

9.1 Purpose and Intent

The purpose of this chapter is to describe the Water Management Plan for the Project Site. The Water Management Plan includes the following components:

- A runoff management plan to address on-site drainage and control of off-site flows which cross the Project Site in order to reduce potential downstream flooding, preserve and protect drainage corridors, and reduce erosion and sediment deposition; and
- A water quality management plan to address treatment of project flows and off-site runoff to improve downstream water quality and nourish habitat and wetland areas within the open space areas of the Project Site.

9.2 Runoff Management Plan

9.2.1 Existing Topographic Features

Several landforms within and adjacent to the Project Site form the existing drainages within and around the Project Site:

- **Lowland Area:** Comprised of the northwesterly portion and westerly edge of the Project Site, the Lowland Area currently contains degraded wetland and ruderal vegetation, and is crisscrossed by roads, pipelines, and other facilities associated with historic oil operations. The Lowland Area also contains several narrow channels and shallow depressions that occasionally pond water.
- **Upland Area:** Comprised of the southeasterly and easterly portions of the Project Site, the Upland Area currently contains existing oil pipelines, roads, buildings, and other equipment related to oil extraction activities.
- **Bluffs/Slopes:** Located between the Lowland Area and the Upland Area, the Bluffs/Slopes include west and south facing slopes of varying steepness. The Bluffs/Slopes have been impacted by localized erosion and destabilization, resulting in sloughing and sediment contributions to Semeniuk Slough, located off-site to the west.
- **Arroyos:** Three existing drainage corridors generally referred to as “arroyos” traverse the Project Site from the eastern Project boundary across the Upland Area towards the Lowland Area and Semeniuk Slough to the west. The Southern Arroyo and Northern Arroyo are considered significant drainage features and convey runoff primarily from off-site upstream areas through the Project Site. The on-site and off-site tributaries to these

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two arroyos, especially the Southern Arroyo, have been subject to significant erosion and sloughing of sediment which has flowed into the main arroyo channels, and these sediments have been delivered downstream during storm events to the receiving water bodies. In the case of the Southern Arroyo, significant sediment and conveyance capacity issues have occurred within Semeniuk Slough and areas to the west. The Master Development Plan describes improvements to be constructed as part of the Project to stabilize these eroding tributaries to remove the primary sources of sediment being delivered to Semeniuk Slough.

- **Semeniuk Slough:** A remnant channel of the Santa Ana River, Semeniuk Slough consists of a meandering drainage course (aka Oxbow Loop) that flanks the western edge of the Project Site and connects to the ACOE Wetlands Restoration Area further to the west. Semeniuk Slough receives runoff from both on-site and off-site areas, with most of the runoff coming from the Southern Arroyo, which drains generally west and north towards the Lowland Area. A small dike separates the Semeniuk Slough channel from the Lowland Area, while several culverts allow for tidal exchange between the two areas.

9.2.2 Existing Drainage Conditions

1. Off-site Run-on

The Project Site currently receives off-site stormwater and nuisance flows from approximately 146 acres of primarily industrial/commercial development areas located to the east of the Project Site. The majority of off-site stormwater is delivered to the Project Site via existing streets and public storm drains which deposit the flows into the Southern Arroyo and the Northern Arroyo drainage corridors.

Off-site flows from approximately 99 acres of existing urban development enter the Northern Arroyo, and off-site flows from approximately 47 acres of urban development enter the Southern Arroyo.

2. On-site Runoff

The Project Site's natural drainage generally flows from the higher elevations in the east toward lower elevations to the west. The Northern Arroyo conveys flows directly to the Lowland, and the Southern Arroyo delivers flows to Semeniuk Slough.

There are no major existing storm drain facilities within the Project Site. At the southerly edge of the Project Site, an existing underground reinforced concrete box (RCB) storm drain along West Coast Highway collects runoff from the Project Site and areas to the east and discharges it into Semeniuk Slough. This existing storm drain along West Coast Highway is owned and operated by the California Department of Transportation (Caltrans). Flows from Semeniuk Slough discharge into the ACOE Wetlands Restoration Area (marsh basin) which is equipped with tidal gates that control flows into the Santa Ana River prior to discharging into the Pacific Ocean.

9.2.3 Master Drainage Plan

The Master Drainage Plan is designed to avoid and neutralize potential adverse effects of the Project on stormwater runoff quantity and quality.

No major changes in the existing watershed drainage pattern shall occur as a result of construction of the Master Drainage Plan for the Project. All project runoff shall continue to drain either to the Semeniuk Slough or the Lowland Area. Minor adjustments to the on-site sub-watershed boundaries shall be implemented to better manage flow velocities and volumes into each of these areas. The Master Drainage Plan integrates Low Impact Development (LID), habitat restoration, and aesthetic features with traditional civil engineering drainage design requirements. New drainage facilities to be constructed as part of the Project are described in the following section.

1. Storm Drain Systems

As shown in Exhibit 9-1, Master Drainage Plan, six primary storm drain systems, labeled A through F, shall be constructed as part of the Project, to drain Project flows in an environmentally responsible manner to downstream receiving water bodies. These storm drains are described below:

- **Storm Drain A:** This storm drain system will collect flows from the Community Park as well as Bluff Road and North Bluff Road, and deliver these flows to the existing Caltrans box culvert under West Coast Highway. The Project is designed to reduce the tributary drainage area flowing to this storm drain system to counterbalance the increase in Project runoff rates. As a result, Project flows shall not increase overall flows above existing conditions to the existing Caltrans box culvert under West Coast Highway.
- **Storm Drains B and C:** These two storm drain systems will collect flows from the development areas adjacent to the Southern Arroyo and deliver these flows to a diffuser basin located at the foot of the arroyo adjacent to the Semeniuk Slough. Storm Drain B will collect flows from the South Family Village and Resort Colony. Storm Drain C will collect flows from the southern portion of the North Family Village. This system will have three environmental benefits: 1) it will minimize the discharge of stormwater flows

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directly to the Southern Arroyo to reduce bank erosion and help protect the long-term stability of the Southern Arroyo; 2) it will dissipate erosive energy at the foot of the Southern Arroyo before storm flows enter the Semeniuk Slough; and 3) it will significantly reduce the amount of sediment being transported to Semeniuk Slough.

- **Storm Drains D and E:** These two storm drain systems will collect flows from the northern portion of the North Family Village and the middle and southern portion of the Urban Colony, and deliver storm flows to the Lowland Area. Under the existing condition, a portion of these flows are tributary to the Southern Arroyo and Semeniuk Slough. The planned redirection of this drainage is specifically designed to reduce the flood loading of Semeniuk Slough. An energy diffuser shall be incorporated into a basin located in SPA 4b, (Diffuser Basin/Habitat Area) to be improved in the Lowland at the foot of the Southern Arroyo to reduce the momentum of the flows delivered by Storm Drains D and E. The Lowland Area has the capacity to accommodate the increase in flows. A dispersion system shall be provided in the basin to distribute runoff to a larger area of the Lowland, fostering a more diverse and extensive habitat restoration program.
- **Storm Drain F:** This storm drain system will collect flows from the northern portion of the Urban Colony and deliver it to the Northern Arroyo. The tributary area to Storm Drain F shall be designed to match existing runoff conditions in the Northern Arroyo. An energy dissipater shall be installed at the terminus of the storm drain to transition flows from erosive velocities to non-erosive velocities, and to deliver those non-erosive flows to the natural channel within the Northern Arroyo.
- **Storm Drain G:** This relatively small storm drain system will collect flows from the northernmost portion of the Project Site and deliver them to the Lowland Area via a culvert and a storm drain located in North Bluff Road, south of 19th Street.

9.2.4 Watershed Assessment Report

The Watershed Assessment Report for the Newport Banning Project, prepared by Fuscoe Engineering, Inc., contains a comprehensive description of the drainage and flood control objectives, details, and calculations. This report is available for review at the City of Newport Beach and is referenced in the EIR.

The Project's improvements to water quality within and adjacent to the Project Site are described in the following Section 9.3, and complement the Master Drainage Plan described above.

9.3 Water Quality Management Plan

9.3.1 Existing Water Quality Conditions

The Project Site does not currently have any comprehensive or specific water quality measures or facilities, although the existing oil field operates with local erosion and sediment controls in place for existing oil operations. As described in Section 9.2, urban run-on from existing commercial, industrial, and residential areas located east of the Project Site flows untreated from storm drain outlets along the east property line through the Project Site, principally through the Southern and Northern Arroyos, to Semeniuk Slough and the Lowland. Existing on-site runoff flows over and through the Project Site largely collect in the arroyos without the benefit of water quality treatment.

9.3.2 Master Water Quality Management Plan

1. Management Plan Components

The Water Quality Management Plan (WQMP) for the Project includes facilities to be constructed as part of the Project to implement the following three major WQMP components:

- Treatment of off-site run-on and related attenuation of run-on peak flows which currently enter the Southern Arroyo;
- Treatment of Project runoff prior to discharge into the existing arroyo drainage corridors, through the use of hydrologic source controls, Low Impact Development (LID) features and treatment control basins; and
- Utilization of treated drainage water to nourish habitat areas on the Upland Mesa, within the Southern and Northern Arroyos, and within the Lowland Area.

The Water Quality Management Plan (WQMP) is illustrated in Exhibit 9 -2. The three major components of the WQMP are explained below.

a. Improve Off-site Run-on Flowing Through the Project Site

The WQMP includes the installation of a regional water quality basin along the eastern edge of the Project Site to provide treatment of run-on from an approximately 47-acre mixed urban (i.e., commercial, industrial, and residential) area located adjacent to the Project Site. This water quality basin will also attenuate peak flow discharge velocities prior to their entering the Southern Arroyo. The treatment and controlled release of

these flows will significantly reduce currently high levels of local erosion and sediment deposition in Semeniuk Slough.

b. Treatment of On-Site Generated Runoff

The WQMP includes implementation of a “Treatment Train” approach for Project runoff that utilizes specialized features and Best Management Practices (BMPs) to provide treatment as required by water quality regulations.

For purposes of treating on-site generated runoff, the WQMP is comprised of three zones that are used to treat water in sequential stages as described below:

- Interior Development Zone – Stage 1 treatment within the interior landscape areas of the Villages and Colonies;
- Transitional Zone – Stage 2 treatment within street rights-of-way, parkways, paseos, and similar common landscape areas that adjoin the Villages and Colonies; and
- Perimeter Zone – Stage 3 treatment, generally within certain areas of the South and North Bluff Park, between the Villages and Colonies and the Southern and Northern Arroyos, and in two areas within the Open Space Preserve.

(1) Stage 1 – Interior Development Zone

The first stage of water quality protection shall begin within the interior of the Project’s development areas, such as landscape/planter areas and non-vehicular walkways to initiate treatment directly at the source of the runoff.

The focus of Interior Zone treatment is to maximize the use of hydrologic source control (HSC), including localized on-lot filtration/infiltration, impervious area dispersion, porous pavements in non-vehicular areas, amended soils, street trees, and the use of private and common area landscaping for stormwater filtering. Each HSC will be quantified within the interior development areas per the 2010 Model WQMP Standards and accounted for in construction-level Water Quality Management Plans (WQMPs) associated with final Grading Permit applications. Primary benefits will include water quality treatment and flow mitigation, relying on soil-based infiltration processes and rainfall interception during small, more frequent storm events.

(2) Stage 2 – Transitional Zone

The second stage of water quality protection shall occur primarily within the Transitional Zone within public street rights-of ways (especially parkways) and along common landscape areas that lead into and out of the North and South Family Villages, the Resort Colony, and the Urban Colony. Integrating multi-stage pollution controls within and adjacent to the built travelways will reduce the environmental footprint of the Project by removing gross pollutants and smaller particulates associated with road runoff, thereby providing cleaner runoff water.

The primary water quality measures deployed within the Transitional Zone shall include the use of green curbs (i.e., slotted or flat curbs that promote low flow diversion of runoff into natural treatment areas), bio-swales within the parkways, and sub-surface bio-cell enhancements to promote cleansing of stormwater runoff. The bioswales provide pre-treatment and filtering of coarse and gross pollutants, while the biocells provide removal of finer sediments, bacteria, and heavy metals. Bio-cells are bioretention features designed within the subsurface of the bioswale to provide volume based treatment of stormwater through specially designed soil and sand layers. These sustainable infrastructure features within the public street network (i.e., “Green Streets”) will provide significant water quality treatment for flows generated from the streets themselves as well as from the private yards, public parks, and common landscape areas and open spaces that adjoin them.

(3) Stage 3 – Perimeter Zone

The last stage of water quality treatment and protection shall occur primarily along the outer edges of development, within carefully located and designed areas of South Bluff Park and North Bluff Park. Stage 3 water quality treatment will also occur within the Water Quality Basin (SPA 4a) in the Lowland area where a final cleansing will occur. The community water quality basins within the South and North Bluff Parks, and the Water Quality Basin in the Lowland Area will further treat runoff that has been previously treated by Stage 1 and Stage 2 water quality features, and will also treat runoff flows that because of their location could not be treated within the Interior or Transitional Zones of the Project. The Perimeter Zone shall also include the Water Quality/Detention Basins along eastern edge of the Project Site to provide treatment of off-site flows at the upstream end, before they enter the Southern Arroyo.

The Perimeter Zone will include native or habitat-compatible plantings for water quality pollutant removal, as well as sub-drain designs to replicate or mimic natural infiltration processes and minimize standing water. These water quality basins, regardless of their location, shall be maintained on a regular basis and long-term

maintenance agreements with responsible parties will be provided in the Project-Level Water Quality Management Plans (WQMPs) submitted for City review and approval.

Flows will be delivered to these Stage 3 treatment facilities through primary storm drain lines or parallel low-flow drainage systems. The use of parallel low-flow drainage systems is an effective method to increase the tributary treatment area associated with the proposed BMP. For areas where infiltration is not feasible or recommended, the use of sub-drains will allow the WQMP to incorporate bioretention components within the design of the water quality basins that promote additional filtering through soil and sand base layers. Treated flows shall be collected by sub-drain systems for discharge into local habitat areas or returned to the backbone storm drain systems for delivery to the Southern Arroyo and Northern Arroyo, and ultimately the Lowland.

c. Use of Treated Runoff as Hydrologic Source for Restored Habitat

The water resulting from multi-stage runoff treatment represents an opportunity to use the treated water as a hydrologic source for habitat restoration areas and/or potentially to be stored for future landscape irrigation use within the Project Site. Stage 1 offers the greatest potential for water storage and reuse, while Stages 2 and 3 offer special opportunities for hydrologic nourishment of restoration areas either on the Upland Area, within the arroyos, or within the Lowland Area.

For discharges of treated water from the community water quality basins into the arroyos or low flow discharges into the Lowlands from the Lowland Basin, the outlets shall include energy dissipaters and multiple outlet points. This technique will minimize the potential for local scour and erosion while allowing for larger areas to receive hydrologic nourishment for habitat restoration areas.

Where a secondary use of the water is not feasible or desired, the treated flows shall be returned to the appropriate storm drain system, which will deliver it downstream to the locations previously described.

9.3.3 Future Project-Level Water Quality Management Plans

The specific details and locations of all water quality measures shall be described and accounted for in Project-Level WQMPs, required to be submitted for City review and approval prior to issuance of development permits and to be constructed as part of all approved land use development projects within the Project Site.



