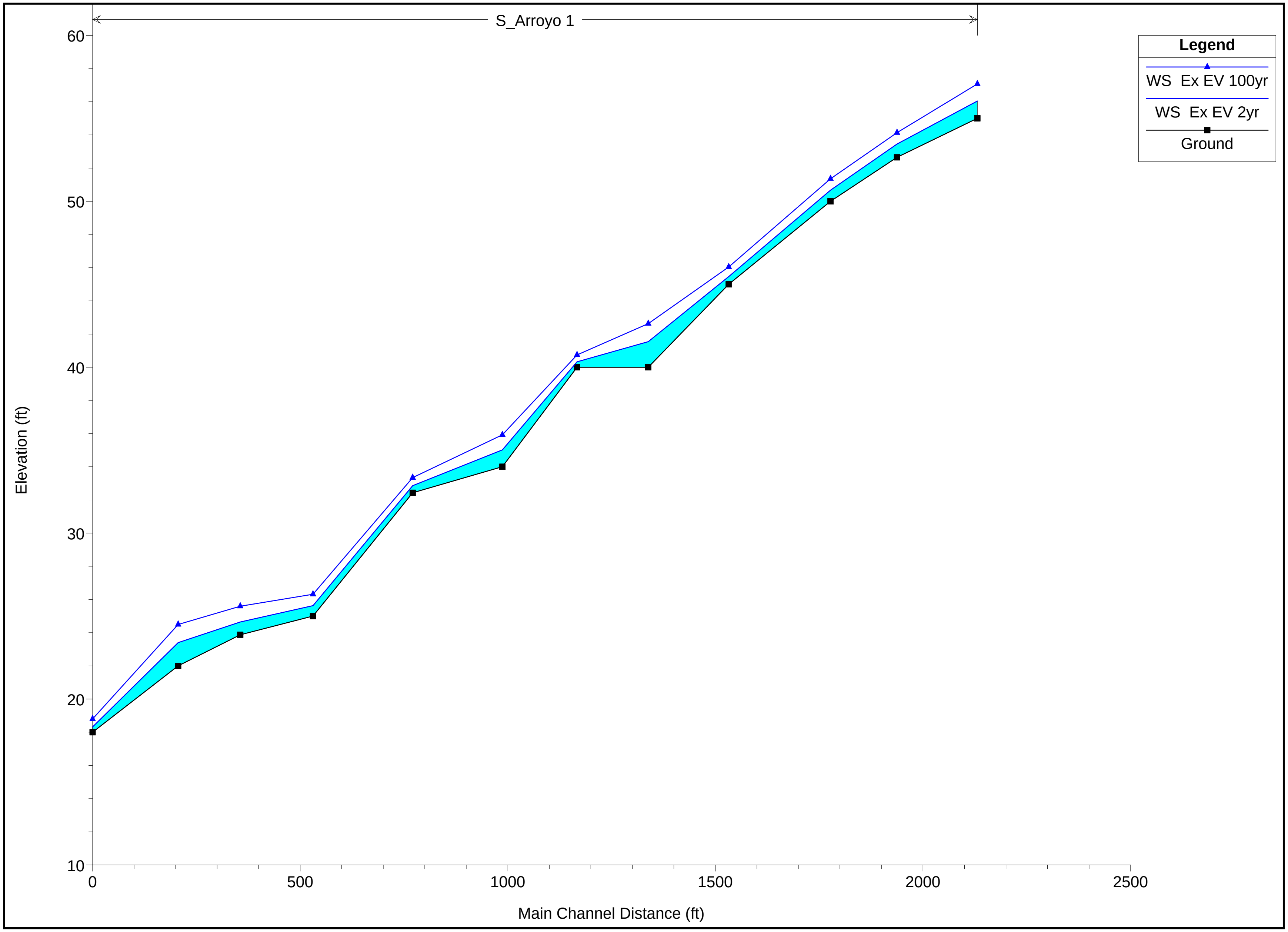


RS = 656
.06
.06
.06
Elevation (ft)
Station (ft)
33
32
31
30
29
28
27
26
25
0
20
40
60
80
100
120
140
160
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta


RS = 481
.06
.06
.06
Elevation (ft)
38
36
34
32
30
28
26
24
22
0
50
100
150
200
250
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta


RS = 331
.06
.06
.06
Elevation (ft)
36
34
32
30
28
26
24
22
0
50
100
150
200
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta


RS = 125
.06
.06
.06
Elevation (ft)
36
34
32
30
28
26
24
22
20
18
0
50
100
150
200
250
Station (ft)
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Bank Sta



S_Arroyo 1
Legend
WS Ex EV 100yr
WS Ex EV 2yr
Ground
Elevation (ft)
60
50
40
30
20
10
0
500
1000
1500
2000
2500
Main Channel Distance (ft)

C3 HEC-RAS Modeling Report for Southerly Arroyo Channel under Proposed Condition

```
                  HEC-RAS Version 3.1.3 May 2005
                   U.S. Army Corp of Engineers
                  Hydrologic Engineering Center
                        609 Second Street
                        Davis, California

 X     X  XXXXXX    XXXX        XXXX       XX      XXXX
 X     X  X        X    X       X   X     X  X    X
 X     X  X        X            X   X    X    X   X
 XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
 X     X  X        X            X  X     X    X        X
 X     X  X        X    X       X   X    X    X        X
 X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Newport Banning Ranch
Project File : ras82101.prj
Run Date and Time: 4/15/2008 3:58:31 PM

Project in English units

PLAN DATA

Plan Title: Pr. S Arroyo Run
Plan File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.p03

Geometry Title: P South Arroyo
Geometry File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.g03

Flow Title : Pr. S_Arryo Flows
Flow File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.f03

Plan Summary Information:

Number of:				
	Cross Sections =	11	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Pr. S_Arryo Flows
Flow File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.f03

Flow Data (cfs)

River	Reach	RS	Pr EV 2yr	Pr EV 100yr
S_Arroyo	1	2062	30	107
S_Arroyo	1	1112	32	122
S_Arroyo	1	481	32	130

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
S_Arroyo	1	Pr EV 2yr	Critical	Critical

GEOMETRY DATA

Geometry Title: P South Arroyo
Geometry File : p:\Projects\821\01\Wat\HH\EIR Study\HEC_RAS\ras82101.g03

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 2062

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	65.75	2.83	65	5.66	64	8.49	64	9.9	64.71
11.31	65.13	12.73	65.34	14.14	65.49	15.56	65.54	16.97	65.51
18.38	65	21.21	65	22.63	64.16	24.04	64	25.46	63.38
26.87	62.85	31.11	61.16	33.94	60.6	35.36	60.14	36.77	60
38.18	59.67	39.6	59.43	41.01	59	45.25	56.16	46.67	54.82
48.08	54	50.91	53.42	52.33	52.97	56.57	52.65	57.98	52.65
62.23	53	63.64	53	65.05	55	67.88	56.47	73.54	59.7
74.95	60	82.02	62.8	86.27	64.6	87.68	65	91.92	67.15
97.58	70	107.48	72.65	111.72	73.52				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	36.77	.06	74.95	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
36.77	74.95	160.23	160.23	160.23	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	53.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.060	
W.S. Elev (ft)	53.49	Reach Len. (ft)	160.23	160.23	160.23
Crit W.S. (ft)	53.41	Flow Area (sq ft)		8.08	
E.G. Slope (ft/ft)	0.045684	Area (sq ft)		8.08	
Q Total (cfs)	30.00	Flow (cfs)		30.00	
Top Width (ft)	13.41	Top Width (ft)		13.41	
Vel Total (ft/s)	3.71	Avg. Vel. (ft/s)		3.71	
Max Chl Dpth (ft)	0.84	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	140.4	Conv. (cfs)		140.4	
Length Wtd. (ft)	160.23	Wetted Per. (ft)		13.77	
Min Ch El (ft)	52.65	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		6.22	
Frctn Loss (ft)	2.90	Cum Volume (acre-ft)		0.75	
C & E Loss (ft)	0.05	Cum SA (acres)		1.41	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	54.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.060	
W.S. Elev (ft)	54.21	Reach Len. (ft)	160.23	160.23	160.23
Crit W.S. (ft)	54.14	Flow Area (sq ft)		19.20	
E.G. Slope (ft/ft)	0.045174	Area (sq ft)		19.20	
Q Total (cfs)	107.00	Flow (cfs)		107.00	
Top Width (ft)	16.78	Top Width (ft)		16.78	
Vel Total (ft/s)	5.57	Avg. Vel. (ft/s)		5.57	
Max Chl Dpth (ft)	1.56	Hydr. Depth (ft)		1.14	
Conv. Total (cfs)	503.4	Conv. (cfs)		503.4	
Length Wtd. (ft)	160.23	Wetted Per. (ft)		17.62	
Min Ch El (ft)	52.65	Shear (lb/sq ft)		3.07	
Alpha	1.00	Stream Power (lb/ft s)		17.12	
Frctn Loss (ft)	3.03	Cum Volume (acre-ft)	0.00	1.82	0.00
C & E Loss (ft)	0.11	Cum SA (acres)	0.02	1.78	0.02

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 1902

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	64.29	2.24	62.79	6.71	60.14	7.71	59.78	18	55
22.48	53.97	31.08	52.07	36.91	50.9	37.91	50.54	40.74	50
61.11	50	65.59	51.14	66.59	51.33	71.06	52.74	73.3	53.66
77.77	55	82.77	57.7	87.77	60	92.24	61.4	102.54	65
103.95	65.27								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	18	.06	77.77	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
18	77.77	245.09	245.09	245.09	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	50.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.060	
W.S. Elev (ft)	50.71	Reach Len. (ft)	245.09	245.09	245.09
Crit W.S. (ft)		Flow Area (sq ft)		16.79	
E.G. Slope (ft/ft)	0.009636	Area (sq ft)		16.79	
Q Total (cfs)	30.00	Flow (cfs)		30.00	
Top Width (ft)	26.48	Top Width (ft)		26.48	
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)		1.79	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.63	
Conv. Total (cfs)	305.6	Conv. (cfs)		305.6	
Length Wtd. (ft)	245.09	Wetted Per. (ft)		26.65	
Min Ch El (ft)	50.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		0.68	
Frctn Loss (ft)	5.02	Cum Volume (acre-ft)		0.71	
C & E Loss (ft)	0.02	Cum SA (acres)		1.34	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	51.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.060	
W.S. Elev (ft)	51.45	Reach Len. (ft)	245.09	245.09	245.09
Crit W.S. (ft)		Flow Area (sq ft)		38.50	
E.G. Slope (ft/ft)	0.010308	Area (sq ft)		38.50	
Q Total (cfs)	107.00	Flow (cfs)		107.00	
Top Width (ft)	32.79	Top Width (ft)		32.79	
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	1053.9	Conv. (cfs)		1053.9	
Length Wtd. (ft)	245.09	Wetted Per. (ft)		33.14	
Min Ch El (ft)	50.00	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		2.08	
Frctn Loss (ft)	4.94	Cum Volume (acre-ft)	0.00	1.72	0.00
C & E Loss (ft)	0.04	Cum SA (acres)	0.02	1.69	0.02

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo

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REACH: 1                  RS: 1657

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   67.68       5   66.18    8.61      65   25.63   60.21   27.05   59.69
   33.45   56.22   35.69      55   42.09   52.76    49.9      50   52.14   48.53
   57.14      45    71.4      45   87.03   48.98   89.26   49.72   90.68      50
    99.9    53.9  102.13      55  112.13   59.43  113.55      60  115.78   60.32
  116.78   60.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    49.9     .06   90.68     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          49.9   90.68           193.82  193.82  193.82             .1       .3

CROSS SECTION OUTPUT  Profile #Pr EV 2yr

  E.G. Elev (ft)             45.73    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.23    Wt. n-Val.                            0.060
  W.S. Elev (ft)             45.50    Reach Len. (ft)          193.82     193.82     193.82
  Crit W.S. (ft)             45.50    Flow Area (sq ft)                      7.77
  E.G. Slope (ft/ft)      0.069784    Area (sq ft)                           7.77
  Q Total (cfs)              30.00    Flow (cfs)                            30.00
  Top Width (ft)             16.92    Top Width (ft)                        16.92
  Vel Total (ft/s)            3.86    Avg. Vel. (ft/s)                       3.86
  Max Chl Dpth (ft)           0.50    Hydr. Depth (ft)                       0.46
  Conv. Total (cfs)          113.6    Conv. (cfs)                           113.6
  Length Wtd. (ft)          193.82    Wetted Per. (ft)                      17.14
  Min Ch El (ft)             45.00    Shear (lb/sq ft)                       1.97
  Alpha                       1.00    Stream Power (lb/ft s)                 7.62
  Frctn Loss (ft)             1.23    Cum Volume (acre-ft)                   0.64
  C & E Loss (ft)             0.06    Cum SA (acres)                         1.22


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #Pr EV 100yr

  E.G. Elev (ft)             46.60    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.48    Wt. n-Val.                            0.060
  W.S. Elev (ft)             46.12    Reach Len. (ft)          193.82     193.82     193.82
  Crit W.S. (ft)             46.12    Flow Area (sq ft)                     19.22
  E.G. Slope (ft/ft)      0.055810    Area (sq ft)                          19.22
  Q Total (cfs)             107.00    Flow (cfs)                           107.00
  Top Width (ft)             20.22    Top Width (ft)                        20.22
  Vel Total (ft/s)            5.57    Avg. Vel. (ft/s)                       5.57
  Max Chl Dpth (ft)           1.12    Hydr. Depth (ft)                       0.95
  Conv. Total (cfs)          452.9    Conv. (cfs)                           452.9
  Length Wtd. (ft)          193.82    Wetted Per. (ft)                      20.71
  Min Ch El (ft)             45.00    Shear (lb/sq ft)                       3.23
  Alpha                       1.00    Stream Power (lb/ft s)                18.00
  Frctn Loss (ft)             1.85    Cum Volume (acre-ft)       0.00        1.55       0.00
  C & E Loss (ft)             0.12    Cum SA (acres)             0.02        1.54       0.02


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION
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RIVER: S_Arroyo
REACH: 1 RS: 1463

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	59.42	0	59.38	14.87	55	21.94	52.69	29.75	50
41.06	45.83	43.3	45	46.13	43.98	56.76	40	66.66	40
68.07	40.44	75.14	45	85.77	49.14	87.18	50	88.6	50.37
91.43	51	92.84	51.5	94.26	52	97.91	53	98.91	53.26
101.14	54	102.56	55	103.97	55.22	106.8	55.7	107.8	55.81
108.8	55.91	110.8	56	112.21	56	113.21	56.09	114.21	56.16
115.21	56.45	116.63	56.72	118.04	57	119.46	57.45	122.28	58
123.7	58.49								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	43.3	.06	75.14	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
43.3	75.14	171.6	171.6	171.6	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	41.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.060	
W.S. Elev (ft)	41.61	Reach Len. (ft)	171.60	171.60	171.60
Crit W.S. (ft)		Flow Area (sq ft)		22.41	
E.G. Slope (ft/ft)	0.002203	Area (sq ft)		22.41	
Q Total (cfs)	30.00	Flow (cfs)		30.00	
Top Width (ft)	17.42	Top Width (ft)		17.42	
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)		1.34	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.29	
Conv. Total (cfs)	639.2	Conv. (cfs)		639.2	
Length Wtd. (ft)	171.60	Wetted Per. (ft)		18.12	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		0.23	
Frctn Loss (ft)	1.10	Cum Volume (acre-ft)		0.57	
C & E Loss (ft)	0.01	Cum SA (acres)		1.14	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	42.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.060	
W.S. Elev (ft)	42.76	Reach Len. (ft)	171.60	171.60	171.60
Crit W.S. (ft)		Flow Area (sq ft)		45.32	
E.G. Slope (ft/ft)	0.003797	Area (sq ft)		45.32	
Q Total (cfs)	107.00	Flow (cfs)		107.00	
Top Width (ft)	22.29	Top Width (ft)		22.29	
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)		2.36	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	1736.6	Conv. (cfs)		1736.6	
Length Wtd. (ft)	171.60	Wetted Per. (ft)		23.54	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)		1.08	
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)	0.00	1.41	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.45	0.02

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 1292

INPUT

Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	51.51	1	51.07	4.61	50	6.84	49.54	8.84	49.23
11.08	48.8	18.69	47.36	24.08	45.98	26.08	45.77	27.49	45.54
29.73	45	36.05	43.63	40.53	42.73	42.76	42.24	45	41.85
53.54	40	78.37	40	79.79	40.56	81.79	41	83.2	41.2
85.2	42	88.81	43	91.97	44	92.97	44.05	96.57	45
97.57	45.25	100.74	46	102.97	46.38	105.21	47	111.57	48
115.17	48.36	116.17	48.4	117.17	48.45	118.59	48.5	119.59	48.54
120.59	48.56	122	48.58	126.12	48.78	128.36	49	130.6	49.49

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	45	.06	85.2	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
45	85.2	179.73	179.73	179.73	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	40.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.060	
W.S. Elev (ft)	40.35	Reach Len. (ft)	179.73	179.73	179.73
Crit W.S. (ft)	40.35	Flow Area (sq ft)		9.14	
E.G. Slope (ft/ft)	0.075952	Area (sq ft)		9.14	
Q Total (cfs)	30.00	Flow (cfs)		30.00	
Top Width (ft)	27.34	Top Width (ft)		27.34	
Vel Total (ft/s)	3.28	Avg. Vel. (ft/s)		3.28	
Max Chl Dpth (ft)	0.35	Hydr. Depth (ft)		0.33	
Conv. Total (cfs)	108.9	Conv. (cfs)		108.9	
Length Wtd. (ft)	179.73	Wetted Per. (ft)		27.44	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		1.58	
Alpha	1.00	Stream Power (lb/ft s)		5.18	
Frctn Loss (ft)	1.59	Cum Volume (acre-ft)		0.51	
C & E Loss (ft)	0.04	Cum SA (acres)		1.05	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	41.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.060	
W.S. Elev (ft)	40.80	Reach Len. (ft)	179.73	179.73	179.73
Crit W.S. (ft)	40.80	Flow Area (sq ft)		22.20	
E.G. Slope (ft/ft)	0.059757	Area (sq ft)		22.20	
Q Total (cfs)	107.00	Flow (cfs)		107.00	
Top Width (ft)	31.03	Top Width (ft)		31.03	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	0.80	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	437.7	Conv. (cfs)		437.7	
Length Wtd. (ft)	179.73	Wetted Per. (ft)		31.25	
Min Ch El (ft)	40.00	Shear (lb/sq ft)		2.65	
Alpha	1.00	Stream Power (lb/ft s)		12.77	
Frctn Loss (ft)	1.73	Cum Volume (acre-ft)	0.00	1.28	0.00
C & E Loss (ft)	0.09	Cum SA (acres)	0.02	1.34	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 1112

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43.01	12.53	40	33.62	35.85	38.1	35	48.39	34
65.89	34	68.13	34.15	70.36	34.41	72.6	34.65	76.2	35
77.62	35.44	79.85	36	80.85	36.15	82.27	36.71	83.27	37
86.87	37.93	87.87	38.02	91.48	39.01	96.48	40	97.48	40.24
101.08	40.88	102.08	41	105.69	41.97	106.69	42	107.69	42.07
111.3	43	113.53	43.42	115.77	44.02	120.24	44.67		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	33.62	.06	79.85	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
33.62	79.85	215.95	215.95	215.95	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	35.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.060	
W.S. Elev (ft)	34.99	Reach Len. (ft)	215.95	215.95	215.95
Crit W.S. (ft)	34.42	Flow Area (sq ft)		27.55	
E.G. Slope (ft/ft)	0.003370	Area (sq ft)		27.55	
Q Total (cfs)	32.00	Flow (cfs)		32.00	
Top Width (ft)	37.86	Top Width (ft)		37.86	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	551.2	Conv. (cfs)		551.2	
Length Wtd. (ft)	215.95	Wetted Per. (ft)		37.95	
Min Ch El (ft)	34.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	1.99	Cum Volume (acre-ft)		0.43	
C & E Loss (ft)	0.01	Cum SA (acres)		0.92	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	35.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.060	
W.S. Elev (ft)	35.82	Reach Len. (ft)	215.95	215.95	215.95
Crit W.S. (ft)	34.94	Flow Area (sq ft)		62.32	
E.G. Slope (ft/ft)	0.004129	Area (sq ft)		62.32	
Q Total (cfs)	122.00	Flow (cfs)		122.00	
Top Width (ft)	45.39	Top Width (ft)		45.39	
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)		1.96	
Max Chl Dpth (ft)	1.82	Hydr. Depth (ft)		1.37	
Conv. Total (cfs)	1898.5	Conv. (cfs)		1898.5	
Length Wtd. (ft)	215.95	Wetted Per. (ft)		45.68	
Min Ch El (ft)	34.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		0.69	
Frctn Loss (ft)	2.26	Cum Volume (acre-ft)	0.00	1.10	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.18	0.02

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 896

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43.13	1	42.74	11.2	40	27.32	35	30.32	34.3
31.74	34	34.74	33.51	37.74	33	40.9	32.79	43.9	32.61
44.9	32.6	47.14	32.49	62.27	32.43	63.27	32.48	65.27	32.48
66.27	32.54	67.27	32.55	69.5	32.62	71.5	32.73	73.5	32.87
75.74	33	76.74	33.08	77.74	33.11	82.84	33.49	85.84	33.67
89.96	34	91.96	34.21	98.04	35	105.12	35.57	110.21	36
112.21	36.24	118.3	37	122.3	37.6	125.46	38	127.46	38.33
128.46	38.54	130.46	38.83	131.87	38.95	132.87	39	134.87	39.25

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	34.74	.06	82.84	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
34.74	82.84	240.26	240.26	240.26	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	33.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.060	
W.S. Elev (ft)	32.85	Reach Len. (ft)	240.26	240.26	240.26
Crit W.S. (ft)	32.85	Flow Area (sq ft)		10.21	
E.G. Slope (ft/ft)	0.077400	Area (sq ft)		10.21	
Q Total (cfs)	32.00	Flow (cfs)		32.00	
Top Width (ft)	33.29	Top Width (ft)		33.29	
Vel Total (ft/s)	3.13	Avg. Vel. (ft/s)		3.13	
Max Chl Dpth (ft)	0.42	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	115.0	Conv. (cfs)		115.0	
Length Wtd. (ft)	240.26	Wetted Per. (ft)		33.31	
Min Ch El (ft)	32.43	Shear (lb/sq ft)		1.48	
Alpha	1.00	Stream Power (lb/ft s)		4.64	
Frctn Loss (ft)	3.54	Cum Volume (acre-ft)		0.34	
C & E Loss (ft)	0.04	Cum SA (acres)		0.74	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	33.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.060	
W.S. Elev (ft)	33.28	Reach Len. (ft)	240.26	240.26	240.26
Crit W.S. (ft)	33.28	Flow Area (sq ft)		27.15	
E.G. Slope (ft/ft)	0.062843	Area (sq ft)		27.15	
Q Total (cfs)	122.00	Flow (cfs)		122.00	
Top Width (ft)	44.01	Top Width (ft)		44.01	
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)		4.49	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.62	
Conv. Total (cfs)	486.7	Conv. (cfs)		486.7	
Length Wtd. (ft)	240.26	Wetted Per. (ft)		44.08	
Min Ch El (ft)	32.43	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		10.86	
Frctn Loss (ft)	4.27	Cum Volume (acre-ft)	0.00	0.88	0.00
C & E Loss (ft)	0.07	Cum SA (acres)	0.02	0.96	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: S_Arroyo

```
REACH: 1                 RS: 656

INPUT
Description:
Station Elevation Data    num=      41
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
       0    32.18       1       32    5.47    31.11    6.47       31    7.47    30.75
   11.94       30   18.03    28.95   23.41       28   26.57    27.45   28.81       27
   30.81    26.67   34.93       26   39.41    25.32   41.41       25   79.35       25
   86.63     25.9   87.63       26   93.96    26.88   94.96       27   103.5    27.88
   104.5       28  105.92    28.13  106.92    28.25  112.31    28.73  115.31    28.95
  116.73       29  117.73    29.04  119.96    29.13  123.13     29.2  124.13    29.22
  127.29    29.29  128.29    29.32  132.76    29.38  136.88    29.41  139.12    29.45
  142.12    29.49  143.53     29.5  144.53    29.52  146.95    29.52  150.11    29.57
  151.11    29.58

Manning's n Values        num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
       0      .06   34.93      .06   87.63      .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         34.93   87.63           175.08  175.08  175.08             .1       .3

CROSS SECTION OUTPUT  Profile #Pr EV 2yr

  E.G. Elev (ft)              25.62    Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.03    Wt. n-Val.                            0.060
  W.S. Elev (ft)              25.60    Reach Len. (ft)            175.08     175.08     175.08
  Crit W.S. (ft)              25.28    Flow Area (sq ft)                     25.14
  E.G. Slope (ft/ft)       0.006028    Area (sq ft)                          25.14
  Q Total (cfs)               32.00    Flow (cfs)                            32.00
  Top Width (ft)              46.57    Top Width (ft)                        46.57
  Vel Total (ft/s)             1.27    Avg. Vel. (ft/s)                       1.27
  Max Chl Dpth (ft)            0.60    Hydr. Depth (ft)                       0.54
  Conv. Total (cfs)           412.2    Conv. (cfs)                           412.2
  Length Wtd. (ft)           175.08    Wetted Per. (ft)                      46.65
  Min Ch El (ft)              25.00    Shear (lb/sq ft)                       0.20
  Alpha                        1.00    Stream Power (lb/ft s)                 0.26
  Frctn Loss (ft)              1.10    Cum Volume (acre-ft)                   0.24
  C & E Loss (ft)              0.00    Cum SA (acres)                         0.52


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Pr EV 100yr

  E.G. Elev (ft)              26.24    Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.08    Wt. n-Val.                  0.060      0.060      0.060
  W.S. Elev (ft)              26.16    Reach Len. (ft)            175.08     175.08     175.08
  Crit W.S. (ft)                       Flow Area (sq ft)            0.08      53.65       0.09
  E.G. Slope (ft/ft)       0.008254    Area (sq ft)                 0.08      53.65       0.09
  Q Total (cfs)              122.00    Flow (cfs)                   0.03     121.93       0.04
  Top Width (ft)              54.84    Top Width (ft)               0.99      52.70       1.15
  Vel Total (ft/s)             2.27    Avg. Vel. (ft/s)             0.41       2.27       0.42
  Max Chl Dpth (ft)            1.16    Hydr. Depth (ft)             0.08       1.02       0.08
  Conv. Total (cfs)          1342.9    Conv. (cfs)                   0.4     1342.1        0.4
  Length Wtd. (ft)           175.08    Wetted Per. (ft)             1.00      52.84       1.16
  Min Ch El (ft)              25.00    Shear (lb/sq ft)             0.04       0.52       0.04
  Alpha                        1.00    Stream Power (lb/ft s)       0.02       1.19       0.02
  Frctn Loss (ft)              0.93    Cum Volume (acre-ft)         0.00       0.66       0.00
  C & E Loss (ft)              0.01    Cum SA (acres)               0.02       0.69       0.02


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: S_Arroyo
REACH: 1                 RS: 481

INPUT
Description:
Station Elevation Data    num=      46
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
       0    37.91    3.16    37.28    4.16       37     6.4    36.61    9.56       36
   10.56    35.82   13.72       35   15.14    34.43   17.37       34   20.98       33
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24.58	32.09	25.58	32	27	31.62	29.23	30.96	31.47	30
32.88	29.73	37.36	29	39.59	28	41.01	27.75	43.24	27
47.72	26.76	57.15	26.27	71.09	25.53	80.53	25	86.36	24.73
103.36	24	120.86	24	141.45	23.87	144.28	24	161.28	25
168.49	25.51	176.55	26	183.26	26.6	186.87	27	190.47	28
191.89	28.21	194.12	29	195.12	29.21	200.12	30	202.36	30.47
203.36	30.65	210.57	32.22	214.17	32.97	224.47	35	230.3	37.02
232.54	37.67								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	80.53	.06	161.28	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
80.53	161.28	149.6	149.6	149.6	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	24.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.060	
W.S. Elev (ft)	24.51	Reach Len. (ft)	149.60	149.60	149.60
Crit W.S. (ft)		Flow Area (sq ft)		27.40	
E.G. Slope (ft/ft)	0.006512	Area (sq ft)		27.40	
Q Total (cfs)	32.00	Flow (cfs)		32.00	
Top Width (ft)	61.32	Top Width (ft)		61.32	
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)		1.17	
Max Chl Dpth (ft)	0.64	Hydr. Depth (ft)		0.45	
Conv. Total (cfs)	396.5	Conv. (cfs)		396.5	
Length Wtd. (ft)	149.60	Wetted Per. (ft)		61.35	
Min Ch El (ft)	23.87	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)		0.14	
C & E Loss (ft)	0.00	Cum SA (acres)		0.31	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	25.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	25.26	Reach Len. (ft)	149.60	149.60	149.60
Crit W.S. (ft)		Flow Area (sq ft)	0.58	83.15	0.46
E.G. Slope (ft/ft)	0.003812	Area (sq ft)	0.58	83.15	0.46
Q Total (cfs)	130.00	Flow (cfs)	0.23	129.60	0.18
Top Width (ft)	88.91	Top Width (ft)	4.55	80.75	3.61
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)	0.39	1.56	0.39
Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)	0.13	1.03	0.13
Conv. Total (cfs)	2105.5	Conv. (cfs)	3.6	2099.0	2.9
Length Wtd. (ft)	149.60	Wetted Per. (ft)	4.56	80.80	3.62
Min Ch El (ft)	23.87	Shear (lb/sq ft)	0.03	0.24	0.03
Alpha	1.02	Stream Power (lb/ft s)	0.01	0.38	0.01
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	0.00	0.38	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.43	0.01

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 331

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	28.1	1	28	2.41	27.82	3.83	27.75	6.06	27.53
7.48	27.45	9.71	27.28	10.71	27.21	12.95	27	15.19	26.87
18.79	26.71	28.23	26.6	31.05	26.69	33.29	26.74	34.29	26.72
35.29	26.68	38.9	26.91	41.13	27	66.24	27	67.65	26.94
69.07	26.64	72.67	26.17	74.08	26	75.08	25.87	84.52	24.98
88.76	24	95.47	23.17	96.88	23	100.49	22.18	101.49	22
107.15	22	111.62	22.74	113.85	23	121.07	24.01	126.07	24.46
132.47	25	135.63	25.23	138.46	25.53	139.46	25.64	140.46	25.72
141.46	25.81	143.7	26	146.52	26.73	147.52	27.1	151.13	28

152.13	28.05	153.13	28.14	155.96	29	159.56	29.84	160.56	30
161.56	30.21	162.98	30.64	173.79	33.57	178.79	35	182.4	35.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	84.52	.06	132.47	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
84.52	132.47	206.09	206.09	206.09	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

E.G. Elev (ft)	23.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.060	
W.S. Elev (ft)	23.21	Reach Len. (ft)	206.09	206.09	206.09
Crit W.S. (ft)	22.77	Flow Area (sq ft)		15.09	
E.G. Slope (ft/ft)	0.010982	Area (sq ft)		15.09	
Q Total (cfs)	32.00	Flow (cfs)		32.00	
Top Width (ft)	20.23	Top Width (ft)		20.23	
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	305.4	Conv. (cfs)		305.4	
Length Wtd. (ft)	206.09	Wetted Per. (ft)		20.44	
Min Ch El (ft)	22.00	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)		1.07	
Frctn Loss (ft)	4.90	Cum Volume (acre-ft)		0.06	
C & E Loss (ft)	0.00	Cum SA (acres)		0.17	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Pr EV 100yr

E.G. Elev (ft)	24.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.060	
W.S. Elev (ft)	24.13	Reach Len. (ft)	206.09	206.09	206.09
Crit W.S. (ft)	23.59	Flow Area (sq ft)		40.16	
E.G. Slope (ft/ft)	0.013995	Area (sq ft)		40.16	
Q Total (cfs)	130.00	Flow (cfs)		130.00	
Top Width (ft)	34.24	Top Width (ft)		34.24	
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.24	
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	1098.9	Conv. (cfs)		1098.9	
Length Wtd. (ft)	206.09	Wetted Per. (ft)		34.57	
Min Ch El (ft)	22.00	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		3.29	
Frctn Loss (ft)	5.41	Cum Volume (acre-ft)		0.17	
C & E Loss (ft)	0.01	Cum SA (acres)		0.23	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: S_Arroyo
REACH: 1 RS: 125

INPUT
Description:
Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.23	0	32	2.24	31.31	3.65	30.94	6.89	30.68
8.3	30.57	14.13	30.45	15.13	30.46	16.55	30.46	18.78	30.49
21.02	30.48	22.02	30.47	23.43	30.45	27.04	30.26	29.27	30.12
30.27	30	31.69	29.72	33.92	29	35.34	28.4	36.34	27.69
38.57	27	40.81	26.14	41.81	26	42.81	25.65	45.05	25
47.28	24.46	48.7	23.83	51.86	23	53.27	22.59	55.51	22
58.34	21.23	59.34	21	62.94	20.18	63.94	20	65.36	20
69.83	19.53	74.3	19	78.77	18.76	83.25	18.51	89.08	18.17
90.49	18.11	92.73	18	132.94	18	137.94	18.3	143.77	18.63
149.6	19	152.76	19.31	158.59	20	159.59	20.52	161.01	21.17
163.24	23.08	166.85	25	167.85	26	169.26	26.58	170.26	27.22

171.68	28.27	173.09	29	175.33	29.59	176.33	29.78	178.56	30.08
179.98	30.15	184.45	30.63	185.45	30.77	188.28	31	191.44	31.27
192.85	31.31	193.85	31.39	195.27	31.43	196.27	31.49	199.1	31.59
202.26	32	203.67	32	207.28	32.66	208.28	33	209.69	33.19
211.93	34	212.93	34.53	214.34	35	214.34	35.09		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	63.94	.06	158.59	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
63.94	158.59	124.97	124.97	124.97	.1	.3

CROSS SECTION OUTPUT Profile #Pr EV 2yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	18.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.060	
W.S. Elev (ft)	18.26	Reach Len. (ft)			
Crit W.S. (ft)	18.26	Flow Area (sq ft)		11.66	
E.G. Slope (ft/ft)	0.084876	Area (sq ft)		11.66	
Q Total (cfs)	32.00	Flow (cfs)		32.00	
Top Width (ft)	49.70	Top Width (ft)		49.70	
Vel Total (ft/s)	2.74	Avg. Vel. (ft/s)		2.74	
Max Chl Dpth (ft)	0.26	Hydr. Depth (ft)		0.23	
Conv. Total (cfs)	109.8	Conv. (cfs)		109.8	
Length Wtd. (ft)		Wetted Per. (ft)		49.71	
Min Ch El (ft)	18.00	Shear (lb/sq ft)		1.24	
Alpha	1.00	Stream Power (lb/ft s)		3.41	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #Pr EV 100yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	18.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.060	
W.S. Elev (ft)	18.62	Reach Len. (ft)			
Crit W.S. (ft)	18.62	Flow Area (sq ft)		31.95	
E.G. Slope (ft/ft)	0.065892	Area (sq ft)		31.95	
Q Total (cfs)	130.00	Flow (cfs)		130.00	
Top Width (ft)	62.36	Top Width (ft)		62.36	
Vel Total (ft/s)	4.07	Avg. Vel. (ft/s)		4.07	
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	506.4	Conv. (cfs)		506.4	
Length Wtd. (ft)		Wetted Per. (ft)		62.40	
Min Ch El (ft)	18.00	Shear (lb/sq ft)		2.11	
Alpha	1.00	Stream Power (lb/ft s)		8.57	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:S_Arroyo

Reach	River Sta.	n1	n2	n3
1	2062	.06	.06	.06
1	1902	.06	.06	.06
1	1657	.06	.06	.06
1	1463	.06	.06	.06
1	1292	.06	.06	.06
1	1112	.06	.06	.06
1	896	.06	.06	.06
1	656	.06	.06	.06
1	481	.06	.06	.06
1	331	.06	.06	.06
1	125	.06	.06	.06

SUMMARY OF REACH LENGTHS

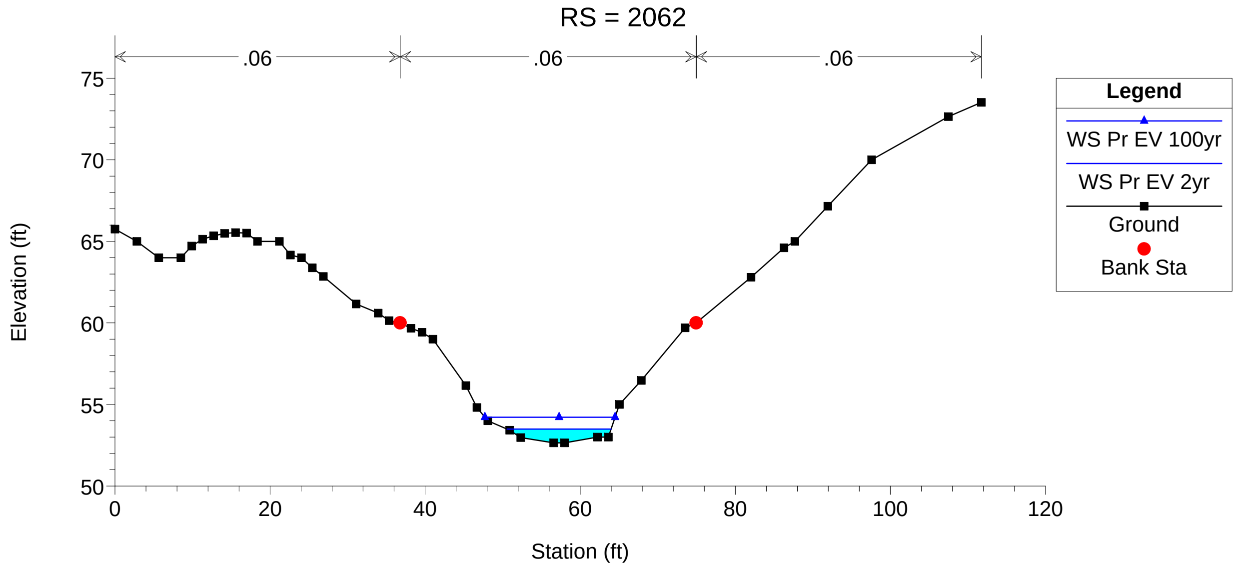
River: S_Arroyo

Reach	River Sta.	Left	Channel	Right

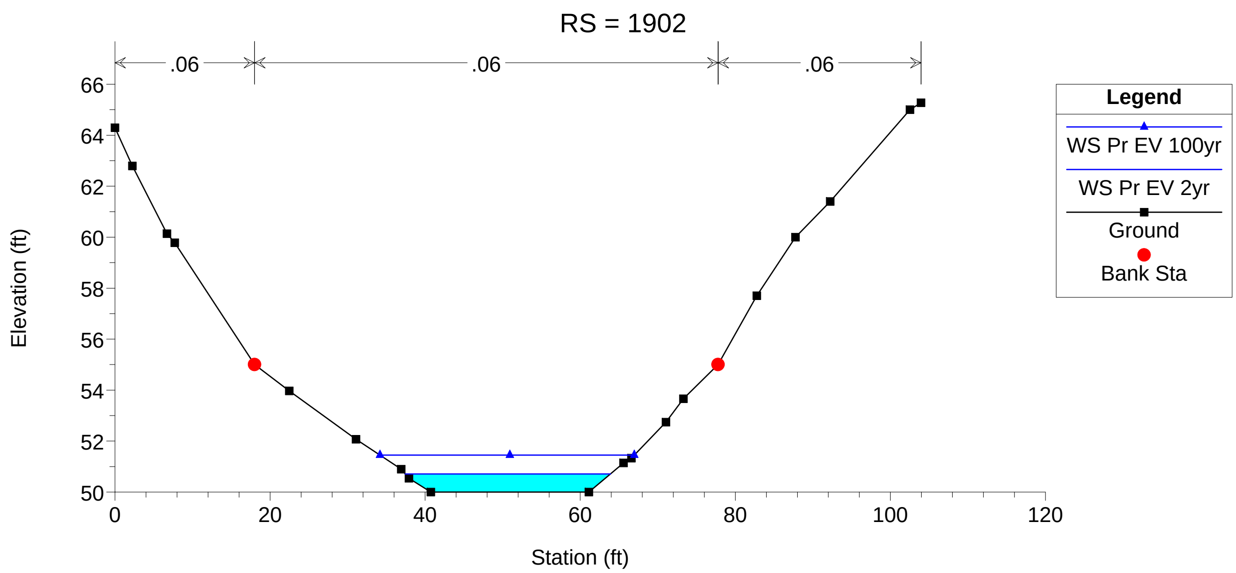
1	2062	160.23	160.23	160.23
1	1902	245.09	245.09	245.09
1	1657	193.82	193.82	193.82
1	1463	171.6	171.6	171.6
1	1292	179.73	179.73	179.73
1	1112	215.95	215.95	215.95
1	896	240.26	240.26	240.26
1	656	175.08	175.08	175.08
1	481	149.6	149.6	149.6
1	331	206.09	206.09	206.09
1	125	124.97	124.97	124.97

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: S_Arroyo

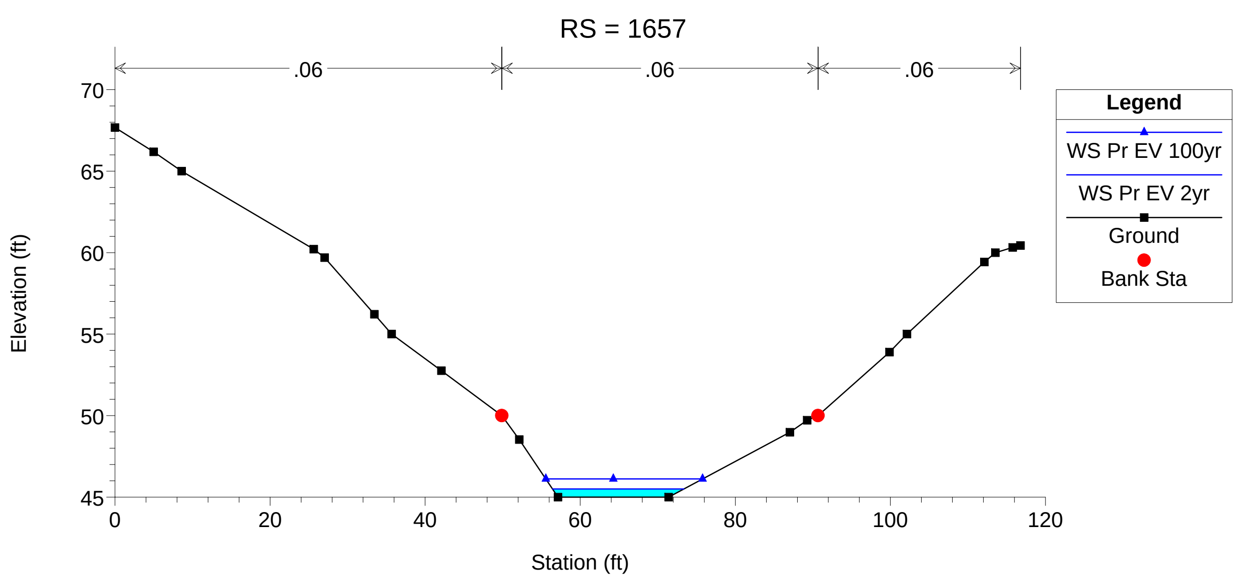
Reach	River Sta.	Contr.	Expan.
1	2062	.1	.3
1	1902	.1	.3
1	1657	.1	.3
1	1463	.1	.3
1	1292	.1	.3
1	1112	.1	.3
1	896	.1	.3
1	656	.1	.3
1	481	.1	.3
1	331	.1	.3
1	125	.1	.3



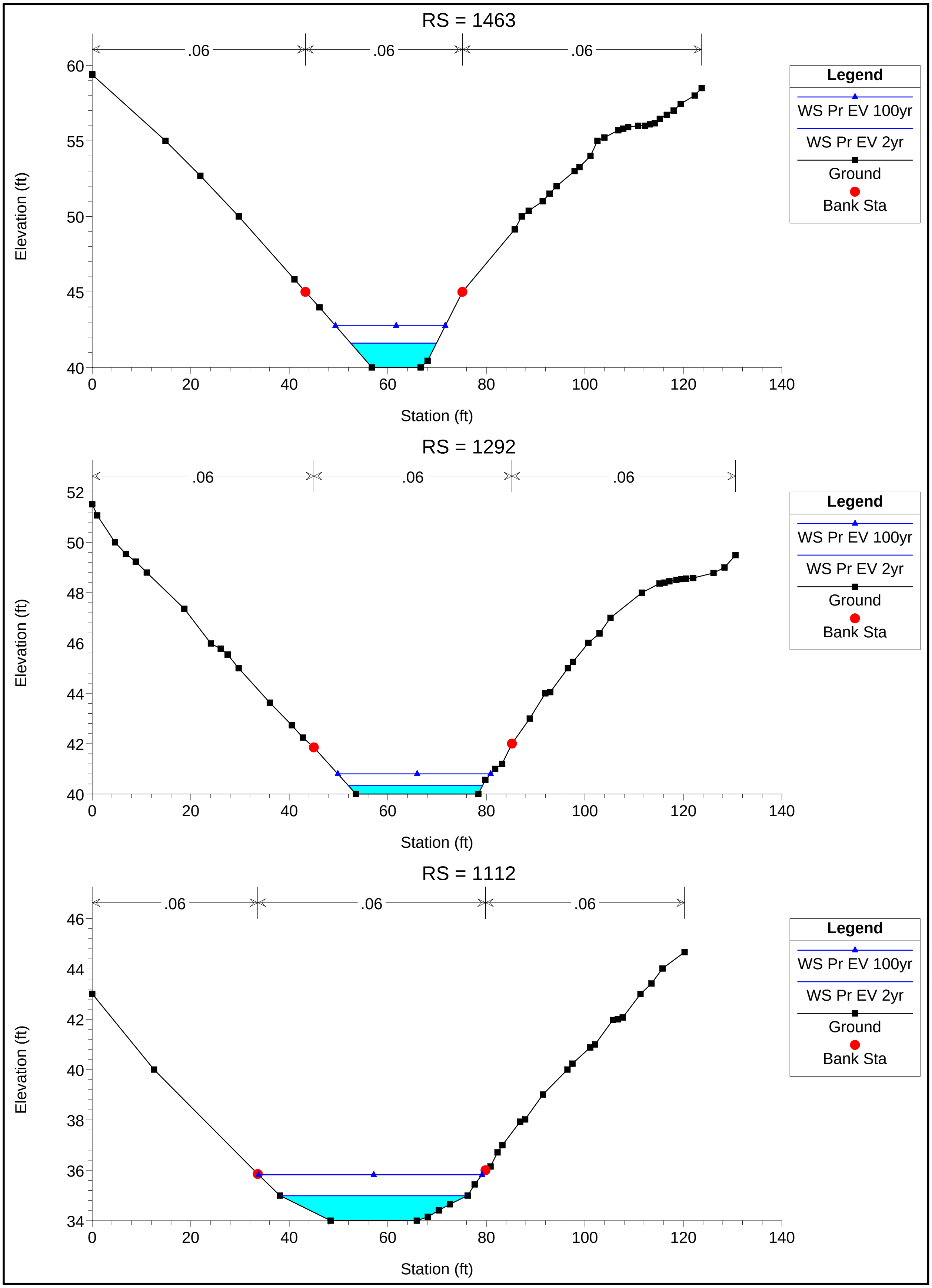
RS = 2062
.06
.06
.06
75
70
65
60
55
50
0
20
40
60
80
100
120
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta

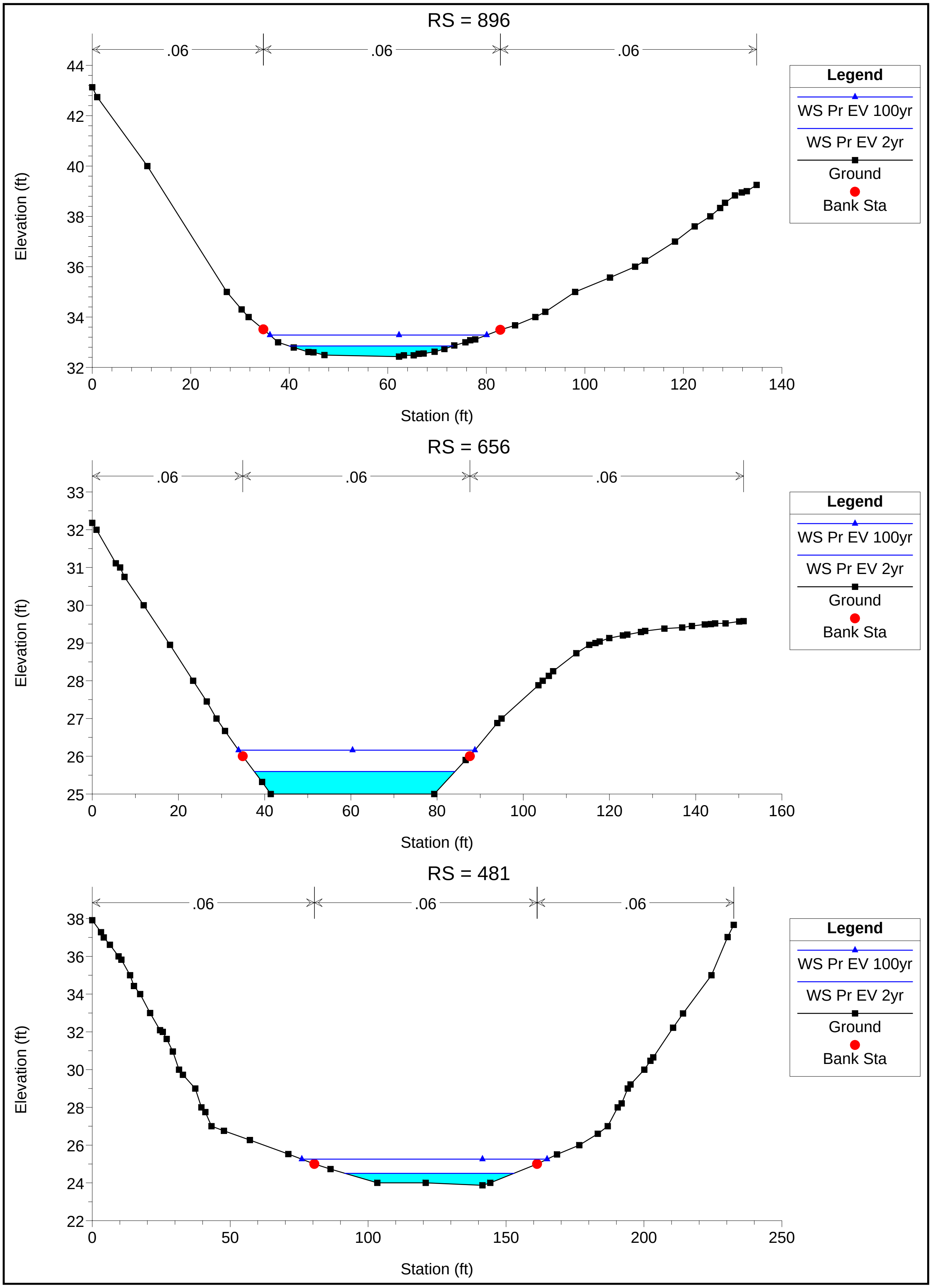


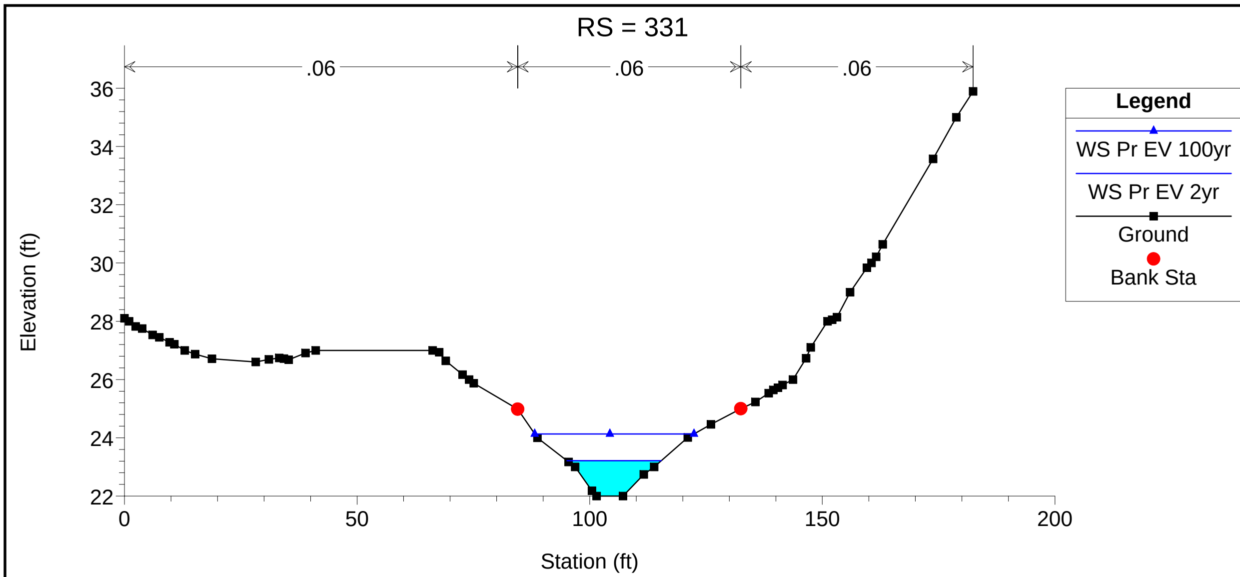
RS = 1902
.06
.06
.06
66
64
62
60
58
56
54
52
50
0
20
40
60
80
100
120
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta

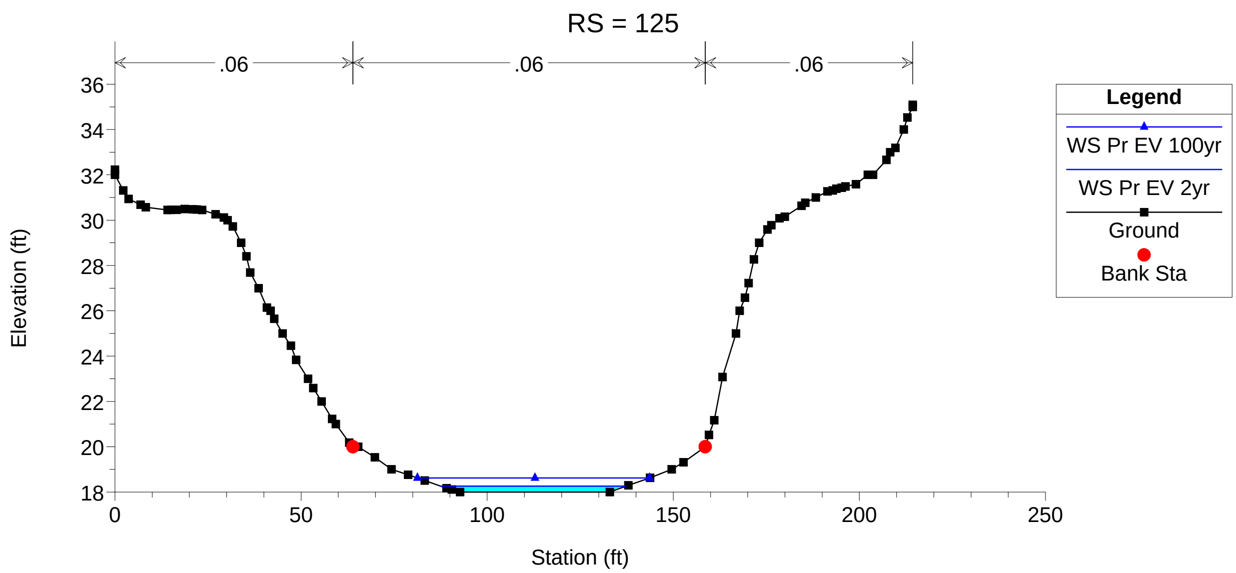


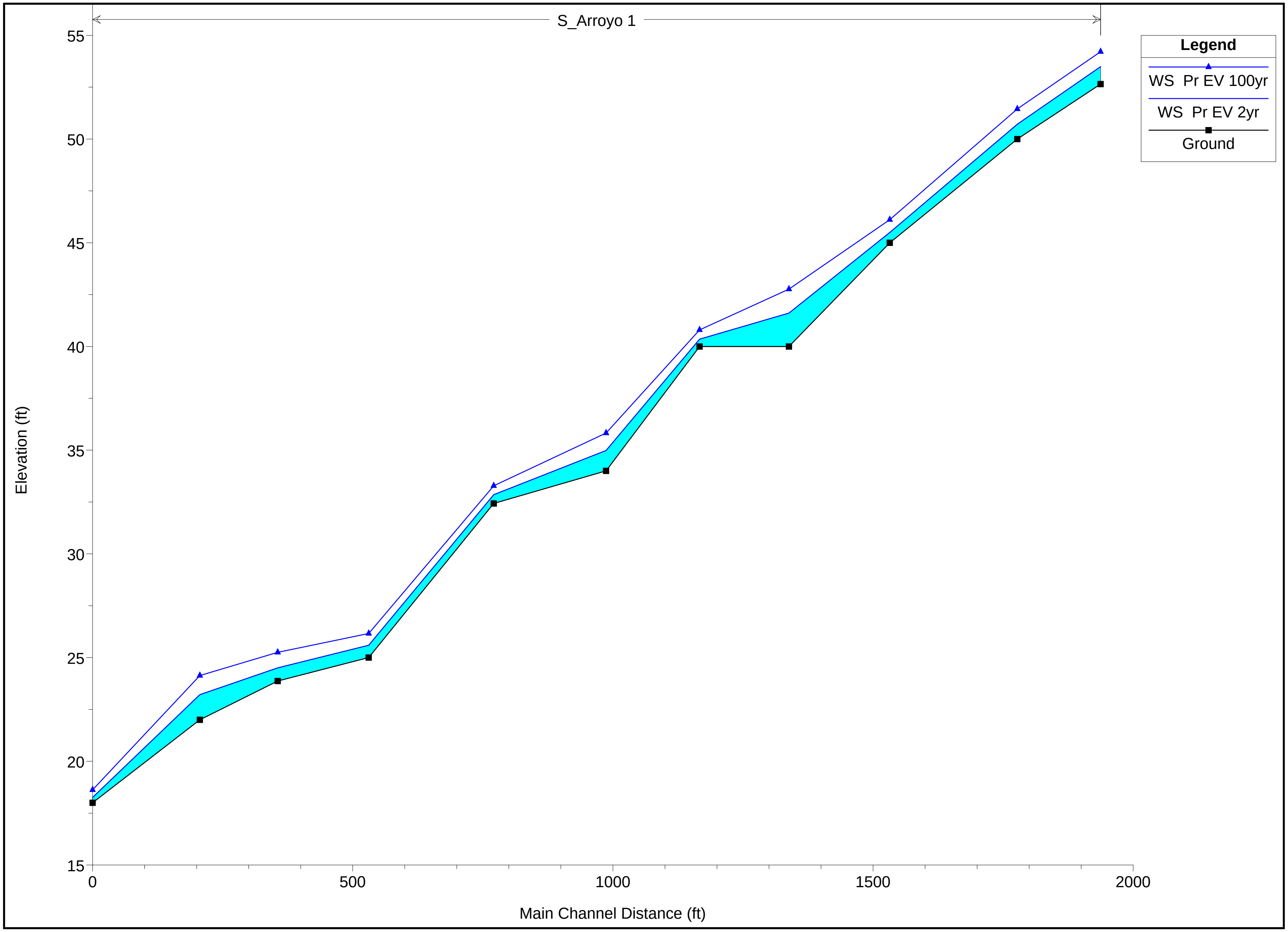
RS = 1657
.06
.06
.06
70
65
60
55
50
45
0
20
40
60
80
100
120
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta


RS = 1463
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta
RS = 1292
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta
RS = 1112
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta


RS = 896
.06
.06
.06
Elevation (ft)
Station (ft)
44
42
40
38
36
34
32
0
20
40
60
80
100
120
140
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta
RS = 656
.06
.06
.06
Elevation (ft)
Station (ft)
33
32
31
30
29
28
27
26
25
0
20
40
60
80
100
120
140
160
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta
RS = 481
.06
.06
.06
Elevation (ft)
Station (ft)
38
36
34
32
30
28
26
24
22
0
50
100
150
200
250
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta


RS = 331
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta


RS = 125
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Bank Sta


S_Arroyo 1
Legend
WS Pr EV 100yr
WS Pr EV 2yr
Ground
Elevation (ft)
55
50
45
40
35
30
25
20
15
0
500
1000
1500
2000
Main Channel Distance (ft)

D WATER BUDGET ANALYSIS

D1 Northerly Arroyo under Existing Condition

WATER BUDGET ANALYSIS

NEWPORT BANNING RANCH

Northerly Arroyo Habitat Under Existing Condition

Average Temperature (F)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	64	64	63	65	66	69	72	73	73	72	67	64
Min	47	48	50	52	56	59	62	64	62	58	52	47

Average Rainfall (inch)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.08	2.05	1.84	0.9	0.17	0.05	0.01	0.09	0.36	0.18	1.55	1.57	10.85

Potential Evapotranspiration (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
PET	1.44	1.60	1.78	2.16	2.66	3.21	3.68	3.77	3.35	2.77	1.91	1.41	29.74

Offsite Drainage Area:

DA = *129.25* acres

Land Use	Acreage	Imp
Road	5.35	0.9
Ex. Residential	5.94	0.8
Commercial/Industrial	80.09	0.9
School	9.91	0.4
Upland Area	27.96	0.1

Average = *0.68*

RV = 0.7xImp+0.1

= *0.58*

Habitat Footprint = *5.86* ac

Offsite Surface Inflow Si													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
Vol (ac-ft)	13.0	12.8	11.5	5.6	1.1	0.3	0.1	0.6	2.2	1.1	9.7	9.8	67.6
Depth (in)	26.6	26.2	23.5	11.5	2.2	0.6	0.1	1.1	4.6	2.3	19.8	20.0	138.5

1) Depth (in) = Volume (ac-ft) / Habitat Footprint (ac) *12 (in/ft)

Loss Fraction = *30%*

Water Balance (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.1	2.1	1.8	0.9	0.2	0.1	0.0	0.1	0.4	0.2	1.6	1.6	10.9
Si	26.6	26.2	23.5	11.5	2.2	0.6	0.1	1.1	4.6	2.3	19.8	20.0	138.5
Go	8.6	8.5	7.6	3.7	0.7	0.2	0.0	0.4	1.5	0.7	6.4	6.5	44.8
ET	1.4	1.6	1.8	2.2	2.7	3.2	3.7	3.8	3.4	2.8	1.9	1.4	29.7
Balance	18.6	18.2	16.0	6.5	(1.0)	(2.7)	(3.6)	(2.9)	0.1	(1.0)	13.0	13.7	74.8

1) Balance = P + Si - Go - ET

D2 Northerly Arroyo under Proposed Condition

<u>WATER BUDGET ANALYSIS</u>

NEWPORT BANNING RANCH

Northerly Arroyo Habitat Under Proposed Condition

Average Temperature (F)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	64	64	63	65	66	69	72	73	73	72	67	64
Min	47	48	50	52	56	59	62	64	62	58	52	47

Average Rainfall (inch)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.08	2.05	1.84	0.9	0.17	0.05	0.01	0.09	0.36	0.18	1.55	1.57	10.85

Potential Evapotranspiration (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
PET	1.44	1.60	1.78	2.16	2.66	3.21	3.68	3.77	3.35	2.77	1.91	1.41	29.74

<u>Offsite Drainage Area:</u>

DA = *122.09* acres

Land Use	Acreage	Imp
Road	5.35	0.90
Ex. Residential	5.94	0.80
Prop. Residential	4.43	0.65
Commercial/Industrial	78.14	0.90
School	9.91	0.40
Upland Area	18.32	0.10

Average= *0.70*

RV = 0.7xImp+0.1

= *0.59*

Habitat Footprint = *5.86* ac

Offsite Surface Inflow Si													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
Vol (ac-ft)	12.5	12.3	11.1	5.4	1.0	0.3	0.1	0.5	2.2	1.1	9.3	9.4	65.3
Depth (in)	25.6	25.3	22.7	11.1	2.1	0.6	0.1	1.1	4.4	2.2	19.1	19.3	133.7

1) Depth (in) = Volume (ac-ft) / Habitat Footprint (ac) *12 (in/ft)

Loss Fraction = *30%*

Water Balance (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.1	2.1	1.8	0.9	0.2	0.1	0.0	0.1	0.4	0.2	1.6	1.6	10.9
Si	25.6	25.3	22.7	11.1	2.1	0.6	0.1	1.1	4.4	2.2	19.1	19.3	133.7
Go	8.3	8.2	7.4	3.6	0.7	0.2	0.0	0.4	1.4	0.7	6.2	6.3	43.4
ET	1.4	1.6	1.8	2.2	2.7	3.2	3.7	3.8	3.4	2.8	1.9	1.4	29.7
Balance	18.0	17.5	15.4	6.2	(1.1)	(2.7)	(3.6)	(2.9)	0.0	(1.1)	12.5	13.2	71.4

1) Balance = P + Si - Go - ET

D3 Southerly Arroyo under Existing Condition

WATER BUDGET ANALYSIS
NEWPORT BANNING RANCH
Southerly Arroyo Habitat Under Existing Condition

Average Temperature (F)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	64	64	63	65	66	69	72	73	73	72	67	64
Min	47	48	50	52	56	59	62	64	62	58	52	47

Average Rainfall (inch)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.08	2.05	1.84	0.9	0.17	0.05	0.01	0.09	0.36	0.18	1.55	1.57	10.85

Potential Evapotranspiration (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
PET	1.44	1.60	1.78	2.16	2.66	3.21	3.68	3.77	3.35	2.77	1.91	1.41	29.74

Offsite Drainage Area:

DA = *114.64* acres

Land Use	Acreage	Imp
Ex. Residential	11.7	0.8
Commercial/Industrial	31.91	0.9
Upland Area	71.03	0.1

Average = *0.39*

RV = 0.7xImp+0.1
= *0.38*

Habitat Footprint = *25.71* ac

Offsite Surface Inflow Si													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
Vol (ac-ft)	7.5	7.4	6.6	3.2	0.6	0.2	0.04	0.3	1.3	0.6	5.6	5.6	39.0
Depth (in)	3.5	3.4	3.1	1.5	0.3	0.1	0.02	0.2	0.6	0.3	2.6	2.6	18.2

1) Depth (in) = Volume (ac-ft) / Habitat Footprint (ac) *12 (in/ft)

Loss Fraction = *30%*

Water Balance (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.1	2.1	1.8	0.9	0.2	0.1	0.0	0.1	0.4	0.2	1.6	1.6	10.9
Si	3.5	3.4	3.1	1.5	0.3	0.1	0.0	0.2	0.6	0.3	2.6	2.6	18.2
Go	1.7	1.6	1.5	0.7	0.1	0.0	0.0	0.1	0.3	0.1	1.2	1.3	8.7
ET	1.4	1.6	1.8	2.2	2.7	3.2	3.7	3.8	3.4	2.8	1.9	1.4	29.7
Balance	2.5	2.2	1.7	(0.5)	(2.3)	(3.1)	(3.7)	(3.6)	(2.7)	(2.4)	1.0	1.5	(9.4)

1) Balance = P + Si - Go - ET

D4 Southerly Arroyo under Proposed Condition

WATER BUDGET ANALYSIS
NEWPORT BANNING RANCH
Southerly Arroyo Habitat Under Proposed Condition

Average Temperature (F)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	64	64	63	65	66	69	72	73	73	72	67	64
Min	47	48	50	52	56	59	62	64	62	58	52	47

Average Rainfall (inch)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.08	2.05	1.84	0.9	0.17	0.05	0.01	0.09	0.36	0.18	1.55	1.57	10.85

Potential Evapotranspiration (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
PET	1.44	1.60	1.78	2.16	2.66	3.21	3.68	3.77	3.35	2.77	1.91	1.41	29.74

Offsite Drainage Area:

DA = *57.13* acres

Land Use	Acreage	Imp
Road	2.47	0.9
Ex. Residential	11.7	0.8
Commercial/Industrial	31.91	0.9
Park	6.35	0.15
Upland Area	4.7	0.1

Average= *0.73*

RV = 0.7xImp+0.1

= *0.61*

Habitat Footprint = *23.5* ac

Offsite Surface Inflow Si													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
Vol (ac-ft)	6.1	6.0	5.4	2.6	0.5	0.1	0.03	0.3	1.0	0.5	4.5	4.6	31.6
Depth (in)	3.1	3.0	2.7	1.3	0.3	0.1	0.01	0.1	0.5	0.3	2.3	2.3	16.1

1) Depth (in) = Volume (ac-ft) / Habitat Footprint (ac) *12 (in/ft)

Loss Fraction = *30%*

Water Balance (inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year (total)
P	2.1	2.1	1.8	0.9	0.2	0.1	0.0	0.1	0.4	0.2	1.6	1.6	10.9
Si	3.1	3.0	2.7	1.3	0.3	0.1	0.0	0.1	0.5	0.3	2.3	2.3	16.1
Go	1.6	1.5	1.4	0.7	0.1	0.0	0.0	0.1	0.3	0.1	1.2	1.2	8.1
ET	1.4	1.6	1.8	2.2	2.7	3.2	3.7	3.8	3.4	2.8	1.9	1.4	29.7
Balance	2.2	2.0	1.4	(0.6)	(2.4)	(3.1)	(3.7)	(3.6)	(2.7)	(2.5)	0.8	1.3	(10.9)

1) Balance = P + Si - Go - ET

D5 ET Reference Material

TABLE 2: THORNTHWAITE EQUATION

The Thornthwaite equation,

$$ET_u = 0.63(10t_C/I)^a$$

where $a = 0.000000675(I)^3 - 0.0000771(I)^2 + 0.01792(I) + 0.49239$
t_C = degrees C

is based on an exponential relationship between mean monthly temperature and mean monthly consumptive use. The relationship is based largely on experience in central and eastern United States. The temperature-efficiency index, I, an integral element of the Thornthwaite's classification of climate, is the sum of 12 monthly values of the heat index $i = (t_c/5)^{1.514}$, where t_C is the mean monthly temperature in degrees centigrade. The Thornthwaite equation, however, gives only unadjusted rates (ET_u) of **potential** evapotranspiration. Since the number of days in the month varies from 28 to 31 and since the number of hours in the day between the onset of evapotranspiration in the morning and its termination in the evening varies with the season and with latitude, it becomes necessary to reduce or increase the unadjusted rates by a factor (N) listed in Table 3 which varies with the month and the latitude.

P = precipitation (inches)
t_F = temperature (degrees F)
t_C = temperature (degrees C)
$i = (t_c/5)^{1.514}$
ET_u = unadjusted potential evapotranspiration (inches)
ET_a = adjusted potential evapotranspiration (inches)
N = monthly adjustment factor related to hours of daylight

term	Jan	Feb	Mar	April	May	June
P	1.15	0.67	2.13	1.44	6.57	3.61
t_F	21.8	22.4	32.6	45.0	56.8	66.2
t_C	-5.67	-5.33	0.33	7.22	13.78	19.0
i	-1.21	-1.10	0.016	1.74	4.64	_.__
ET_u	-0.97	-0.91	0.04	1.30	2.18	_.__
ET_a	-0.80	-0.74	0.04	1.42	3.24	_.__

term	July	Aug	Sept	Oct	Nov	Dec
P	0.93	4.90	4.49	1.29	3.65	0.86
t_F	70.8	68.9	61.6	50.3	38.0	26.5
t_C	21.56	20.5	16.44	10.16	3.33	-3.06
i	9.14	8.47	6.06	2.93	0.54	-0.47
ET_u	4.21	3.99	3.13	1.84	0.54	-0.49
ET_a	5.46	4.77	3.25	1.75	0.44	-0.38

TABLE 3: ADJUSTING FACTOR (N) FOR POTENTIAL EVAPOTRANSPIRATION COMPUTED BY THE THORNTHWAITE EQUATION (NORTHERN HEMISPHERE)

Lat. deg.	J	F	M	A	M	J	J	A	S	O	N	D
0	1.04	0.94	1.04	1.01	1.04	1.01	1.04	1.04	1.01	1.04	1.01	1.04
10	1.00	0.91	1.03	1.03	1.08	1.06	1.08	1.07	1.02	1.02	0.98	0.99
20	0.95	0.90	1.03	1.05	1.13	1.11	1.14	1.11	1.02	1.00	0.93	0.94
30	0.90	0.87	1.03	1.08	1.18	1.17	1.20	1.14	1.03	0.98	0.89	0.88
35	0.87	0.85	1.03	1.09	1.21	1.21	1.23	1.16	1.03	0.97	0.86	0.85
40	0.84	0.83	1.03	1.11	1.24	1.25	1.27	1.18	1.04	0.96	0.83	0.81
45	0.80	0.81	1.02	1.13	1.28	1.29	1.31	1.21	1.04	0.94	0.79	0.75
50	0.74	0.78	1.02	1.15	1.33	1.36	1.37	1.25	1.06	0.92	0.76	0.70

E BEST MANAGEMENT PRACTICES

E1 SITE DESIGN / LID BMPS

SITE DESIGN & LOW IMPACT DEVELOPMENT (LID)
BEST MANAGEMENT PRACTICES (BMPs)

(excerpted, with minor revision from the Orange County Drainage Area Management Plan (DAMP), Exhibit 7.II, Model Water Quality Management Plan)

DESIGN CONCEPT 1: MINIMIZE STORMWATER RUNOFF, MINIMIZE PROJECT'S IMPERVIOUS FOOTPRINT AND CONSERVE NATURAL AREAS

Minimize and/or control the post-development peak storm water runoff discharge rates, velocities and volumes by utilizing measures that reduce runoff rates and volumes, and increase infiltration. A reduction in the storm water runoff from a development project using properly designed BMPs, can yield a corresponding reduction in the amount of pollutants transported from the site. The undeveloped runoff volume should be determined by considering the project site to be in a natural condition with surface vegetation in place.

The following site design options shall be considered and incorporated where applicable and feasible, during the site planning and approval process consistent with applicable General Plan policies, other development standards and regulations and with any Site Design BMPs included in an applicable regional or watershed program.

1. Maximize the permeable area. This can be achieved in various ways, including, but not limited to increasing building density (number of stories above or below ground) and developing land use regulations seeking to limit impervious surfaces. Decrea sing the project's footprint can substantially reduce the project's impacts to water quality and hydrologic conditions, provided that the undeveloped area remains open space.
2. Conserve natural areas. This can be achieved by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition. Where available, permittees should also refer to their Multiple Species Conservation Plans or other biological regulations, as appropriate to assist in determining sensitive portions of the site. Sensitive areas include, but are not limited to: areas necessary to maintain the viability of wildlife corridors, occupied habitat of sensitive species and all wetlands, and coastal scrub and other upland communities.
3. Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low -traffic streets and other low-traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials
4. Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised 3. Incorporate landscaped buffer areas between sidewalks and streets.
5. Reduce widths of street where off-street parking is available 4

6. Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs
7. Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design
8. Use natural drainage systems.
9. Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration 5
10. Construct onsite ponding areas or retention facilities to increase opportunities for infiltration
11. Other site design options that are comparable, and equally effective

DESIGN CONCEPT 2: MINIMIZE DIRECTLY CONNECTED IMPERVIOUS AREAS (DCIAs)

Priority Projects shall incorporate the following design characteristics, as appropriate, and incorporate any Site Design BMPs included in any regional or watershed program that the project relies upon for Treatment Control BMPs.

1. Where landscaping is proposed, drain rooftops into adjacent landscaping prior to discharging to the storm drain
2. Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping
3. Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales
4. Use one or more of the following (for further guidance, see Start at the Source [1999]):
   - Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings
   - Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter
   - Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to municipal storm drain systems d. Other design concepts that are comparable and equally effective
5. Use one or more of the following features for design of driveways and private residential parking areas:
   - Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the municipal storm drain system
   - Uncovered temporary or guest parking on private residential lots may be: paved with a permeable surface; or, designed to drain into landscaping prior to discharging to the municipal storm drain system

- Other design concepts that are comparable and equally effective

6. Use one or more of the following design concepts for the design of parking areas:
   - Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design
   - Overflow parking (parking stalls provided in excess of the City's minimum parking requirements) may be constructed with permeable paving
   - Other design concepts that are comparable and equally effective
7. Other design characteristics that are comparable and equally effective

E2 SOURCE CONTROL BMPS

SOURCE CONTROL BEST MANAGEMENT PRACTICES (BMPs)

(excerpted, with minor revision from the Orange County Drainage Area Management Plan (DAMP), Exhibit 7.II, Model Water Quality Management Plan)

N1 Education for Property Owners, Tenants and Occupants

For developments with no Property Owners Association (POA) or with POAs of less than fifty (50) dwelling units, practical information materials will be provided to the first residents/occupants/tenants on general housekeeping practices that contribute to the protection of stormwater quality. These materials will be initially developed and provided to first residents/occupants/tenants by the developer. Thereafter such materials will be available through the City's education program. Different materials for residential, office commercial, retail commercial, vehicle-related commercial and industrial uses will be involved.

For developments with POA and residential projects of more than fifty (50) dwelling units, project conditions of approval will require that the POA provide environmental awareness education materials, made available by the municipalities, to all member periodically. Among other things, these materials will describe the use of chemicals (including household type) that should be limited to the property, with no discharge of wastes via hosing or other direct discharge to gutters, catch basins and storm drains.

N2 Activity Restrictions

If a POA is formed, conditions, covenants and restrictions (CCRs) shall be prepared by the developer for the purpose of surface water quality protection. An example would be not allowing car washing outside of established community car wash areas in multi-unit complexes. Alternatively, use restrictions may be developed by a building operator through lease terms, etc. These restrictions must be included in the Project WQMP.

N3 Common Area Landscape Management

On-going maintenance consistent with County Water Conservation Resolution or city equivalent, plus fertilizer and/or pesticide usage consistent with Management Guidelines for Use of Fertilizers (DAMP Section 5.5). Statements regarding the specific applicable guidelines must be included in the Project WQMP.

N4 BMP Maintenance

Identify responsibility for implementation of each non-structural BMP and scheduled cleaning and/or maintenance of all structural BMP facilities.

N5 Title 22 CCR Compliance

Compliance with Title 22 of the California Code of Regulations (CCR) and relevant sections of the California Health & Safety Code regarding hazardous waste management shall be enforced by County Environmental Health on behalf of the State. The Project WQMP must describe how the development will comply with the applicable hazardous waste management section(s) of Title 22.

N6 Local Water Quality Permit Compliance

The City, under the Water Quality Ordinance, may issue permits to ensure clean storm water discharges from fuel dispensing areas and other areas of concern to public properties.

N7 Spill Contingency Plan

Prepared by building operator for use by specified types of building or suite occupancies and which mandates stockpiling of cleanup materials, notification of responsible agencies, disposal of cleanup materials, documentation, etc.

N8 Underground Storage Tank Compliance

Compliance with State regulations dealing with underground storage tanks, enforced by County Environmental Health on behalf of State.

N9 Hazardous Materials Disclosure Compliance

Compliance with City ordinances typically enforced by respective fire protection agency for the management of hazardous materials. The Orange County, health care agencies, and/or other appropriate agencies (i.e. Department of Toxics Substances Control are typically responsible for enforcing hazardous materials and hazardous waste handling and disposal regulations.

N10 Uniform Fire Code Implementation

Compliance with Article 80 of the Uniform Fire Code enforced by fire protection agency.

N11 Common Area Litter Control

For industrial/commercial developments and for developments with POAs, the owner/POA shall be required to implement trash management and litter control procedures in the common areas aimed at reducing pollution of drainage water. The owner/POA may contract with their landscape maintenance firms to provide this service during regularly scheduled maintenance, which should consist of litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations by tenants/homeowners or businesses and reporting the violations to the owner/POA for investigation.

N12 Employee Training

Education program (see N1) as it would apply to future employees of individual businesses. Developer either prepares manual(s) for initial purchasers of business site or for development that is constructed for an unspecified use makes commitment on behalf of POA or future business owner to prepare.

N13 Housekeeping of Loading Docks

Loading docks typically found at large retail and warehouse-type commercial and industrial facilities shall be kept in a clean and orderly condition through a regular program of sweeping and litter control and immediate cleanup of spills and broken containers. Cleanup procedures should minimize or eliminate the use of water. If washdown water is used, it must be disposed of in an approved manner and not discharged to the storm drain system. If there are no other alternatives, discharge of non-storm water flow to the sanitary sewer may be considered only if allowed by the local sewering agency through a permitted connection.

N14 Common Area Catch Basin Inspection

For industrial/commercial developments and for developments with privately maintained drainage systems, the owner is required to have at least 80 percent of drainage facilities inspected, cleaned and maintained on an annual basis with 100 percent of the facilities included in a two-year period. Cleaning should take place in the late summer/early fall prior to the start of the rainy season. Drainage facilities include catch basins (storm drain inlets) detention basins, retention basins, sediment basins, open drainage channels and lift stations.

N15 Street Sweeping Private Streets and Parking Lots

Streets and parking lots are required to be swept prior to the storm season, in late summer or early fall, prior to the start of the rainy season.

N16 Commercial Vehicle Washing

This BMP Has Been Removed.

N17 Retail Gasoline Outlets

Retail gasoline outlets (RGOs) are required to follow operations and maintenance best management practices shown in the California Stormwater Quality Association (CASQA, formerly California Stormwater Quality Task Force) Best Management Practice Guide for Retail Gasoline Outlets. This document may be obtained by downloading from the CASQA website at http://www.stormwatertaskforce.org/swqtf/RGOGuide.htm or from forthcoming CASQA website.

Provide Storm Drain System Stenciling and Signage

Storm drain stencils are highly visible source control messages, typically placed directly adjacent to storm drain inlets. The stencils contain a brief statement that prohibits the dumping of improper materials into the municipal storm drain system. Graphical icons, either illustrating anti-dumping symbols or images of receiving water fauna, are effective supplements to the anti-dumping message. Stencils and signs alert the public to the destination of pollutants discharged into stormwater.

The following requirements shall be included in the project design and shown on the project plans:

1. Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language (such as: "NO DUMPING-DRAINS TO OCEAN") and/or graphical icons to discourage illegal dumping.
2. Post signs and prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.
3. Maintain legibility of stencils and signs.

Design Outdoor Hazardous Material Storage Areas to Reduce Pollutant Introduction

Improper storage of materials outdoors may increase the potential for toxic compounds, oil and grease, fuels, solvents, coolants, wastes, heavy metals, nutrients, suspended solids, and other pollutants to enter the municipal storm drain system. Where the plan of development includes outdoor areas for storage of hazardous materials that may contribute pollutants to the municipal storm drain system, the following storm water BMPs are required:

1. Hazardous materials with the potential to contaminate urban runoff shall either be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with runoff or spillage to the municipal storm drain system; or (2) protected by secondary containment structures (not double wall containers) such as berms, dikes, or curbs.
2. The storage area shall be paved and sufficiently impervious to contain leaks and spills.
3. The storage area shall have a roof or awning to minimize direct precipitation and collection of storm water within the secondary containment area.
4. Any storm water retained within the containment structure must not be discharged to the street or storm drain system. Location(s) of installations of where these preventative measures will be employed must be included on the map or plans identifying BMPs.

Design Trash Storage Areas To Reduce Pollutant Introduction

All trash container areas shall meet the following requirements (limited exclusion: detached residential homes):

1. Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, screened or walled to prevent off-site transport of trash; and
2. Provide attached lids on all trash containers that exclude rain, or roof or awning to minimize direct precipitation.

3. Connection of trash area drains to the municipal storm drain system is prohibited.

Use Efficient Irrigation Systems and Landscape Design

Projects shall design the timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the municipal storm drain system. (Limited exclusion: detached residential homes.) The following methods to reduce excessive irrigation runoff shall be considered, and incorporated on common areas of development and other areas where determined applicable and feasible by the City:

1. Employing rain shutoff devices to prevent irrigation after precipitation.
2. Designing irrigation systems to each landscape area's specific water requirements.
3. Using flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
4. Implementing landscape plan consistent with County Water Conservation Resolution or city equivalent, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.
5. The timing and application methods of irrigation water shall be designed to minimize the runoff of excess irrigation water into the municipal storm drain system.
6. Employing other comparable, equally effective, methods to reduce irrigation water runoff.
7. Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider other design features, such as:
    - Use mulches (such as wood chips or shredded wood products) in planter areas without ground cover to minimize sediment in runoff.
    - Install appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant material where possible and/or as recommended by the landscape architect.
    - Leave a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible.
    - Choose plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth.

Protect Slopes and Channels

Project plans shall include Source Control BMPs to decrease the potential for erosion of slopes and/or channels, consistent with local codes and ordinances and with the approval of all agencies with jurisdiction, e.g., the U.S. Army Corps of Engineers, the Regional Boards and the California Department of Fish and Game. The following design principles shall be considered, and incorporated and implemented where determined applicable and feasible by the City:

1. Convey runoff safely from the tops of slopes.
2. Avoid disturbing steep or unstable slopes.
3. Avoid disturbing natural channels.
4. Install permanent stabilization BMPs on disturbed slopes as quickly as possible.
5. Vegetate slopes with native or drought tolerant vegetation.
6. Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
7. Install permanent stabilization BMPs in channel crossings as quickly as possible, and ensure that increases in runoff velocity and frequency caused by the project do not erode the channel.
8. Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
9. Onsite conveyance channels should be lined, where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are large enough to erode grass or other vegetative linings, riprap, concrete soil cement or geo-grid stabilization may be substituted or used in combination with grass or other vegetation stabilization.
10. Other design principles that are comparable and equally effective.

Loading Dock Areas

Loading/unloading dock areas shall include the following:

1. Cover loading dock areas, or design drainage to preclude urban run-on and runoff.
2. Direct connections to the municipal storm drain system from below grade loading docks (truck wells) or similar structures are prohibited. Storm water can be discharged through a permitted connection to the storm drain system with a Treatment Control BMP applicable to the use.
3. Other comparable and equally effective features that prevent unpermitted discharges to the municipal storm drain system.
4. Housekeeping of loading docks shall be consistent with N13.

Maintenance Bays

Maintenance bays shall include the following:

1. Repair/maintenance bays shall be indoors; or, designed to preclude urban run-on and runoff.

2. Design a repair/maintenance bay drainage system to capture all wash water, leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash -down waters from entering the storm drain system. Connect drains to a sump for collection and disposal. Discharge from the repair/maintenance bays to the municipal storm drain system is prohibited. If there are no other alternatives, discharge of non-storm water flow to the sanitary sewer may be considered, but only when allowed by the local sewering agency through permitted connection.
3. Other comparable and equally effective features, that prevent discharges to the municipal storm drain system.

Vehicle Wash Areas

Projects that include areas for washing/steam cleaning of vehicles shall use the following:

1. Self-contained or covered with a roof or overhang.
2. Equipped with a wash racks constructed in accordance with the guidelines in Attachment C, and with the prior approval of the sewering agency (Note: Discharge monitoring may be required by the sewering agency).
3. Equipped with a clarifier or other pretreatment facility.
4. Other comparable and equally effective features that prevent unpermitted discharges, to the municipal storm drain system.

Outdoor Processing Areas

Outdoor process equipment operations, such as rock grinding or crushing, painting or coating, grinding or sanding, degreasing or parts cleaning, landfills, waste piles, and wastewater and solid waste handling, treatment, and disposal, and other operations determined to be a potential threat to water quality by the City shall adhere to the following requirements.

1. Cover or enclose areas that would be the sources of pollutants; or, slope the area toward a sump that will provide infiltration or evaporation with no discharge; or, if there are no other alternatives, discharge of non-storm water flow to the sanitary sewer may be considered only when allowed by the local sewering agency through permitted connection
2. Grade or berm area to prevent run-on from surrounding areas.
3. Installation of storm drains in areas of equipment repair is prohibited.
4. Other comparable or equally effective features that prevent unpermitted discharges to the municipal storm drain system.
5. Where wet material processing occurs (e.g. electroplating), secondary containment structures (not double wall containers) shall be provided to hold spills resulting from accidents, leaking tanks or equipment, or any other unplanned releases (Note: If these are plumbed to the sanitary sewer, the structures and plumbing shall be in accordance with Section 7.II-Attachment C, and with the

prior approval of the sewering agency). See also Section 7.II-3.4.2, N10. Design of secondary containment structures shall be consistent with Design of Outdoor Material Storage Areas To Reduce Pollutant Introduction.

Some of these land uses (e.g. landfills, waste piles, wastewater and solid waste handling, treatment and disposal) may be subject to other permits including Phase I Industrial Permits that may require additional BMPs.

Equipment Wash Areas

Outdoor equipment/accessory washing and steam cleaning activities shall use the following:

1. Be self-contained or covered with a roof or overhang.
2. Design an equipment wash area drainage system to capture all wash water. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around equipment wash areas to prevent wash -down waters from entering the storm drain system. Connect drains to a sump for collection and disposal. Discharge from equipment wash areas to the municipal storm drain system is prohibited. If there are no other alternatives, discharge of non-storm water flow to the sanitary sewer may be considered, but only when allowed by the local sewering agency through a permitted connection.
3. Other comparable or equally effective features that prevent unpermitted discharges to the municipal storm drain system.

Fueling Areas

Fuel dispensing areas shall contain the following:

1. At a minimum, the fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.
2. The fuel dispensing area shall be paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited.
3. The fuel dispensing area shall have an appropriate slope (2% -4%) to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of storm water.
4. An overhanging roof structure or canopy shall be provided. The cover's minimum dimensions must be equal to or greater than the area of the fuel dispensing area in #1 above. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area shall drain to the project's Treatment Control BMP(s) prior to discharging to the municipal storm drain system.

Hillside Landscaping

Hillside areas that are disturbed by project development shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control, satisfactory to the City.

Wash Water Controls For Food Preparation Areas

Food establishments (per State Health & Safety Code 27520) shall have either contained areas or sinks, each with sanitary sewer connections for disposal of wash waters containing kitchen and food wastes. If located outside, the contained area s or sinks shall also be structurally covered to prevent entry of storm water. Adequate signs shall be provided and appropriately placed stating the prohibition of discharging washwater to the storm drain system.

Community Car Wash Racks

In complexes larger than 100 dwelling units where car washing is allowed, a designated car wash area that does not drain to a storm drain system shall be provided for common usage. Wash waters from this area may be directed to the sanitary sewer (in accordance with Attachment C, and with the prior approval of the sewering agency); to an engineered infiltration system; or to an equally effective alternative. Pre-treatment may also be required. Signage shall be provided prohibiting discharges of washwater outside of the designated area.

E3 LID / TREATMENT CONTROL BMP CALCULATIONS

LID / TREATMENT CONTROL BMP SIZING CALCULATIONS

Date: April 17, 2008

Project: Newport Banning Ranch

Job: 821.01.02

Stormwater Quality Design Volume (SQDV) Calculation

(Source: Orange County Drainage Area Management Plan (DAMP), Exhibit 7.11 – Model Water Quality Management Plan, September 26, 2003)

Calculate the storm water quality design volume for the site (or each sub-drainage area that will discharge to a separate BMP) produced by a 24-hour, 85th percentile storm event using the following equation:

SQDV = C * I * A * (*unit conversion*)

Where:

C = runoff coefficient obtained from Table A-1
I = rainfall intensity (see map on following page)
A = area of the site treated by the BMP, in acres

Vegetated Biocell Sizing

(Source: Los Angeles Regional Water Quality Control Board (RWQCB). Example Standard Urban Storm Water Management Plan [SUSMP]; Appendix A: Water Quality Volume Calculations. Website: http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/general/sams_club/Appendix%20A.pdf)

Calculate the volume of water treated by each biocell based on the depths and properties of the various layers of the biocell:

$V_{BC} = V_P + V_{MGS} + V_{SO} + V_1$

Where:

V_{BC} = volume treated by biocell in ft^3 (must be equal to or greater than SQDV)
V_P = volume ponded in biocell in ft^3
V_{MGS} = volume stored in mulch, gravel, and topsoil in ft^3
V_1 = volume infiltrated in ft^3

The volumes in the equation above can be determined by the following sequence of equations:

Volume Ponded in Biocell (V_P):

$V_P = [(A_T + A_B) * P] / 2$

Where:

A_T = area of top of biocell, in square feet
A_B = area of bottom of biocell, in square feet
P = ponding depth, in feet

Volume in Mulch, Topsoil and Gravel Layer (V_{MGS})

$V_{MGS} = A_T * [(M*\eta_M) + (G*\eta_G) + (S* \eta_S)]$

Where:

A_T = area of top of biocell, in square feet
M = depth of mulch, in feet
η_M = porosity of mulch, in percent void space
G = depth of gravel layer, in feet
η_G = porosity of gravel layer, in percent void space
S = depth of topsoil
η_S = porosity of top soil, in percent void space

Velocity of Water in Amended Soil Layer (v_i)

$V_i = F_P / [12 * \eta_{SO} * (1\text{-}w)]$

Where:

F_P = infiltration capacity of the amended soil, or hydraulic conductivity (in inches per hour)
η_{SO} =
w = soil water content before rain event, in percent of voids assumed saturated

Duration of Infiltration During 24 hr Storm Event (T)

$T = 24 – (S_O / v_i)$

Where:

S_O = depth of amended soil layer, in feet

Volume Infiltrated (V_1)

$V_1 = T * A_T * [F_P / (12 * SF)]$

Where:

SF = safety factor for infiltration capacity. Assumed to be 1 if overflow drain is provided.

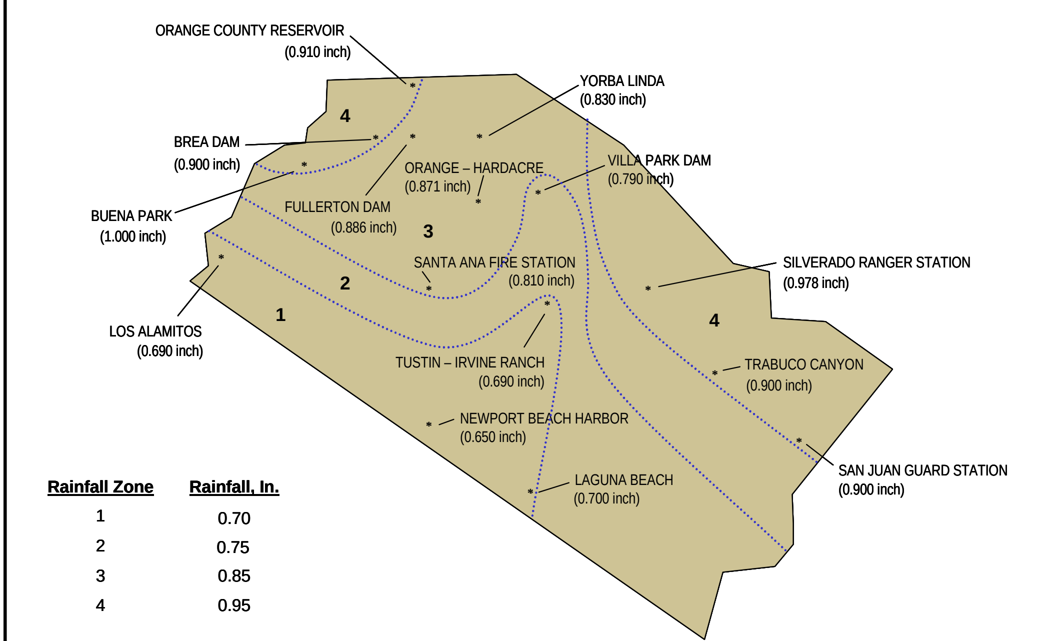


Figure A-1
Orange County California
Precipitation Stations
24-hour, 85th percentile rainfall

Table A-1: C Values Based on Impervious/Pervious Area Ratios		
% Impervious	% Pervious	C
0	100	0.15
5	95	0.19
10	90	0.23
15	85	0.26
20	80	0.30
25	75	0.34
30	70	0.38
35	65	0.41
40	60	0.45
45	55	0.49
50	50	0.53
55	45	0.56
60	40	0.60
65	35	0.64
70	30	0.68
75	25	0.71
80	20	0.75
85	15	0.79
90	10	0.83
95	5	0.86
100	0	0.90

Storm Water Quality Design Volume Calculations - Newport Banning Ranch

SQDV = C * I * A * (Conversion)

C = Runoff Coefficient   depth = volume / area
I = Rainfall Intensity   I = volume / C * A * conversion
conversion = (1/12)*(43560)

Drainage Area	Development Area	% impervious	Runoff Coefficient	Rainfall Intensity (in)	Drainage Area (acres)	Conversion Factor	Treatment Required (ft^3)	Treatment Required (acre-ft)
A19.1	Road	90%	0.83	0.7	2.81	3630	**5,901.38**	**0.135**
A19.11	Park (4b)	10%	0.23	0.7	2.21	3630	**1,271.94**	**0.029**
A17	Park (4b)	10%	0.23	0.7	1.6	3630	**920.86**	**0.021**
A16.4	Park (4b)	10%	0.23	0.7	3.71	3630	**2,135.24**	**0.049**
A19.8	Road	90%	0.83	0.7	1.85	3630	**3,885.25**	**0.089**
A12.12	Resort Colony (5a/6a)	65%	0.64	0.7	7.17	3630	**11,641.92**	**0.267**
A12.9	Road	90%	0.83	0.7	1.01	3630	**2,121.14**	**0.049**
A12.14	Resort Colony (6a/6b)	65%	0.64	0.7	6.6	3630	**10,716.41**	**0.246**
A12.13	Road	90%	0.83	0.7	0.44	3630	**924.06**	**0.021**
A12.11	Townhomes (9a)	75%	0.71	0.7	1.33	3630	**2,412.98**	**0.055**
A12.8	Townhomes (9a)	75%	0.71	0.7	0.48	3630	**870.85**	**0.020**
A19.9	Townhomes (9a)	75%	0.71	0.7	2.51	3630	**4,553.83**	**0.105**
A12.7	Townhomes (9a)	75%	0.71	0.7	0.62	3630	**1,124.85**	**0.026**
A12.4	Townhomes (9a)	75%	0.71	0.7	4.05	3630	**7,347.81**	**0.169**
A12.2	Road	90%	0.83	0.7	0.43	3630	**903.06**	**0.021**
A12.1	Townhomes (9a)	75%	0.71	0.7	1.54	3630	**2,793.98**	**0.064**
A12.3	Bluff Top Homes (9b)	60%	0.60	0.7	1.14	3630	**1,742.39**	**0.040**
A12.5	Road	90%	0.83	0.7	0.41	3630	**861.06**	**0.020**
A12.6	Bluff Top Homes (9b)	60%	0.60	0.7	1.13	3630	**1,727.10**	**0.040**
A12.10	Bluff Top Homes (9b)	60%	0.60	0.7	2.1	3630	**3,209.66**	**0.074**
A7.4	Road	90%	0.83	0.7	2.47	3630	**5,187.34**	**0.119**
A7.3	Park (4a)	10%	0.23	0.7	6.35	3630	**3,654.66**	**0.084**
A19.6	Park (4a)	10%	0.23	0.7	2.54	3630	**1,461.86**	**0.034**
A19.5	Road	90%	0.83	0.7	3.09	3630	**6,489.42**	**0.149**
A19.1	Park Flats (7c)	75%	0.71	0.7	1.8	3630	**3,265.69**	**0.075**
A19.2	Park Flats (7c)	75%	0.71	0.7	2.42	3630	**4,390.54**	**0.101**
A19.3	Road	90%	0.83	0.7	0.9	3630	**1,890.12**	**0.043**
A19.4	Park (4a)	10%	0.23	0.7	1.92	3630	**1,105.03**	**0.025**
A19.7	Park (4a)	10%	0.23	0.7	2.54	3630	**1,461.86**	**0.034**
A11.2	Road	90%	0.83	0.7	0.25	3630	**525.03**	**0.012**
A11.5	Road	90%	0.83	0.7	1.18	3630	**2,478.16**	**0.057**

Drainage Area	Development Area	% impervious	Runoff Coefficient	Rainfall Intensity (in)	Drainage Area (acres)	Conversion Factor	Treatment Required (ft^3)	Treatment Required (acre-ft)
A11.6	Bluff Traditional (9c)	75%	0.71	0.7	1.15	3630	**2,086.42**	**0.048**
A11.4	Park (4e)	10%	0.23	0.7	1.84	3630	**1,058.99**	**0.024**
A11.7	Bluff Traditional (9c)	75%	0.71	0.7	4.75	3630	**8,617.80**	**0.198**
A11.8	Bluff Top Homes (8a)	60%	0.60	0.7	6.1	3630	**9,323.31**	**0.214**
A11.1	Road	90%	0.83	0.7	0.19	3630	**399.03**	**0.009**
B11.2	North Terrace Lofts (7a)	75%	0.71	0.7	4.43	3630	**8,037.23**	**0.185**
C3.3	Bluff Traditional (9c)	75%	0.71	0.7	3.05	3630	**5,533.54**	**0.127**
C4.1	Road	90%	0.83	0.7	0.73	3630	**1,533.10**	**0.035**
C5.2	Bluff Traditional (9c)	75%	0.71	0.7	2.49	3630	**4,517.54**	**0.104**
C6.1	Road	90%	0.83	0.7	0.62	3630	**1,302.08**	**0.030**
C6.2	Bluff Traditional (9c)	75%	0.71	0.7	3.14	3630	**5,696.82**	**0.131**
C3.2	Coastal Beach (8b)	75%	0.71	0.7	2.09	3630	**3,791.83**	**0.087**
C4.2	Coastal Beach (8b)	75%	0.71	0.7	1.21	3630	**2,195.27**	**0.050**
C5.1	Road	90%	0.83	0.7	0.32	3630	**672.04**	**0.015**
C6.3	Park (4f)	10%	0.23	0.7	1.37	3630	**788.49**	**0.018**
C7.3	Coastal Beach (8b)	75%	0.71	0.7	3.51	3630	**6,368.10**	**0.146**
C7.1	Road	90%	0.83	0.7	1.12	3630	**2,352.15**	**0.054**
C8.2	Coastal Beach (8b)	75%	0.71	0.7	5.34	3630	**9,688.22**	**0.222**
C8.1	Road	90%	0.83	0.7	0.48	3630	**1,008.07**	**0.023**
C8.3	Bluff Top Homes (8a)	60%	0.60	0.7	2.16	3630	**3,301.37**	**0.076**
C9.1	Road	90%	0.83	0.7	2.55	3630	**5,355.35**	**0.123**
C9.2	Coastal Beach (8b)	75%	0.71	0.7	2.41	3630	**4,372.40**	**0.100**
C14.2	Coastal Beach (8b)	75%	0.71	0.7	2.24	3630	**4,063.97**	**0.093**
C13.2	Park (4j)	10%	0.23	0.7	3.8	3630	**2,187.04**	**0.050**
C14.1	Road	90%	0.83	0.7	0.2	3630	**420.03**	**0.010**
C3.1	Road	90%	0.83	0.7	2.81	3630	**5,901.38**	**0.135**
C12.3	South Terrace Lofts (7b)	75%	0.71	0.7	8.66	3630	**15,711.61**	**0.361**
C12.1	Road	90%	0.83	0.7	2.34	3630	**4,914.32**	**0.113**
C12.2	South Terrace Lofts (7b)	75%	0.71	0.7	5.84	3630	**10,595.36**	**0.243**
C13.1	Road	90%	0.83	0.7	0.27	3630	**567.04**	**0.013**
C15	Eco-Guest Retreat	15%	0.26	0.7	5.07	3630	**3,401.08**	**0.078**
C11	Off-site drainage	90%	0.83	0.7	1.06	3630	**2,226.14**	**0.051**
C10	Off-site drainage	90%	0.83	0.7	0.88	3630	**1,848.12**	**0.042**
	Total	**62%**	**0.62**	**0.7**	**152.82**	**3630**	**238,814.11**	**5.482**