5.8 HYDROLOGY, WATER QUALITY / STORMWATER RUNOFF

5.8.1 Environmental Setting

The VPP Project is located within the Ballona Creek Watershed (watershed). The watershed is located on the coastal plain in the western portion of the Los Angeles Basin with the Santa Monica Mountains on the north and the Baldwin Hills on the south. Ballona Creek flows downstream from the Santa Monica Mountains through the City of Culver City and flows into the ocean at Playa Del Rey. Except for its estuary, Ballona Creek is a concrete-lined channel extending through a complex underground storm drainage system that drains approximately 130 square miles of urban developed land area. Tributaries of Ballona Creek include Centinela Creek, Sepulveda Canyon Channel, Benedict Canyon Channel, and numerous other stormdrains all of which are either concrete channels or underground box culverts.

Cities within the watershed area consist of Culver City, Beverly Hills, West Hollywood, parts of Santa Monica, parts of Inglewood, parts of Los Angeles and portions of unincorporated areas of Los Angeles County. Adjacent to the downstream portion of the Ballona Creek Channel are the Marina Del Rey Harbor, Ballona Lagoon and Venice canals, Del Rey Lagoon and Ballona Wetlands. These waterbodies do not discharge into Ballona Creek, but are grouped as waterbodies in this subwatershed because of their proximity and various forms of hydrological connection to Ballona Creek (Los Angeles RWQCB, 2004).

Portions of the watershed are underlain by oil deposits. In 1892, extraction of oil began in the watershed, with the discovery of oil in Echo Park. In subsequent decades, oil wells were drilled throughout portions of the watershed. Initially, production was generally limited to downtown Los Angeles, but exploration continued to move west. With the discovery of the Inglewood oil field in 1924, production began in and around the Baldwin Hills. Oil was discovered in the Venice area in 1930, which initiated an oil boom along the coast. Today, the Project area is dotted with sixty-nine plugged and abandoned oil wells.

The watershed is within the Mediterranean climate zone of California, which is characterized by wet winters and long dry summers. The proximity and steep rise of the San Gabriel Mountains from the coast creates a barrier that traps moist ocean air against the mountain slopes and partially blocks summer heat coming from the desert and winter cold coming from the interior northeast. Average daytime summer and winter temperatures range from 71/63°F at the coast. The long-term annual rainfall average along the coast is 12.5 inches with most precipitation falling in a few major storm events between November and March. Most winter storms come from the northwest, moving across southern California into Arizona. Typical storms in the watershed bring ¾ inch or less of rainfall. Storms from the south or southwest are less common, but because they may stall off the coast, they may bring 3 to 6 inches of rain over portions of the watershed. Summer rains are rare, but when they occur, they are a result of tropical thunderstorms originating in the Gulf of Mexico or late summer hurricanes off the West Coast of Mexico.

Most of the storm drainage system, within the watershed, is managed through flood control structural features consisting of debris basins, storm drains, underground culverts, and open concrete channels. Many of these flood control features were designed and implemented by the USACOE. Ballona Creek is an underground box culvert throughout the eastern portion of the watershed, then converting to an open channel near the vicinity of Venice Boulevard and Pickford Street, and continuing downstream for approximately 9 miles to Santa Monica Bay. Only a few channels remain open for major portions of their length, including the Sepulveda Wash and Centinela Creek. Natural, undisturbed streams are located

primarily within the Santa Monica Mountains and Baldwin Hills area, where the water flow is seasonal and the channels are small. A few channels within major canyons area have been channelized and remain open channels, including Stone Canyon Creek.

Due to historical modification to Ballona Creek and its tributaries, natural hydrologic conditions have been significantly modified within the watershed. Today, approximately 40 percent of the watershed is covered with impervious surfaces and therefore, runoff enters the Ballona Creek and its tributaries at a more accelerated rate, and in greater volume than in prior years due to an increase in urban development. Since most channels are concrete-lined or within underground box culverts, the natural processes of erosion and sedimentation runoff have been altered. Under current conditions, eroded sediment material is transmitted downstream to the mouth of Ballona Creek where it collects and causes periodic closure of the public boating facility entrance at Marina Del Rey.

The construction of levees along portions of Ballona Creek and the construction of Marina Del Rey have significantly reduced the extent of tidal wetlands, and tidal flushing in the estuary and associated lagoons (i.e., Del Rey Lagoon and Ballona Lagoon). With an increase of imported water supply and an increase of landscape material to the area, surface runoff from irrigation systems has resulted in year-round flow conditions within most channels which are typically dry throughout most of the year.

Groundwater resource is located under most of the Ballona Creek Watershed area in groundwater formations known as the West Basin and a small portion of the Central Basin under the southeastern portion of the watershed. Groundwater in the Ballona Creek Watershed is replenished by percolation of rainfall and stream flow from the Santa Monica Mountains to the north and the Baldwin Hills to the south. With approximately 40 percent of the watershed covered by impervious surfaces and concrete lining most tributary channels, the land area open to direct infiltration of rainfall and percolation from stream channels has been substantially reduced (Los Angeles Department of Public Works, 2004).

The Water Quality Control Plan for the Los Angeles Region identifies the following beneficial uses for Ballona Creek, the Ballona Creek Estuary, the Ballona Lagoon, the Venice canals and the Del Rey Lagoon within the project area as shown in Table 5.8-1:

Table 5.8-1 Beneficial uses for Ballona Creek, Ballona Creek Estuary, Ballona Lagoon, Venice Canals and Del Rey Lagoon

• Navigation	• Migration of aquatic organisms
• Recreation	• Spawning/reproduction/early development
• Commercial and sport fishing	• Shellfish harvesting
• Estuarine habitat	• Warm freshwater habitat
• Marine habitat	• Municipal and domestic supply
• Rare, threatened or endangered species	

Source: Water Quality Control Plan for Los Angeles Region

Under Section 303(d) of the CWA, the proposed Project is required to identify the water bodies that do not meet water quality objectives necessary to support designated beneficial uses. Water bodies that have been identified as impaired are often referred to as the "303(d) List". Once a water body has been deemed impaired, a total maximum daily load (TMDL) must be developed for each water quality constituent that

compromises a beneficial use. A TMDL is an estimate of the total load of pollutants that a water body may receive without impairing applicable water quality standards.

The VPP is located within the area of Venice Beach, Venice canals, Marina Del Rey, Marina Del Rey Channel, Ballona Creek and its estuary, the Del Rey Lagoon and Dockweiler State Beach. Table 5.8-2 below summarizes the 2002 303(d) (approved by EPA in 2003) listings for these water bodies, as well as the associated TMDL completion dates.

Table 5.8-2 2002 CWA Section 303(D) Listed water bodies in the project area

Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Est. Size Affected	Proposed TMDL Completion
Ballona Creek	Cadmium (sediment)	Nonpoint/Point Source	High	6.5 miles	2004
	ChemA (tissue)	Source Unknown	High	6.5 miles	2004
	Chlordane (tissue)	Nonpoint/Point Source	High	6.5 miles	2004
	Copper, Dissolved	Nonpoint Source	High	6.5 miles	2004
	Dichlorodiphenyltrichloroethane (DDT) (tissue)	Nonpoint/Point Source	High	6.5 miles	2004
	Dieldrin (tissue)	Nonpoint/Point Source	High	6.5 miles	2004
	Enteric Viruses	Nonpoint/Point Source	High	6.5 miles	2003
Ballona Creek Estuary	Chlordane (tissue & sediment)	Nonpoint/Point Source	High	2.3 miles	2004
	DDT (sediment)	Nonpoint/Point Source	High	2.3 miles	2004
	High Coliform Count	Nonpoint/Point Source	High	2.3 miles	2003
	Lead (sediment)	Nonpoint/Point Source	High	2.3 miles	2004
	PAHs (sediment)	Nonpoint/Point Source	Low	2.3 miles	2004
	PCBs (tissue & sediment)	Nonpoint/Point Source	High	2.3 miles	2004
	Sediment Toxicity	Nonpoint/Point Source	High	2.3 miles	2004
Marina Del Rey Harbor Beach	Beach Closures	Nonpoint/Point Source	High	.29 miles	2003
	High Coliform Count	Nonpoint/Point Source	High	.29 miles	2003
Dockweiler Beach	Beach Closures	Nonpoint Source	High	4.6 miles	2002
	High Coliform Count	Nonpoint Source	High	4.6 miles	2002
Venice Beach	Beach Closures	Nonpoint Source	High	2.5 miles	2002
	High Coliform Count	Nonpoint Source	High	2.5 miles	2002

The Regional Board has adopted a trash TMDL (zero trash in the water) for the Ballona Creek and wetland, a metal TMDL for Ballona Creek, and at toxic pollutants TMDL for the Ballona Creek Estuary. The metals and toxic pollutant TMDLs are summarized Table 5.8-3 and 5.8-4 on the following page.

Dry-weather numeric targets are expressed in terms of dissolved and total recoverable fraction.

Table 5.8-3 Metals TMDL (Dry-Weather Numeric Targets)

Metal	Target* (µg/L) Dissolved	Conversion Factor	Target (µg/L) Total Recoverable
Copper	23	0.96	24
Lead	8.1	0.631***	13
Selenium**	---	---	5
Zinc	300	0.986	304

**Freshwater targets are based on a hardness of 300 µg/L*
***Selenium is expressed in the total recoverable form*
****Conversion factor is hardness dependent, based on a hardness of 300 µg/L*
Source: Los Angeles RWQCB, May 31, 2005
µg/L – micrograms per liter

Wet-weather numeric targets expressed in terms of dissolved and total recoverable fraction.

Table 5.8-4 Metals TMDL (Wet-Weather Numeric Targets)

Metal	Target* (µg/L) Dissolved	Conversion Factor	Target (µg/L) Total Recoverable
Copper	11	0.62	18
Lead	49	0.829***	59
Selenium**	---	---	5
Zinc	94	0.79	119

**Freshwater targets are based on a hardness of 77 µg/L.*
***Selenium is expressed in the total recoverable form*
****Conversion factor is hardness dependent, based on a hardness of 77 µg/L*
Source: Los Angeles RWQCB, May 31, 2005

Numeric targets for sediment quality in Ballona Creek and Estuary as shown in Table 5.8-5 below.

Table 5.8-5 Numeric Targets for Sediment Quality in Ballona Creek and Estuary

Organics	Numeric Target for Sediment
Chlordane	0.5 micrograms per kilogram (µg/kg)
Total DDT	1.58 µg/kg
Total PCBs	22.7 µg/kg
Total PAHs	4,022 µg/kg
Metals	Numeric Target for Sediment
Cadmium	1.2 milligrams per kilogram (mg/kg)
Copper	34 mg/kg
Lead	46.7 mg/kg
Silver	1.0 mg/kg
Zinc	150 mg/kg

Since only the cities of Beverly Hills and Santa Monica use groundwater for domestic water supplies, information regarding groundwater quality in most of the watershed is limited. "Hard" water (water with high levels of dissolved solids, which contribute to the formation of calcium and other deposits on shower walls and other surfaces), is common throughout southern California. Other contaminants from urban land uses may also be present in groundwater such as volatile organic compounds (VOCs), hexavalent

chromium (or Chromium 6), and N-nitrosodimethylamine (NDMA) from industrial activities and nitrates from the use of fertilizers and septic tanks. In 1996, the discovery of a gasoline additive, methyl tert-butyl ether (MTBE) in groundwater extracted from a well in the City of Santa Monica prompted the shutdown of City wells and lead to the removal of MTBE from gasoline. However, the extent of possible MTBE contamination in soil and/or groundwater in the watershed is currently unknown (Los Angeles Department of Public Works, 2004).

5.8.2 Thresholds of Significance

The proposed Project would cause a significant impact to the hydrologic (surface water) if conditions from the Project would:

- Result in flood damages from a 50-year or greater storm even and have the potential to cause significant impact to the general public and environmental resources;
- Result in a substantial reduction or increase in the amount of surface water associated in a water body; or
- Result in a permanent or adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

The proposed Project would cause a significant impact on surface water quality if discharges associated with the Project would:

- Result in creating an increase to pollution, contamination or nuisance as defined in Section 13050 of the California Water Code or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body.

The proposed Project would cause a significant impact to groundwater resources if it would:

- Result in a change in available potable water supply levels due to:
    - A significant reduction in the groundwater supply and the inability of a water supply agency to use the groundwater resources for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or to respond to emergencies and drought;
    - Reduced yields of adjacent wells or well fields (public or private); or
    - Adversely change the rate or direction of flow of groundwater; or
    - Result in a demonstrable and sustained reduction of groundwater recharge capacity.

The proposed Project would cause a significant impact on groundwater quality if it would:

- Result in a change to the rate or direction of movement of existing contaminants;
- Result in the expansion of an area affected by contaminants;
- Result in an increased level of groundwater contamination (including that from direct percolation, injection or salt water intrusion); or
- Result in regulatory water quality standards at an existing production well to be violated, as defined in the CCR, Title 22, Division 4, Chapter 15 and in the Safe Drinking Water Act;
- Result in a changed condition to the surface water hydrology;
- Result in causing minor flooding during a projected 50-year developed storm event. However, it would not likely have the potential to harm people or damage property or sensitive biological resources;

- During construction and in the case of dewatering, result in a potential increase to the amount of surface water into local water bodies; and
- The proposed Project would not result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow. The proposed Project is located within an urban developed area.

SURFACE WATER QUALITY THRESHOLDS OF SIGNIFICANCE

It is technically infeasible that completion of the proposed Project, within any of the proposed three alternative locations, will cause any unwarranted discharge that would affect the current surface water quality condition. Unless there is a catastrophic event (e.g., high magnitude earthquake) the proposed Project is designed to provide additional mitigation of possible sewage spills from the existing pumping station/sewer main system.

During construction, the surface water quality condition may be affected by discharges associated with the Project including accidental spills, dewatering, construction maintenance and storage, equipment parking, spoil pile and debris stockpiles. Miscellaneous nuisance water flows may also be discharged during the construction of this project at the location of the jacking pits. These possible discharges would be managed as required by the project-specific construction SWPPP.

GROUNDWATER CONDITIONS

Implementation of the proposed Project would not extend into a groundwater aquifer nor would it involve the pumping of any water from an underlying aquifer. Therefore, the proposed Project is not expected to cause any adverse impact to groundwater resources.

Perched groundwater, however, may likely be encountered during the excavation operation of construction. Dewatering during construction could also lower local groundwater levels and potentially result in subsidence of the immediate area adjacent to the proposed Project alignment (reference design material). However, construction dewatering would not result in a loss of groundwater from a producing aquifer.

EXISTING GROUNDWATER CONDITIONS

The proposed Project lies within the Santa Monica Sub-basin in the northwestern part of the Coastal Plain of the Los Angeles Groundwater Basin. The Santa Monica Sub-basin is bounded by the Santa Monica Mountains on the north, the Ballona Escarpment on the south, the Pacific Ocean on the west, and the Newport-Inglewood Fault to the east. The Santa Monica Sub-basin includes several distinct aquifers in the vicinity of the proposed Project, the semiperched aquifer, the Ballona aquifer, and the Silverado aquifer.

The shallowest aquifer within the vicinity of the Project area is the semiperched aquifer, which is found to consist of coarse sands and gravel material that are at or near the ground surface [California Department of Water Resources (CDWR), 1961]. The semiperched aquifer varies in regional depth from zero to approximately 60 feet and in some instances may contain significant amounts of unconfined water with more than 20 feet in depth. The semiperched aquifer is considered of little beneficial use because wells in the aquifer yield very small quantities of water (CDWR, 1961). The semiperched aquifer is confined

from the underlying aquifer by the Bellflower Aquiclude, which consists of sediments of lower permeability that restrict vertical movement of groundwater (CDWR, 1961). The Bellflower Aquiclude is estimated to be less than 20 feet in depth in the Project area.

The Ballona aquifer is estimated to be located beneath the Bellflower Aquiclude and the Project area at a depth of approximately 40 to 60 feet below the ground surface (elevations -30 to -50 feet) and is estimated to vary in depth from approximately 10 to 30 feet within the Project area boundary (CDWR, 1961). The Silverado aquifer is merged with the Ballona aquifer within the Project vicinity (CDWR, 1961). The base of the Silverado aquifer is estimated to lie at a depth of approximately 110 feet below the ground surface (elevation -100 feet). The Silverado aquifer is a main groundwater producing unit in the Santa Monica Sub-basin.

Historical regional data have recorded the highest groundwater level, within this area, to be as high as approximately 5 feet below the ground surface (CDMG, 1998). Recent geotechnical studies conducted for the proposed Project have documented the current groundwater levels to be estimated at a depth of approximately 10 to 15 feet below the ground surface (URS, 2000a; 2000b).

GROUNDWATER LEVEL THRESHOLDS OF SIGNIFICANCE

The proposed Project will be constructed within a developed, urban area and located within the coastal zone. It is not proposed that this Project will have any significant impact to surface water quality thresholds of significance are described in Section 5.8.2., of this document. The groundwater within the Project area boundary is not used as a potable water source.

GROUNDWATER QUALITY THRESHOLDS OF SIGNIFICANCE

The proposed Project is located within a historical, developed coastal zone with land uses consisting of residential, industrial and recreation areas. The Project will maintain the City of Los Angeles compliance with the NPDES Municipal Separate Storm Sewer System (MS4) Permit. The permit requires that the permittees (City of Los Angeles) maintain their current sanitary sewer systems in order to prevent accidental discharges. Without the proposed Project, the existing sanitary sewer system cannot be adequately maintained without causing a disruption in service to the users (the local public).

- The proposed Project will be located within saturated subgrade soils and it is unlikely to affect the rate or change the direction of movement of existing contaminants. The proposed Project is not designed to restrict, impede or delineate movement of existing groundwater contamination. The proposed Project is designed to minimize and/or prevent the risk of accidental sewage releases into the local waterways and/or groundwater.
- The proposed Project is not designed to further expand the area currently affected by known contaminants.
- The completed Project would not result in an increased level of groundwater contamination (including that from direct percolation, injection or saltwater intrusion). The location of this Project, in reference to the ocean and local waterways, provides for a very high watertable. During construction, there is a possibility that an accidental pollutant release could contaminate a localized groundwater area.
- The proposed Project will not impact any existing production wells, as defined in the CCR, Title 22, Division 4, Chapter 15 and in the Safe Drinking Water Act.

5.8.3 Environmental Impacts

All proposed alternatives will cause similar construction operations impact to the project boundary and adjacent area. The completed Project will be in compliance with the NPDES Municipal Separate Storm Sewer System (MS4) Permit and meet the necessary sanitary sewer service standards. Without the installment of the new sanitary sewer main, the current sanitary system will continue to deteriorate and run a high risk of overflowing the system, cause a potential break in the system, and cause a potential health risk to the local waterways.

From a hydrology and water quality position, all alternatives cause a similar temporary disturbance to the current site conditions. All three proposed alignments cross under the Marina Del Rey Channel and Ballona Creek via tunneling, and the Marquesas Way alignment crosses under the Grand Canal via tunneling. Tunneling would occur below the bottom of these waterways, and have no effect on the waterways.

5.8.4 Mitigation Measures

The following mitigation measure has been added to the project to minimize the proposed Project's impacts on water quality and hydrologic conditions.

H/WQ-1 Appropriate BMP measures (sandbags, plastic lining covering stormwater inlets, temporary detentions basins, etc.) will be implemented during the construction period to retain excavated soil material on site and minimize the potential risk of contaminated soil being removed off site. Also, monitoring activities will be conducted during the installation of the BMP measures and throughout the construction period.

5.8.5 Unavoidable Adverse Impacts

Provided that all federal, state, and local regulations pertaining to Project activities are followed accordingly and stormwater prevention plans are implemented and monitored, then the potential for significant or long-term adverse impacts should be avoidable.

5.8.6 Cumulative and Secondary Impacts

The Project area is not within a sensitive environmental setting. Change to the existing site conditions will be temporary and the site will be restored back to a similar pre-construction condition. Pre- and post-construction hydrologic conditions will be similar and any change in condition will be minimal. All proposed alternatives have similar construction applications and procedures and no one alternative is superior to another. Therefore, there are no foreseen hydrologic or water quality cumulative or secondary impacts.