4.7 Hydrology and Water Quality

4.7.1 Introduction

The hydrology analysis addresses the potential for flooding to occur and the effects of surface recharge on groundwater. The water quality analysis addresses the quality of storm water runoff and dry weather flows. Detailed information regarding these analyses is provided in Technical Report 6*, Hydrology and Water Quality Technical Report*, and Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*. Potential impacts associated with wastewater flows are addressed in Section 4.25.2, *Wastewater*. Changes in the groundwater quality due to the LAX Master Plan are addressed in Section 4.23, *Hazardous Materials*. Impacts associated with floodplains are addressed in Section 4.13, *Floodplains*. Impacts associated with seismically induced hazards are covered in Section 4.22, *Earth/Geology*.

4.7.2 General Approach and Methodology

The various sources and methodologies used for the hydrology and water quality analyses are identified below. Additional details regarding these sources and methodology are provided in Technical Report 6*, Hydrology and Water Quality Technical Report,* and Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report.*

This analysis compares drainage, recharge, and water quality conditions projected for the No Action/No Project Alternative and four build alternatives to baseline conditions. The analysis estimates baseline conditions for the airport, as well as for areas proposed to be acquired as part of the LAX Master Plan or other airport programs, collectively referred to here as the Hydrology and Water Quality Study Area (HWQSA).

The acreage and location of land required for the proposed Master Plan improvements are unique to each of the four build alternatives. Consequently, each alternative would result in a different footprint for LAX. In order for baseline conditions, the No Action/No Project Alternative, and the four build alternatives to be compared side by side, a single hydrology and water quality study area was used. The study area for this analysis, referred to as the Hydrology and Water Quality Study Area (HWQSA), includes the existing LAX property, two areas currently being acquired by Los Angeles World Airports (LAWA) under the Aircraft Noise Mitigation Program (consisting of Belford and Manchester Square, and collectively referred to as the "ANMP" properties) and areas adjacent to LAX that are being considered for acquisition under one of the Master Plan four build alternatives. Impacts associated with the two alternative sites being considered for construction of an off-site fuel farm under Alternative B are discussed qualitatively herein and separately from the HWQSA. Impacts resulting from the construction of ground access improvements, including land within the right-of-way of the LAX Expressway and improvements to State Route 1 under Alternatives A and C, are addressed in Appendix K, *Supplemental Environmental Evaluation for LAX Expressway and State Route 1 Improvements.* Appendix K did not evaluate impacts of the proposed ground access improvements associated with Alternative B. Alternative D does not include the LAX Expressway or improvements to State Route 1. Storm water runoff, groundwater recharge, and pollutant loads within the study area were then calculated (as described below) for baseline conditions and for all alternatives at the 2015 planning horizon.

Under baseline conditions, land within the ANMP acquisition areas is evaluated based on its existing use; under the No Action/No Project Alternative, it is assumed to be vacant. For each of the build alternatives, it is assumed that all proposed acquisition has been completed and existing land uses demolished. Each alternative proposes a different configuration of land acquisition; thus, not all land within the HWQSA would be acquired by any one alternative. Land not acquired would not be affected by the Master Plan.

Hydrology

The analysis of hydrology considered potential changes in storm water runoff (i.e., drainage) resulting from the Master Plan alternatives, as well as potential changes to groundwater recharge resulting from the decrease in pervious surfaces. The methodology used in each of these analyses is described below.

Drainage

The objective of the drainage analysis is to assess the potential for localized flooding to occur under the No Action/No Project Alternative and four build alternatives when compared to baseline conditions. This comparison is made indirectly, using changes in impervious surface area. Typically when evaluating drainage, the peak flow rate for the proposed drainage system is calculated and compared to the design capacity of the existing drainage system using the City of Los Angeles Peak Rate Method or Los Angeles County Modified Rational Method. These methods require detailed maps of storm water conveyance structures so that drainage sub-basins, catch basins, storm drains, and other features can be identified. For future conditions, this level of information is not available. Also, drainage patterns under baseline conditions are not expected to resemble drainage patterns under the future build conditions since, in some areas, the slopes and areas of the drainage basins are expected to change. Without detailed maps identifying the storm drain infrastructure under the future build conditions, the drainage area, time of concentration, flow routing and conveyance capacities cannot be accurately estimated, and therefore, do not provide a means to reasonably evaluate drainage and the potential for flooding using the Peak Rate Method or any other Rational Method-based approach. However, land use changes under the Master Plan alternatives can be evaluated. This method is appropriate since surface water flow rates in urban regions are a function of impervious area.

For this analysis, impervious area was quantified for the areas within the HWQSA draining to the Santa Monica Bay and Dominguez Channel. Using these drainage areas and holding constant all parameters other than land use, a change in land use that would produce a change in the amount of impervious area would produce a corresponding change in storm water peak flow rates. Any increase in the amount of impervious area would produce an increase in peak flow rates, potentially exceeding the design capacity of the drainage structure, and increasing the likelihood of flooding. Therefore, for the purposes of this analysis, changes in impervious area are used as a surrogate to assess potential increases in surface water runoff flow rates and, consequently, the potential for flooding. Impervious factors for the different types of land use were obtained from the *City of Los Angeles Storm Drain Design Manual*[348] (LASDDM). This manual provides impervious factors based on land development and zoning classifications. The development and zoning classifications were used to assign impervious factors to the corresponding land uses identified on the layouts and in the Westchester - Playa del Rey Plan (WPDRP).[349] Details regarding the development of impervious factors used in this analysis are presented in Technical Report 6*, Hydrology and Water Quality Technical Report.* On-airport land uses were identified by reviewing the proposed airport layouts associated with the four build alternatives. Off-airport land uses within the HWQSA were identified using the WPDRP for community development.

Recharge

Surface recharge occurs when precipitation or surface water runoff contacts pervious surfaces and infiltrates through the subsurface to replenish groundwater in aquifers below. The effects of the Master Plan alternatives were evaluated by comparing the volume of surface water recharge within the HWQSA under the No Action/No Project Alternative and the four build alternatives to baseline conditions.

An annual average recharge rate for pervious surfaces was estimated by dividing the known surface recharge volume for the West Coast Groundwater Basin, in which LAX is located, by the pervious area for the entire Basin. The recharge rate quantifies the recharge in terms of volume per unit area for the entire Basin. This method results in a conservative recharge rate because it includes recharge from streams and rivers that recharge other areas of the Basin, but are not present within the HWQSA.

To calculate the annual volume of surface water recharge within the HWQSA, the average annual recharge rate was assumed to occur through the pervious area estimated for the No Action/No Project Alternative and the four build alternatives. Pervious area within the HWQSA was determined by subtracting the amount of impervious area estimated under each alternative as described in the drainage evaluation from the total area within the HWQSA. Details regarding the calculation of the recharge rate for pervious surfaces in the Basin are presented in Technical Report 6*, Hydrology and Water Quality Technical Report.*

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[348] City of Los Angeles Department of Public Works, Storm Drain Design Manual-Part G, 1973.

[349] City of Los Angeles, Westchester - Playa del Rey Plan, December 1990.

Water Quality

The water quality analysis compares the estimated surface water pollutant loads under the No Action/No Project Alternative and the four build alternatives to surface water pollutant loads under baseline conditions. The baseline analysis estimates the existing on-airport pollutant load, as well as that associated with other areas within the HWQSA. Pollutant loads associated with wet weather flows were estimated quantitatively, while pollutant loads due to dry weather flows were addressed qualitatively by characterizing the practices that contribute to these flows.

Estimating the mass of pollutant load transferred to a water body requires knowledge of surface water runoff volume, discharge location, and pollutant load sources for a given area. Pollutants transferred out of the study area by wet weather flows are the result of non-point pollution sources. The most accurate method to estimate pollutant loads is to collect and analyze samples of storm water runoff directly from the project site. However, because pollutant concentrations in storm water runoff vary based on a number of short and long-term seasonal factors, including total rainfall, storm duration, intensity, and frequency among others, several years are typically required to collect a sufficient number of samples to produce statistically significant results. Alternately, pollutant loads are commonly assessed on an average annual basis using average pollutant concentration data from other published storm water investigations.

The United States Environmental Protection Agency's (USEPA) National Urban Runoff Program's (NURP) Final Report presents the results of an extensive runoff sampling and analysis program that consisted of collecting samples from more than 2,300 separate storm events.[350] In part, the NURP report concluded that pollutant concentrations in urban runoff can be characterized as a function of land use using Event Mean Concentrations (EMCs).[351] Land use categories analyzed in the report include residential, mixed use, commercial, and open space/nonurban. Similar investigations have been conducted by the Federal Highway Administration[352] (FHWA) for highways and the American Association of Airport Executives (AAAE) and the Airport Research and Development Foundation for airports.[353]

Local EMC data have been compiled by several municipalities that have participated in an extensive storm water monitoring program to support storm water quality management programs in Los Angeles County. These data have been compiled by the Los Angeles County Department of Public Works (LACDPW) and evaluated statistically to provide estimations of the EMCs for land use categories within the county.[354, 355] The source of EMCs used in this analysis for all land uses except airport operations and airport open space is the LACDPW storm water EMC data that are based on data collected between 1994 and 2000. EMC data generated by AAAE was used for the airport operations and airport open space land uses except for those pollutants for which no AAAE EMC data exist, including total copper, total lead, total zinc, ammonia, total coliform bacteria, fecal coliform bacteria, and fecal enterococcus bacteria. For these pollutants, the LACDPW transportation EMC data were used. The rationale for the selection of EMC source data is presented in Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*.

Implementation of the No Action/No Project Alternative and the four build alternatives would involve both changes in land use as well as an increase in frequency of activities currently performed on existing land uses. No methods are known to exist that account for changes in land use intensity. Consequently, the methodology used in this analysis is not able to quantify differences in annual stormwater pollutant loading due to changes in the level of intensity/intensification of the same land use. Depending upon site history and upon the length of time over which sampling occurred at a particular monitoring station, it is

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350 U.S. Environmental Protection Agency, Water Planning Division, Final Report on the National Urban Runoff Program, December 1983.

351 An EMC represents the average concentration of a particular pollutant for a storm event. It does not consider fluctuations of loads within a storm event.

352 Woodward-Clyde Consultants, Federal Highway Administration, Methodology for Analysis of Pollutant Loadings from Highway Storm Water Runoff, SHWA/RD-87/086, June 1987.

353 Brenda Ostrom, Predicting Pollutant Loads In Airport Storm Water Runoff- Advanced Spatial Statistics, May 12, 1994.

354 URSGreiner Woodward Clyde, Memorandum from Eric Strecker P.E. and Jim Howell, Playa Vista Storm Water EMC's, March 12, 1999.

355 Los Angeles County, Department of Public Works, Stormwater Quality Summary Data 1994-2000, July 2002, http://www.dpw.co.la.ca.us/wmd/NPDES/wq_data.cfm.

possible that changes in pollutant loading due to increased land use activity might already be incorporated in EMC data collected by LACDPW and AAAE, so that the effects of land use intensification may have already been indirectly addressed. This particular aspect of stormwater samples, however, is typically never quantified. If it is assumed that the EMC data do not account for intensification of land use activities, one might assume that, where there is an intensification of an existing land use, an associated pollutant loading increase may also occur, although it is unknown if the resultant pollutant loading is directly proportional, indirectly proportional, proportional by some fractional relationship, or not materially different from the "average" loading measured by the EMC. For these reasons, the quantification of annual stormwater pollutant loading is based on changes in land use, but not on changes in land use intensity.

The pollutants of concern evaluated in this analysis were based upon studies of the Santa Monica Bay, the primary receiving water body for runoff from LAX. According to the *Characterization Study of the Santa Monica Bay Restoration Plan - State of the Bay 1993*,[356] 19 pollutants of concern have been identified for the Santa Monica Bay. Ten of these pollutants were selected for analysis based on the reasonable likelihood that they would be present in storm water runoff from LAX. These pollutants include total suspended solids, phosphorus, total Kjeldahl nitrogen, copper, lead, zinc, biochemical oxygen demand, chemical oxygen demand, oil and grease, and pathogenic bacteria. The specific types of pathogenic bacteria chosen for analysis were fecal coliform, fecal enterococcus, and total coliform bacteria. In addition, ammonia, a component of total Kjeldahl nitrogen, was analyzed. Ammonia and the three types of pathogenic bacteria were selected for analysis based on meeting the following additional criteria: 1) the constituent appears on the State of California's 303(d) list for non-attainment of water quality standards in the receiving water bodies to which the project discharges;[357] 2) a statistically valid EMC for the constituent is available; and 3) there is reasonable basis upon which to expect that the constituent is present in stormwater at LAX. Pollutant loads discharged to the Santa Monica Bay and the Dominguez Channel receiving water bodies were calculated by multiplying pollutants' EMCs and average annual runoff. Average annual runoff volumes were calculated from average annual precipitation, drainage area, and runoff coefficients and impervious fractions.[358] The rationale for the selection of pollutants of concern is presented in Technical Report 6, *Hydrology and Water Quality Technical Report* and Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*.

Dry-weather flows are flows not resulting from precipitation, usually low-volume and low-velocity. The quality of these flows and the type of pollutants associated with them are largely a function of the flow source, rather than the land uses the flows contact en route to the receiving body. Sources of dry weather flows at airports include outdoor maintenance of vehicles, buildings, and grounds; aircraft and ground vehicle fueling; painting, stripping, washing, and deicing; and chemical and fuel transport and storage. Pollutants most expected to be present in dry weather flows at the airport are generally associated with fueling and maintenance activities and include fuels (gasoline, diesel, and Jet A) and oil and grease. Other pollutants associated with dry weather sources at the airport are discussed in Technical Report 6*, Hydrology and Water Quality Technical Report*. Since, the types of pollutants in dry weather flows are governed by the source of the flow and, therefore, are extremely variable and cannot be quantified, the analysis of dry weather flows is limited to the identification of factors that are likely to increase or decrease their occurrence. Sources of pollution potentially resulting in dry weather flows were evaluated by projecting the airport activities to occur under the No Action/No Project Alternative and the four build alternatives and comparing those sources with those under the environmental baseline conditions.

4.7.3 Affected Environment/Environmental Baseline

The affected environment for this evaluation includes the HWQSA and the off-site fuel farms. The environmental baseline conditions for drainage, water quality, and surface recharge pertaining to the area within the HWQSA and the off-site fuel farm sites are described separately below. Impacts resulting from the construction of ground access improvements, including land within the right-of-way of the LAX

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356 Santa Monica Bay Restoration Project, Characterization Study of the Santa Monica Bay Restoration Plan - State of the Bay 1993, January 1994.

357 State of California, State Water Resources Control Board, Resolution No. 2003-0009, February 4, 2003.

358 The impervious fraction is the proportion of the surface that is not pervious to water.

Expressway and improvements to State Route 1, are addressed in Appendix K, *Supplemental Environmental Evaluation for LAX Expressway and State Route 1 Improvements.*

Hydrology

The hydrology issues considered for this analysis include drainage and recharge. Drainage is discussed as it relates specifically to the management of the systems designed to convey storm water runoff to prevent flooding. The environmental setting with respect to drainage and the potential for flooding focus on the regulatory issues that apply in designing drainage and flood control structures and the existing drainage system at LAX. Recharge is discussed as it relates specifically to surface waters that infiltrate pervious surfaces and have the potential to recharge groundwater.

Drainage

Drainage and flood control structures and improvements in the County of Los Angeles are subject to review and approval by the LACDPW, while structures and improvements in the City of Los Angeles are subject to review and approval by the City of Los Angeles Department of Public Works (LADPW), Bureau of Engineering. Both agencies utilize design standards to provide a specified level of protection against flooding for different types of land use.

Storm water discharges are regulated by both agencies through plan approvals and permits. The county and the city both require project proponents to design storm water collection systems using specifications and procedures set forth in their respective storm drain design manuals. The project plans and specifications are submitted to the appropriate jurisdictional agency for review and approval. The agency review includes an evaluation of the effects of the project's discharge volume on the agency's jurisdictional drainage system. In cases where a proposed project would exceed the drainage system's capacity, methods for reducing impacts to the storm drain system are required, and can include controlling peak and total discharge through storm water detention or increasing site perviousness.

At LAX, surface water is discharged to both County of Los Angeles and City of Los Angeles drainage and flood control structures. County of Los Angeles facilities include the Dominguez Channel, which discharges to San Pedro Bay, as well as some of the individual drains that discharge into Santa Monica Bay. The city regulates the remaining drainage and flood control structures at the airport. The City of Los Angeles design standards for these facilities are based upon their Peak Rate Method,[359] which bases design on a pattern storm with a 50-year storm return frequency. The city also allows use of the Los Angeles County Modified Rational Method for design of drainage and flood control facilities.

The existing drainage system at LAX consists of catch basins, subsurface storm drains and open channels, and outfalls.[360] The principal storm water outfalls for surface water captured on the airport property are the Dominguez Channel, the Argo Drain, the Imperial Drain, and the Culver Drain. The service boundaries for each of these outfalls form distinct sub-basins that collect surface water runoff. These sub-basins extend off airport property and collect surface water runoff from surrounding communities. In addition, the Vista del Mar sub-basin provides drainage for the portion of the airport west of Pershing Drive (i.e., the Dunes). The location of these sub-basins within the HWQSA is illustrated in **Figure F4.7-1**, Regional Drainage Infrastructure, Baseline Conditions.

Surface water flow from the Argo, Imperial, Culver, and Vista del Mar sub-basins contributes to the total surface water flow in the Santa Monica Bay Watershed. The Imperial drainage sub-basin is unique among the airport sub-basins in that it contains both a storm water detention basin for reducing peak flow to the outfall and a water quality retention basin for collecting dry weather and "first flush" storm flows from the airport. Both basins are located north of Imperial Highway at the Pershing Drive intersection, with the detention basin located on the west side of Pershing Drive and the water quality retention basin on the east side. The storm water detention basin located west of Pershing Drive is utilized to reduce the peak discharge to the Imperial Drain outfall. The water quality retention basin located east of Pershing Drive provides collection and treatment of all dry weather runoff and the initial portion ("first flush") of wet weather runoff from the airport. However, due to the small size of the retention basin compared to the size of the drainage area, the basin does not substantially reduce storm water volumes or peak flows discharging to the Imperial Drain outfall. Flow from the Dominguez Channel sub-basin contributes to the

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[359] City of Los Angeles Department of Public Works, Bureau of Engineering Manual - Part G, Storm Drain Design, 1973.

[360] An outfall is the point at which drainage conveyance facilities discharge.

surface water flow in the larger Dominguez Channel Watershed. Detailed descriptions of the sub-basin boundaries, outfall locations, and major conveyance facilities for each outfall are described in Technical Report 6*, Hydrology and Water Quality Technical Report*. As described in the Technical Report, all facilities (channels, storm drain pipes, box culverts, etc.) conveying storm water flows from the airport are concrete lined with the exception of the on-site Argo Ditch, which is partially an earthen channel and partially lined. Additional descriptions of the Santa Monica Bay and San Pedro Bay receiving waters are provided below in *Water Quality*.

A recent hydrologic analysis of the conveyance system within the Argo sub-basin of the Santa Monica Bay Watershed indicates that flooding does not occur as a result of the City of Los Angeles Department of Public Works (LADPW) 50-year design storm under existing conditions.[361] In a separate study, the current capacity of the storm drainage infrastructure in the Dominguez Channel Watershed and the Imperial sub-basin of the Santa Monica Bay Watershed were investigated.[362] The study indicated that, while the current drainage system within the Imperial sub-basin was sufficient to convey peak runoff rates associated with the LADPW 50-year design storm, flooding would occur in parts of the Dominguez Channel Watershed under the same conditions.

However, short-term flooding was observed by LAWA personnel during a large rainfall event in 1995 at the following locations:[363]

- Service Road F near Hangars 8 and 9 and near Hangar 1 (Dominguez Channel sub-basin)
- Service Road 3 around the eastern end of Taxiways J and F (Dominguez Channel sub-basin)
- Sepulveda Boulevard (i.e., the Sepulveda Tunnel) near the central part of LAX (Dominguez Channel sub-basin)
- Lincoln Boulevard south of the Westchester golf course (Argo sub-basin)
- Northwest corner of LAX, southeast of the intersection of Westchester Parkway and Pershing Drive (Argo sub-basin)
- Southeast of the intersection of World Way West and Pershing Drive (Imperial sub-basin)

While site specific data concerning these observations are not available, such localized flooding can occur in low elevation areas or in areas where debris accumulates, thus blocking flow. In such cases, flow from localized areas is prevented from reaching the primary conveyance structures that have sufficient capacity. If the return period of the 1995 storm event associated with these observations was less than or equal to the 50-year design storm, the overall capacity of the conveyance systems within the Argo and Imperial subbasins would have been sufficient based on the hydrology studies cited. This is not likely to have been the case in the Dominquez Channel, however, where the studies indicated conveyance capacity inadequacies, especially at the point where the Dominguez subbasin drains into a Los Angeles County conveyance facility that was designed for a 10-year storm event.

The amount of impervious area under baseline conditions was calculated as described in subsection 4.7.2, *General Approach and Methodology*. Using this methodology, 3,510 acres of the 4,224 acres within the HWQSA (83 percent) are impervious under baseline conditions. Within the Santa Monica Bay Watershed, 2,050 acres (75 percent) are impervious and within the Dominguez Channel Watershed, 1,460 acres (97 percent) are impervious.

Two sites close to LAX are being considered for the construction of an off-site fuel farm under Alternative B: Scattergood Electric Generating Station and the oil refinery located south of the airport. Both proposed fuel farm sites are located within the Santa Monica Bay Watershed. Surface water generated at the Scattergood Fuel Farm site consists exclusively of storm water, which is contained within earthen berms approximately six feet high. Surface water that collects within the berms percolates into the ground and does not drain offsite. Surface water generated in the area of the proposed oil refinery fuel farm site consists of storm water and some industrial process water, including non-contact cooling tower blowdown, boiler blowdown, a portion of the refinery's total recovery well ground water, and other

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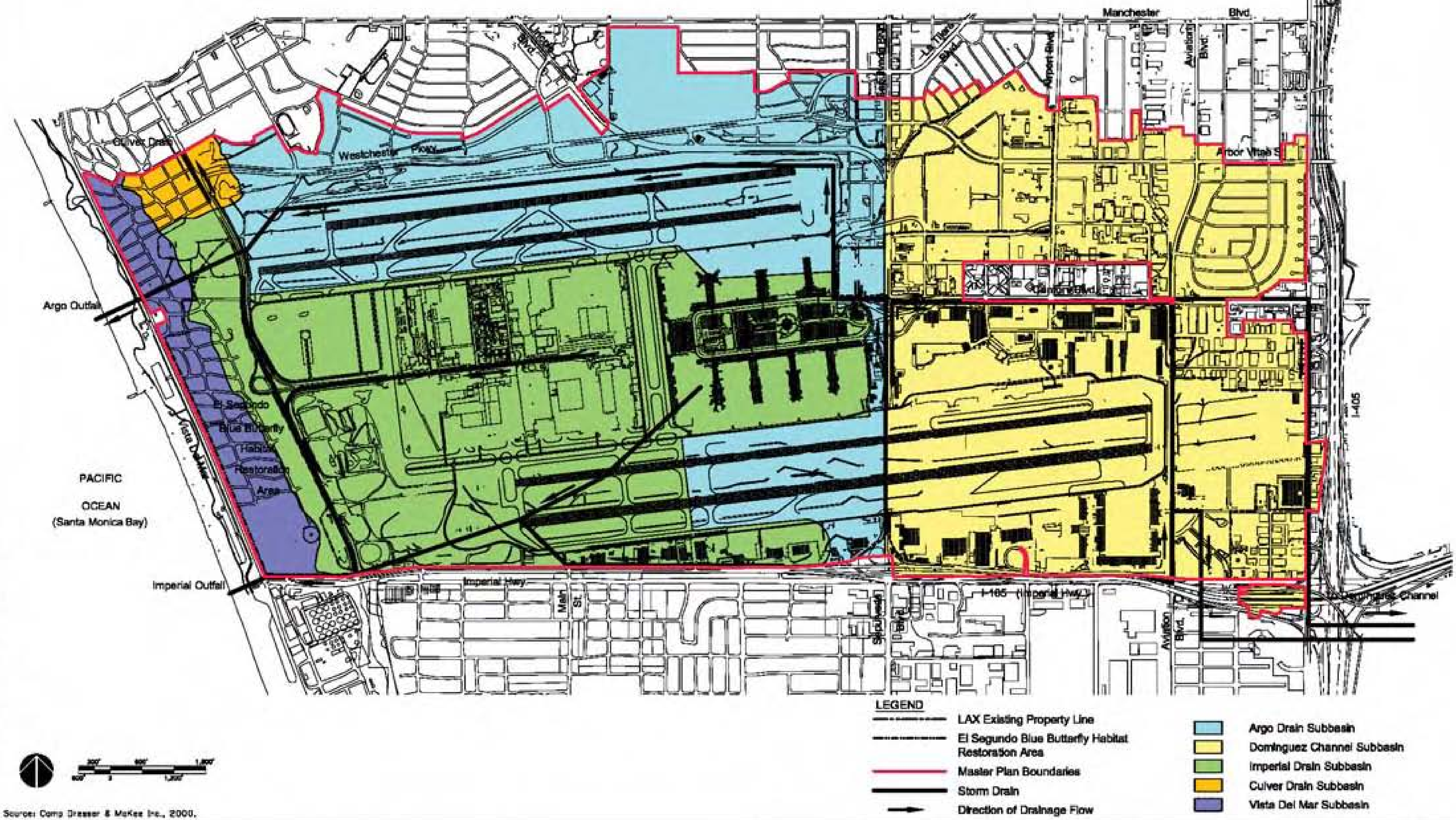
361 City of Los Angeles, Los Angeles World Airports, Revised Hydrology Report for Los Angeles International Airport North Perimeter Storm Drain, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., December 2001.

362 City of Los Angeles, Los Angeles World Airports, Final On-Site Hydrology Report for Los Angeles International Airport, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., October 2002.

363 Los Angeles World Airports, Construction and Maintenance Division.



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LAX Master Plan Final EIS/EIR

Regional Drainage Infrastructure
Baseline Conditions

Figure
F4.7-1

wastes containing no free oil. This water is collected and treated at the refinery's wastewater treatment system where it receives primary treatment consisting of gravity separation and induced air flotation units for oil/water separation, before it is discharged through NPDES-permitted outfalls to Santa Monica Bay.

Recharge

Whether or not surface water infiltrates the pervious surface to recharge or continues to runoff depends on a number of conditions, including soil type, antecedent soil moisture conditions, and the amount of vegetative cover. Once in the soil, the infiltrating water is either taken up by evapotranspiration[364] or it continues to percolate through the soil and to recharge groundwater. Changes to the amount of pervious surfaces on a property can affect the quantity of surface water recharge. Substantial reductions in the amount of surface recharge could lower the water table, reduce the volume of groundwater in storage, and potentially expose the upper aquifer to seawater intrusion.

Groundwater occurs in several aquifers beneath the HWQSA, within what is known as the West Coast Groundwater Basin. Additional descriptions of the groundwater, aquifers (water bearing units), and aquitards (water bearing rock of low permeability) within the basin are provided in Technical Report 6, *Hydrology and Water Quality Technical Report*. Designated beneficial uses for groundwater as defined by the Los Angeles Regional Water Quality Control Board (LARWQCB) in the *Water Quality Control Plan* (*Basin Plan*) for the Los Angeles Region[365] include municipal, industrial, process, and agricultural.[366] However, groundwater beneath LAX is not used for municipal or agricultural purposes (see Section 4.23, *Hazardous Materials*) and industrial and process uses are limited to the removal of small amounts of groundwater extracted incidental to free hydrocarbon product (FHP) recovery.

To characterize the components that contribute to the groundwater supplies in the Basin, a water budget was developed as part of a water management study of the West Coast Basin Barrier Project by the West Basin Municipal Water District.[367] Based on this water budget, 6,700 acre-feet/year of groundwater inflows to the Basin are attributed to surface recharge.[368] This is approximately 13 percent of the total estimated inflows. Sources for this recharge include precipitation, surface water streams, irrigation water from field and lawns, industrial and commercial wastes, and other applied surface waters.[369] Within the HWQSA there are no surface water streams and industrial and commercial waste discharges are prohibited on the airport. Sources for recharge at the airport include precipitation and its associated runoff, and applied irrigation.

The average annual recharge rate within the Basin, and the current volume of recharge within the HWQSA were calculated using the methodologies described in subsection 4.7.2, *General Approach and Methodology*. The annual average recharge rate was based on estimates of surface recharge volume (6,700 acre-feet/year) and the total pervious area within the West Coast Groundwater Basin (28,271 acres). Using these figures, the estimated recharge rate through the pervious surfaces of the West Coast Groundwater Basin was approximately 0.24 feet/year (2.88 inches/year). Based on this average annual recharge rate, the pervious surfaces within the HWQSA under baseline conditions are estimated to provide 171 acre-feet/year of surface recharge. This volume is approximately 0.3 percent of the total inflows estimated for the West Coast Groundwater Basin.

As mentioned previously, surface water generated at the Scattergood site consists exclusively of storm water that is contained within earthen berms. All surface water that collects within the berms is available for recharge through the pervious surfaces at the site. The oil refinery site consists almost exclusively of

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364 Evapotranspiration is defined as the combination of evaporation and transpiration processes. Transpiration is the process by which water in the soil is taken up by the roots of plants and evaporated through the leaves the plants.

365 California Regional Water Quality Control Board, Los Angeles Region 4, Water Quality Control Plan, Los Angeles Region - Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, June 13, 1994.

366 California Regional Water Quality Control Board, Los Angeles Region 4, Water Quality Control Plan, Los Angeles Region - Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, June 13, 1994.

367 The West Coast Basin Barrier Project consists of a series of 153 injection wells that generally parallel the Pacific Ocean and extend from just south of LAX to the Palos Verdes Hills. Fresh water is injected into these wells creating a hydrologic barrier that mitigates seawater intrusion in coastal groundwater aquifers of the West Coast Basin.

368 CH2M Hill, West Basin Municipal Water District, Engineering Report, West Coast Basin Barrier Project - West Basin Water Recycling Program, 1993.

369 CH2M Hill, West Basin Municipal Water District, Engineering Report, West Coast Basin Barrier Project - West Basin Water Recycling Program, 1993.

impervious surfaces. Therefore, for all practical purposes, surface recharge does not occur at the oil refinery site.

Water Quality

Water quality is discussed as it relates to the transport of water quality constituents in surface waters generated by storm water and urban activities and their effects on receiving bodies. For the purposes of this analysis, a constituent may be a pollutant or other measurable component of water quality.

Regulatory Provisions Concerning Water Quality

There are a number of federal, state, and local regulatory programs pertaining to the maintenance and enhancement of water quality. Many of the programs are overlapping. For example, the state is responsible for overseeing many of the permit programs mandated by the federal Clean Water Act (CWA). The County and City of Los Angeles, in turn, are responsible for implementing the permits issued to them under the state program. Included below is a summary of major regulatory provisions concerning water quality. The purpose of these programs is generally to protect and enhance water quality.

Water Quality Assurance Letter

Previously, under the Airport and Airway Improvement Act (AAIA) of 1982 as amended, codified in USC Title 49, Section 47106(c), the Secretary of the U.S. Department of Transportation could approve a grant application for an airport development project involving a major extension of a runway only if a letter, called a Water Quality Assurance Letter, was obtained from the State certifying that the airport development project would be located, designed, constructed, and operated in compliance with applicable water quality standards. On December 12, 2003, President Bush signed into law the FAA reauthorization bill known as Vision 100--Century of Aviation Reauthorization Act (PL 108-176). Section 305 of this Act eliminates the requirement for the Water Quality Assurance Letter previously required under the AAIA.

Water Quality Control Plan

The agency with jurisdiction over water quality at LAX is the LARWQCB. As stated above, the LARWQCB developed the *Basin Plan* which guides conservation and enhancement of water resources and establishes beneficial uses for inland surface waters, tidal prisms, harbors, and groundwater basins within the region. Beneficial uses are designated so that water quality objectives can be established and programs that enhance or maintain water quality can be implemented. The Basin Plan was amended in December 2002, to incorporate implementation provisions for the region's bacteria objectives and to incorporate a wet weather bacteria Total Maximum Daily Load[370] (TMDL) and dry weather bacterial TMDL[371] for Santa Monica beaches.

The Basin Plan also incorporates State Water Resources Control Board (SWRCB) statewide Water Quality Control Plans. The only applicable statewide plan, at this time, is the California Ocean Plan. Like the Basin Plan, the California Ocean Plan was created to establish beneficial uses and associated water quality objectives for California's ocean waters and to provide a basis for regulation of wastes discharged to coastal waters by point and non-point source discharges. In December 2001, the SWRCB adopted proposed amendments that included revisions of chemical water quality objectives, and replacement of acute toxicity effluent limitations with acute toxicity water quality objectives.[372]

National Pollutant Discharge Elimination System (NPDES) Program

The CWA prohibits the discharge of pollutants to waters of the United States from any point source unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. In accordance with the CWA, the USEPA promulgated regulations for permitting storm water discharges by municipal and industrial facilities and construction activities through the NPDES program. The Phase I NPDES municipal storm water program applies to urban areas with a population greater than 100,000 while the industrial program applies to specific types of industry, including airports. The NPDES

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370 State of California, California Regional Water Quality Control Board, Los Angeles Region, Resolution No. 2002-022, December 12, 2002.

371 State of California, California Regional Water Quality Control Board, Los Angeles Region, Resolution No. 02-004, January 24, 2002.

372 State of California, State Water Resources Control Board, California Ocean Plan, December 3, 2001.

program for construction applies to activities that disturb an area of one acre or more. The NPDES permits for municipal, industrial, and construction activities are described below.

NPDES - Municipal Permit

In accordance with the CWA, a Phase I NPDES permit is required for certain municipal separate storm sewer discharges to surface waters. The airport is within the region covered by NPDES Permit No. CAS614001 issued by the LARWQCB on July 15, 1996. The permit is a joint permit, with the County of Los Angeles as the "Principal Permittee" and 85 incorporated cities within the County of Los Angeles, including the City of Los Angeles, as "Permittees." The objective of the permit, and the associated storm water management program, is to effectively prohibit non-storm water discharges and to reduce pollutants in urban storm water discharges to the "maximum extent practicable" in order to attain water quality objectives and to protect the beneficial uses of receiving waters in the County of Los Angeles.

As part of the municipal storm water program, the LARWQCB adopted the Standard Urban Storm Water Mitigation Plan (SUSMP) to address storm water pollution from new development and redevelopment projects. The SUSMP is a model guidance document for use by Permittees to select post-construction Best Management Practices (BMPs) so that the primary objectives of the municipal storm water program are met. The SUSMP program applies to specified project types. Generally, three types of BMPs are described in the SUSMP, including source control, structural, and treatment control.[373] The SUSMP also specifies structural and treatment control BMP design standards for infiltration and/or treatment of storm water runoff.

NPDES - Industrial Permit

The SWRCB issued a statewide Industrial Activities Storm Water General Permit (Industrial Permit) that applies to all industrial facilities that discharge storm water and require a NPDES permit. The major provisions of the Industrial Permit require that the Permittees eliminate or reduce non-storm water discharges, develop and implement a Storm Water Pollution Prevention Plan (SWPPP), and perform monitoring of discharges to the storm water system from their facilities. Since an airport is considered a transportation facility, LAWA and tenants on the airport property that engage in industrial activities are required to be permitted under the industrial NPDES program.

LAWA has prepared a SWPPP to address the permitting of storm water discharges associated with industrial activities at LAX. Numerous tenants, who conduct a variety of airport-related support functions, occupy leaseholds, and also perform these activities, are included as co-Permittees under LAWA's SWPPP program. The LAX SWPPP contains general information, such as drainage system layout and tenant and site activities; describes past and present potential sources of pollutants in storm water; designates programs to identify and eliminate non-storm water discharges; and describes the storm water management controls being implemented at LAX and the ongoing storm water monitoring program. Additional information on the LAX SWPPP is provided in Technical Report 6*, Hydrology and Water Quality Technical Report.*

NPDES - Construction Permit

In addition to the municipal and industrial permits, the SWRCB issued a statewide NPDES general permit for storm water discharges associated with construction activities (Construction Permit), in accordance with federal storm water regulations. Project proponents planning construction activities that disturb an area greater than one acre are required to file a Notice of Intent (NOI) to discharge under the Construction Permit. After a NOI has been submitted, the discharger is authorized by the SWRCB to discharge storm water under the terms and conditions of the general permit. The major provisions of the Construction Permit are generally the same as those for the industrial permit although they focus on impacts associated with construction activities.

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[373] As defined in the SUSMP:
"Source control BMP means any schedules of activities, prohibition of practices, maintenance procedures, managerial practices or operational practices that aim to prevent storm water pollution by reducing the potential for contamination at the source of pollution."
"Structural BMP means any structural facility designed and constructed to mitigate the adverse impacts of storm water and urban runoff pollution (e.g., canopy, structural enclosure). The category may include both source control and treatment BMPs."
"Treatment control BMP means any engineered system designed to remove pollutants by simple gravity setting of particulate pollutants, filtration, biological uptake, media adsorption or any other physical, biological, or chemical process."

As required under the SWRCB General Permit for Construction Activities, LAWA has prepared a Storm Water Guidance Manual for Construction Activities. This document outlines the procedures for preparing and implementing a construction SWPPP before beginning construction operations so that the activities are in compliance with the general permit.

Total Maximum Daily Load Program

Under Section 303(d) of the CWA, states are required to identify the water bodies that do not meet water quality objectives through control of point source discharges under NPDES permits. For these water bodies, states are required to develop appropriate total maximum daily loads (TMDLs). TMDLs are the sum of the individual pollutant load allocations for point sources, nonpoint sources,[374] and natural background conditions, with an appropriate margin of safety for a designated water body. The TMDLs are established based on a quantitative assessment of water quality problems, the contributing sources, and load reductions or control actions needed to restore and protect an individual water body.[375] As opposed to the NPDES programs, which focuses on reducing or eliminating non-storm water discharges and reducing the discharge of pollutants to the maximum extent practicable, TMDLs provide an analytical basis for planning and implementing pollution controls, land management practices, and restoration projects needed to protect water quality.

A list indicating which pollutants and stressors are priorities for each water body, called a 303(d) list, has been developed by the State of California. The 303(d) list indicates that both non-point and point sources of pollution degrade the water quality of the Santa Monica Bay and the Dominguez Channel.[376] A revised 303(d) list was approved by the State Water Resources Control Board (SWRCB) in February 2003. On this list, pollutants and TMDL priority schedules have been assigned that differ from the previous 303(d) list developed by the SWRCB in 1999. The pollutants and TMDL priority schedule for the Santa Monica Bay Offshore and Nearshore and the Dominguez Channel (Estuary to Vermont) are shown in **Table F4.7-1**, TMDL Priority Schedule for Santa Monica Bay Offshore and Nearshore, and **Table F4.7-2**, TMDL Priority Schedule Dominguez Channel (Estuary to Vermont). Priorities (i.e., high, medium, low) were established by the SWRCB based on a combination of factors that included the degree of nonattainment/complexity of the problem, the relative importance of the watershed, and the resources available at the LARWQCB to complete the TMDL. To date, TMDLs have not been completed for the Dominguez Channel (Estuary to Vermont) or for Santa Monica Bay Offshore and Nearshore. However, two bacteria TMDLs have been developed for Santa Monica Bay beaches. The dry and wet weather bacteria TMDLs were approved by the USEPA in July 2003. A coordinated monitoring plan has been submitted to the LARWQCB.

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374 Discharges originating from single sources, like power and wastewater treatment plants, are referred to as point source discharges, while storm water and/or urban runoff are non-point sources of water pollution since their origins cannot be attributed to a single identifiable source.

375 U.S. Environmental Protection Agency, Total Maximum Daily Load Fact Sheet, Available: http://www.epa.gov/region09/water/tmdl/fact.html [4/24/00].

376 U.S. Environmental Protection Agency, Total Maximum Daily Load Program, Available: http://www.epa.gov/region09/water/tmdl/index.html#303d [11/1/00].

Table F4.7-1

TMDL Priority Schedule for Santa Monica Bay Offshore and Nearshore

Pollutant/Stressor	Priority
Chlordane (sediment)	Medium
Dichlorodiphenyltrichloroethane (DDT) (tissue and sediment)	Low
Debris	Low
Fish Consumption Advisory	Low
Polyaromatic Hydrocarbons (PAHs) (sediment)	Low
Polychlorinated Biphenyls (PCBs) (tissue and sediment)	Low
Sediment Toxicity	Low

Source: State of California, State Water Resources Control Board, Resolution No. 2003-0009, February 4, 2003.

Table F4.7-2

TMDL Priority Schedule Dominguez Channel (Estuary to Vermont)

Pollutant/Stressor	Priority
Aldrin (tissue)	Medium
Ammonia	Medium
Benthic Community Effects	Medium
Chem A (tissue)[1]	Medium
Chlordane (tissue)	Medium
Chromium (sediment)	Medium
DDT (tissue and sediment)	Medium
Dieldrin (tissue)	Medium
High Coliform Count	High
Lead (tissue)	Medium
PAHs (sediment)	Medium
Zinc (sediment)	Medium

[1] Chem A refers to the sum of aldrin, dieldrin, chlordane, endrin, heptachlor epoxide, HCH (including lindane), endosulfan, and toxaphene.

Source: State of California, State Water Resources Control Board, Resolution No. 2003-0009, February 4, 2003.

Receiving Bodies of Water

As mentioned previously, there are no natural streams or rivers within the HWQSA. Surface water flows that are generated within the study area are comprised of either wet weather flows in response to precipitation or dry weather flows from land use-related activities. Both wet and dry weather flows drain to either Santa Monica Bay or Dominguez Channel. The Santa Monica Bay and the Dominguez Channel are referred to as "receiving water bodies." Within the HWQSA, the boundary for these two watersheds is located generally along Sepulveda Boulevard with areas west of Sepulveda Boulevard draining to Santa Monica Bay and areas east draining to the Dominguez Channel.

Santa Monica Bay

Santa Monica Bay is an open embayment of the Pacific Ocean with a designated surface area of approximately 266 square miles and is the receiving water body for surface water drainage from approximately 414 square miles of land. Uses of Santa Monica Bay include recreational, commercial, and industrial uses. Regionally, urban, industrial, and open space land uses comprise most of the Santa Monica Bay Watershed and surface water runoff from these areas has drastically altered the natural environment of the Bay. For the purpose of better understanding the impacts of pollutants and evaluating measures to protect the environment of Santa Monica Bay, a consortium of interested parties, including government agencies and private entities, initiated and formed the Santa Monica Bay Restoration Project (SMBRP). The SMBRP produced a report with the objective of updating previous information characterizing Santa Monica Bay. This report, titled *Characterization Study of the Santa Monica Bay Restoration - State of the Bay 1993*, presented a comprehensive assessment of pollution levels in the Bay and evaluated the effects of the pollution. Of the pollutants measured and found to have affected the bay's environment, 19 pollutants were identified in the SMBRP's *State of the Bay Report for 1993* as pollutants of concern.[377] These pollutants include toxic organic compounds, heavy metals, pathogens, nutrients, sediments, trash and debris, oil and grease, and others.

Sources for the pollutants of concern in the Santa Monica Bay include both point sources and non-point sources. According to the SMBRP's report, *Taking the Pulse of the Bay - State of the Bay 1998*, runoff from urban areas is the most important uncontrolled source of pollution discharging into the Bay.[378]

According to the SWRCB *1994 Water Body Fact Sheet* and the LARWQCB, the waters of Santa Monica Bay have been assigned an impaired rating.[379] This rating is based on findings that the waters preclude, compromise, or do not support their designated beneficial uses, which are contained in the Water Quality Control Plan. Some of these beneficial uses include industrial, navigation, recreation, and fishing. In addition, other designated beneficial uses for the Santa Monica Bay require that the waters support biological and rare or endangered habitats, the migration of aquatic organisms, the support of spawning, and early development of fish and shellfish harvesting. The Santa Monica Bay's biological community has been identified as being imbalanced, severely stressed, or known to contain toxicities in concentrations that are hazardous to human health.[380]

Dominguez Channel

The Dominguez Channel delivers surface water from approximately 72 square miles of urban area within Los Angeles. The channel extends from central Los Angeles, approximately two miles east of LAX, to San Pedro Harbor. The Dominguez Channel Watershed is located entirely within the County of Los Angeles and is bordered to the north and west by the Santa Monica Bay Watershed, to the east by the Los Angeles River Watershed, and to the south by the Los Angeles/Long Beach Harbor. The Dominguez Channel is a concrete-lined channel that drains surface waters from the watershed into the Los Angeles Harbor and is the only major surface water feature within the watershed. The Dominguez Channel has been designated by the LARWQCB as an Inland Surface Water Body and, as such, beneficial uses for the channel have been designated. Some beneficial uses for this water body include municipal and domestic supply, contact and non-contact recreation. Other beneficial uses for the Dominguez Channel require that the water support freshwater and wildlife habitat, as well as support rare threatened or endangered species. Additional discussion of these beneficial uses is presented in Technical Report 6*, Hydrology and Water Quality Technical Report.*

Regionally, urban and industrial land uses comprise most of the Dominguez Channel Watershed. The subarea of this watershed within which LAX is located has been designated as impaired due to point source discharges from industrial and municipal activities, accidental spills, and urban runoff. Waters in this subarea have been characterized as having elevated metal and pesticide concentrations in sediments along with high coliform counts.

Storm Water Pollutant Loads

Pollutant loads delivered from the HWQSA to receiving water bodies under baseline conditions, as estimated using the methods described in subsection 4.7.2, *General Approach and Methodology*, are presented in **Table F4.7-3,** Average Annual Pollutant Loads (lb/yr), 1996 Baseline Conditions. Detailed pollutant load calculations for baseline conditions are presented in Technical Report S-5*, Supplemental Hydrology and Water Quality Technical Report.*

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[377] Santa Monica Bay Restoration Project, Characterization Study of the Santa Monica Bay Restoration Plan - State of the Bay 1993, January 1994.

[378] Santa Monica Bay Restoration Project, Taking the Pulse of the Bay - State of the Bay 1998, April 1998.

[379] State Water Resources Control Board, Water Body Fact Sheet, May 18, 1994.

[380] Santa Monica Bay Restoration Project, Characterization Study of the Santa Monica Bay Restoration Plan - State of the Bay 1993, January 1994.

Table F4.7-3

Average Annual Pollutant Loads (lb/yr), 1996 Baseline Conditions

Pollutant	Estimated Average Annual Pollutant Loads (lb/yr) Santa Monica Bay	Dominguez Channel	Total Pollutant Load
Total Suspended Solids	222,617	247,271	469,887
Total Phosphorus	1,148	1,001	2,149
Total Kjeldahl Nitrogen	5,249	5,825	11,074
Total Copper	241	153	394
Total Lead	42	39	81
Total Zinc	1,253	1,108	2,361
Oil and Grease	9,649	7,098	16,747
5-Day Biochemical Oxygen Demand	38,830	38,553	77,384
Chemical Oxygen Demand	204,416	194,855	399,271
Ammonia	1,325	1,326	2,651
Total Coliform Bacteria[1]	1.6E+11	1.4E+11	3.0E+11
Fecal Coliform Bacteria[1]	7.8E+10	7.4E+10	1.5E+11
Fecal Enterococcus Bacteria[1]	7.8E+09	1.9E+10	2.7E+10

NA = Not Applicable
Totals may not add due to rounding.

1 Expressed in organisms/yr.

Source: Camp Dresser & McKee Inc., 2003.

Storm water is not discharged from the Scattergood site and all storm water generated at the oil refinery site is treated and discharged in accordance with an NPDES permit. Therefore, there is no storm water pollutant load presently associated with the off-site fuel farm sites.

Dry Weather Flows

Sources of dry weather flows for airports include outdoor maintenance of vehicles, buildings, and grounds; aircraft and ground vehicle fueling; painting, stripping, washing, and deicing; and chemical and fuel transport and storage. Detailed descriptions of these sources and their associated pollutants are provided in Technical Report 6*, Hydrology and Water Quality Technical Report.* Sources of dry weather flows at the off-site fuel farms include chemical and fuel transport and storage.

4.7.4 Thresholds of Significance

4.7.4.1 CEQA Thresholds of Significance

Hydrology

A significant hydrology impact would occur if the direct and indirect changes in the environment that may be caused by a particular build alternative would potentially result in one or more of the following future conditions:

- An increase in runoff that would cause or exacerbate flooding with the potential to harm people or damage property.
- Substantial interference with groundwater recharge such that there would be a net decrease in the aquifer volume or a change in groundwater storage that would adversely affect the quantity, water level, or flow of the underlying groundwater relative to beneficial uses of the basin.
- Substantial alteration of the existing drainage pattern of the site in a manner which would result in substantial erosion or siltation on- or off-site.

These thresholds of significance are utilized because they address potential concerns relative to flooding and recharge associated with the Master Plan alternatives. These thresholds reflect those contained in the *Draft L.A. CEQA Thresholds Guide*[381] that are relevant to this project, as well as relevant issues identified in the suggested Initial Study Checklist contained in the State CEQA Guidelines.

Water Quality

A significant water quality impact would occur if the direct and indirect changes in the environment that may be caused by a particular build alternative would potentially result in the following future condition:

- An increased load of a pollutant of concern delivered to a receiving water body by surface water runoff.

This threshold of significance was developed because it addresses the potential water quality impacts resulting from project-related runoff being discharged to receiving water bodies that are already considered impaired. The threshold is based on guidance provided by the *Draft L.A. CEQA Thresholds Guide*[382] as well as relevant issues identified in the suggested Initial Study Checklist contained in the State CEQA Guidelines.

4.7.4.2 Federal Standards

There are no federal standards that define significance thresholds for hydrology and water quality impacts. Section 47(e)(6) of FAA Order 5050.4A, *Airport Environmental Handbook*, recognizes the Clean Water Act as the federal authority to establish water quality standards, control discharges into surfaces and subsurface waters, and other water quality functions. As described in subsection 4.7.3, *Affected Environment/Environmental Baseline*, there are a number of federal regulatory programs pertaining to the maintenance and enhancement of water quality pursuant to the Clean Water Act. The most notable programs include the NPDES program and the TMDL program. These programs are implemented by state and local agencies, and are addressed in this analysis. Additionally, Section 4.12, *Wetlands*, of this Final EIS/EIR addresses Section 404 of the Clean Water Act.

4.7.5 Master Plan Commitments

As addressed in subsection 4.7.6, *Environmental Consequences*, implementation of any of the Master Plan alternatives would have potential impacts related to hydrology and water quality. In recognition of these potential impacts, LAWA has included the commitment listed below in the Master Plan, coded "HWQ" for "hydrology and water quality."

- **HWQ-1. Conceptual Drainage Plan (Alternatives A, B, C, and D).**

  Once a Master Plan alternative is selected, and in conjunction with its design, LAWA will develop a conceptual drainage plan of the area within the boundaries of the Master Plan alternative (in accordance with FAA guidance and to the satisfaction of the City of Los Angeles Department of Public Works, Bureau of Engineering). The purpose of the drainage plan will be to assess area-wide drainage flows as related to the Master Plan project area, at a level of detail sufficient to identify the overall improvements necessary to provide adequate drainage capacity to prevent flooding. The conceptual drainage plan will provide the basis and specifications by which detailed drainage improvement plans shall be designed in conjunction with site engineering specific to each Master Plan project. Best Management Practices (BMPs) will be incorporated to minimize the effect of airport operations on surface water quality and to prevent a net increase in pollutant loads to surface water resulting from the selected Master Plan alternative.

  To evaluate drainage capacity, LAWA will use either the Peak Rate Method specified in Part G - Storm Drain Design of the City of Los Angeles' Bureau of Engineering Manual or the Los Angeles County Modified Rational Method, both of which are acceptable to the LADPW. In areas within the boundary of the selected alternative where the surface water runoff rates are found to exceed the capacity of the storm water conveyance infrastructure with the potential to cause flooding, LAWA will take measures to either reduce peak flow rates or increase the structure's capacity. These drainage facilities will be designed to ensure that they adequately convey storm water runoff and prevent

[381] City of Los Angeles, Draft L.A. CEQA Thresholds Guide, May 14, 1998.
[382] City of Los Angeles, Draft L.A. CEQA Thresholds Guide, May 14, 1998.

flooding by adhering to the procedures set forth by the Peak Rate Method/Los Angeles County Modified Rational Method. Methods to reduce the peak flow of surface water runoff could include:

- Decreasing impervious area by removing unnecessary pavement or utilizing porous concrete or modular pavement.
- Building storm water detention structures.
- Diverting runoff to pervious areas (reducing directly-connected impervious areas).
- Diverting runoff to outfalls with additional capacity (reducing the total drainage area for an individual outfall).
- Redirecting storm water flows to increase the time of concentration.

Measures to increase drainage capacity could include:

- Increasing the size and slope (capacity) of storm water conveyance structures (pipes, culverts, channels, etc.).
- Increasing the number of storm water conveyance structures and/or outfalls.

To evaluate the effect of the selected Master Plan alternative on surface water quality, LAWA will prepare a specific Standard Urban Stormwater Mitigation Plan (SUSMP) for the selected alternative, as required by the LARWQCB. The SUSMP addresses water quality and drainage issues by specifying source control, structural, and treatment control BMPs with the objective of reducing the discharge of pollutants from the storm water conveyance system to the maximum extent practicable. Once BMPs are identified, an updated pollutant load estimate will be calculated that takes into account reductions from treatment control BMPs. These BMPs will be applied to both existing and future sources with the goal of achieving no net increase in loadings of pollutants of concern to receiving water bodies. LAWA will therefore address water quality issues, including erosion and sedimentation, and comply with the SUSMP requirements by designing the storm water system through incorporation of the structural and treatment control BMPs specified in the SUSMP.

The following list includes some of the BMPs that could be employed to infiltrate or treat storm water runoff and dry weather flows, and control peak flow rates:

- Vegetated swales and strips
- Oil/Water separators
- Clarifiers
- Media filtration
- Catch basin inserts and screens
- Continuous flow deflective systems
- Bioretention and infiltration
- Detention basins
- Manufactured treatment units
- Hydrodynamic devices

Other structural BMPs may also be selected from the literature and the many federal, state and local guidance documents available. It should be noted that, if an alternative is selected that involves the elimination of the Imperial water quality retention basin (Alternatives A, B, and C), an alternative retention and/or water quality treatment BMP will be provided as per SUSMP requirements.

Performance of structural BMPs varies considerably based on their design.[383] USEPA has published estimated ranges of pollutant removal efficiencies for structural BMPs based on substantial document review. These ranges of removal efficiencies are presented in **Table F4.7-4**, Structural BMP Expected Pollutant Removal Efficiency.

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[383] U.S. Environmental Protection Agency, Preliminary Data Summary of Urban Stormwater Best Management Practices Methodology, August 1999.

Table F4.7-4

Structural BMP Expected Pollutant Removal Efficiency

BMP Type	Typical Pollutant Removal (percent) Suspended Solids	Nitrogen	Phosphorus	Metals
Dry Detention Basins	30-35	15-45	15-45	15-45
Retention Basins	50-80	30-65	30-65	50-80
Infiltration Basins	50-80	50-80	50-80	50-80
Infiltration Trenches/Dry Wells	50-80	50-80	15-45	50-80
Porous Pavement	65-100	65-100	30-65	65-100
Grassed Swales	30-65	15-45	15-45	15-45
Vegetated Filter Strips	50-80	50-80	50-80	30-65
Surface Sand Filters	50-80	<30	50-80	50-80
Other Media Filters	65-100	15-45	0	50-80

Source: U.S. Environmental Protection Agency, Preliminary Data Summary of Urban Storm Water Best Management Practices Methodology, August 1999.

In addition to the structural BMP types that will be used, non-structural/source control BMPs will continue to be a part of the LAX program to reduce pollutant loadings. Existing practices and potentially new ones will be extended to acquisition areas and to the areas where airport operations will increase in frequency or duration. These source control BMPs will be incorporated into the LAX Storm Water Pollution Prevention Plan (SWPPP) and will consequently be required of LAWA and all airport tenants at all locations where industrial activities occur that have the potential to impact water quality.

The overall result of Master Plan Commitment HWQ-1 will be a drainage infrastructure that provides adequate drainage capacity to prevent flooding and control peak flow discharges, that incorporates BMPs to minimize the effect of airport operations on surface water quality, and that prevents a net increase of pollutant loads to either receiving water body as a result of the selected Master Plan alternative.

4.7.6 Environmental Consequences

This subsection describes the environmental impacts of the No Action/No Project Alternative and each of the four build alternatives as they relate to hydrology (drainage and recharge) and water quality.

The drainage analysis addresses changes in impervious area and how these changes would be expected to affect the potential for flooding to occur. Potential environmental impacts related to changes in impervious area affecting the quantity of recharge, are also addressed. As described in subsection 4.7.2, *General Approach and Methodology,* the drainage analysis is based on calculations of total impervious area. Land use designations and impervious area calculations and results for the No Action/No Project Alternative and the four build alternatives are presented in Technical Report 6, *Hydrology and Water Quality Technical Report*, for the No Action/No Project Alternative and Alternatives A, B, and C, and in Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*, for Alternative D. Impervious area values for each alternative are presented in **Table F4.7-5**, Total Impervious Area within the HWQSA (2015).

Table F4.7-5

Total Impervious Area within the HWQSA (2015)

	Impervious Area (acres)					
	1996	Alternative				
Area	**Baseline**	**NA/NP**	**A**	**B**	**C**	**D**
Santa Monica Bay	2,050	2,184	2,259	2,194	2,224	2,174
Dominguez Channel	1,460	1,398	1,371	1,387	1,363	1,499
HWQSA	3,510	3,582	3,630	3,581	3,587	3,673

Source: Camp Dresser & McKee Inc., 2000, 2003.

The recharge analysis discusses the changes in estimated surface water recharge volumes and how this change would be expected to affect the beneficial uses of groundwater in the West Coast Basin. Recharge volumes were calculated as described in subsection 4.7.2, *General Approach and Methodology*. The results of these calculations for each alternative are presented in **Table F4.7-6**, Annual Surface Water Recharge Volumes within the HWQSA (2015).

Table F4.7-6

Annual Surface Water Recharge Volumes within the HWQSA (2015)

	1996	Alternative				
	Baseline	**NA/NP**	**A**	**B**	**C**	**D**
Pervious Area (acres)	714	643	593	641	635	553
Recharge Volume (acre-feet/year)	171	154	142	154	152	131

Source: Camp Dresser & McKee Inc., 2000, 2003.

The water quality analysis estimates the storm water pollutant load that would be discharged to receiving water bodies, describes potential sources for dry weather flows as compared to baseline conditions, and evaluates the effects of construction associated with the No Action/No Project Alternative and the four build alternatives. As described in subsection 4.7.2, *General Approach and Methodology*, storm water pollutant loads are based on EMC data and calculations of annual runoff volumes. Land uses designations, average annual runoff volumes, and pollutant load calculations and results for the No Action/No Project Alternative and the four build alternatives are presented in Technical Report 6, *Hydrology and Water Quality Technical Report,* and in Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*. Impacts associated with dry weather flows and construction activities are discussed and their effects on water quality are evaluated qualitatively. A summary of the 2015 stormwater pollutant loading related to the No Action/No Project Alternative and Alternatives A, B, C, and D is presented in **Table F4.7-7**, Estimated Average Annual Pollutant Loads Within HWQSA (lb/yr) - 1996 Baseline Conditions, No Action/No Project, Alternatives A, B, C, and D (2015).

Table F4.7-7

Estimated Average Annual Pollutant Loads Within HWQSA (lb/yr) -
1996 Baseline Conditions, No Action/No Project Alternative, Alternatives A, B, C, and D (2015)

	Total Pollutant Load (lb/yr)					
Pollutant	**1996 Baseline**	**NA/NP**	**A**	**B**	**C**	**D**
Total Suspended Solids	469,887	499,473	353,644	341,236	364,832	434,041
Total Phosphorus	2,149	2,222	2,148	2,092	2,123	2,223
Total Kjeldahl Nitrogen	11,074	11,739	10,358	9,827	10,220	11,263
Total Copper	394	407	436	431	430	430
Total Lead	81	106	83	80	82	87
Total Zinc	2,361	2,545	2,428	2,361	2,418	2,568
Oil and Grease	16,747	17,661	18,392	17,960	18,040	18,331
5-Day Biochemical Oxygen Demand	77,384	83,466	73,081	69,655	72,081	78,641
Chemical Oxygen Demand	399,271	416,189	393,204	378,138	387,335	413,608
Ammonia	2,651	2,987	2,658	2,484	2,590	2,857
Total Coliform Bacteria[1]	3.0E+11	3.0E+11	3.1E+11	3.0E+11	3.0E+11	3.1E+11
Fecal Coliform Bacteria[1]	1.5E+11	1.5E+11	1.5E+11	1.4E+11	1.5E+11	1.5E+11
Fecal Enterococcus Bacteria[1]	2.7E+10	2.0E+10	1.6E+10	1.5E+10	1.6E+10	1.9E+10

NA = Not Applicable.

[1] Expressed in organisms/year.

Source: Camp Dresser & McKee Inc., 2003.

As described in the Analytical Framework discussion in the introduction to Chapter 4, the basis for determining impacts under CEQA is different from that of NEPA. Under CEQA, the impacts of a proposed project and alternatives are measured against the "environmental baseline," which is normally the physical conditions that existed at the time the Notice of Preparation was published (i.e., June 1997, or 1996 when a full year of data is appropriate, for the LAX Master Plan Draft EIS/EIR). As such, the CEQA analysis in this Final EIS/EIR uses the environmental baseline, or in some cases an "adjusted environmental baseline," as the basis by which to measure and evaluate the impacts of each alternative. Under NEPA, the impacts of each action alternative (i.e., build alternative) are measured against the conditions that would otherwise occur in the future if no action were to occur (i.e., the "No Action" alternative). As such, the NEPA analysis in this Final EIS/EIR uses the No Action/No Project Alternative as the basis by which to measure and evaluate the impacts of each build alternative (i.e., Alternatives A, B, C, and D) in the future (i.e., at buildout in 2015 or, for construction-related impacts, selected future interim year). Based on this fundamental difference in the approach to evaluating impacts, the nature and significance of impacts determined under CEQA are not necessarily representative of, or applicable to, impacts determined under NEPA. The following presentation of environmental consequences should, therefore, be reviewed and considered accordingly.

4.7.6.1 No Action/No Project Alternative

Hydrology

Drainage

Under the No Action/No Project Alternative, there would be limited improvements to the airfield and related uses (e.g., cargo). In addition, as part of an ongoing action by LAWA, land uses within the ANMP properties would be demolished and remain vacant; it is assumed for this analysis that these properties would become open space. LAX Northside and Continental City would be built out with offices, hotels, retail stores, restaurants, a research and development business park, and airport-related uses. Also, the full-length of the Argo Ditch, which is an unlined channel collecting and conveying storm water from the Argo sub-basin to the box culvert of the Argo outfall, would be upgraded to a concrete-lined box culvert.

With the changes planned under the No Action/No Project Alternative, the total amount of impervious area within the HWQSA would be 3,582 acres, an increase of 72 acres over baseline conditions. Since much of the area surrounding the airport in both the Santa Monica Bay and Dominguez Channel watersheds is developed, most of the area is impervious. The change in impervious area resulting from the No Action/No Project Alternative would therefore represent only a marginal increase on a regional basis. However, the change in impervious area under the No Action/No Project Alternative would occur primarily within the Santa Monica Bay Watershed, where impervious area would increase by 134 acres (seven percent) as a result of converting land uses at LAX Northside from open space to mixed use development. In the Dominguez Channel Watershed, demolition of the ANMP properties would decrease the impervious area by 62 acres (four percent).

The drainage systems serving LAX Northside and Continental City would be designed using the LADPW Peak Rate Method. As a result, flooding within the development areas would be controlled to acceptable levels. Nevertheless, it is anticipated that surface water runoff and peak flow rates discharged from the LAX Northside and Continental City areas would increase over baseline conditions. Surface water runoff from LAX Northside would drain to the Argo and Culver sub-basins. Runoff from Continental City would drain to the Dominguez Channel sub-basin. Under the No Action/No Project Alternative, while the Argo Ditch would be improved from an earthen ditch to a concrete box culvert, the other regional drainage facilities within the Argo sub-basin would not be upgraded. Recent analyses referred to in subsection 4.7.3, *Affected Environment/Environmental Baseline*, evaluated conveyance systems within selected HWQSA sub-basins and found that, under existing conditions, flooding from runoff associated with the LADPW 50-year design storm did not occur within the Argo and Imperial sub-basins, while flooding did occur in the Dominguez Channel sub-basin for the same design storm under existing conditions.[384, 385] Neither analysis considered conveyance capacity assuming the development that would occur under the No Action/No Project Alternative. Increases in impervious area and the associated increase in storm water peak flow rates could potentially exceed the capacity of the storm water facilities in these sub-basins, resulting in flooding.

As described in subsection 4.7.3, *Affected Environment/Environmental Baseline*, all facilities receiving and conveying storm water from the airport would be concrete lined under the No Action/No Project Alternative. Therefore, increases in storm water flows and potential changes in the drainage infrastructure would not result in substantial erosion or siltation, either on-site or off-site.

Surface Recharge

Under the No Action/No Project Alternative, the volume of surface recharge within the HWQSA would decrease by 17 acre-feet/year to 154 acre-feet/year as compared to baseline conditions. This change would represent less than a 0.1 percent reduction in the total groundwater inflows estimated for the West Coast Basin under baseline conditions and would not substantially change groundwater storage or groundwater elevations beneath the study area. With the exception of the extraction and treatment of contaminated groundwater (see Section 4.23, *Hazardous Materials*), no groundwater production occurs within the Master Plan boundaries relative to the beneficial uses designated for the West Coast Groundwater Basin.

Water Quality

As indicated previously, under the No Action/No Project Alternative, there would be limited improvements to the airfield and related uses at LAX. Land uses within the ANMP properties would be demolished as part of an ongoing separate action by LAWA, and LAX Northside and Continental City would be built out.

Storm Water Pollutant Loads

When compared to baseline conditions, the estimated annual pollutant loads generated under the No Action/No Project Alternative would increase for all constituents except for fecal coliform bacteria and fecal enterococcus bacteria. Relative increases compared to baseline conditions for the other constituents would range from less than 1 percent for total coliform bacteria to 31 percent for total lead. The estimated fecal coliform bacteria and fecal enterococcus bacteria load would decrease compared to baseline conditions by 2 percent and 28 percent, respectively. Most of this increased pollutant load would occur in the Santa Monica Bay Watershed and is attributed to the development of LAX Northside from open space to mixed use development. In the Dominguez Channel, the estimated loads of most

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[384] City of Los Angeles, Los Angeles World Airports, Revised Hydrology Report for Los Angeles International Airport North Perimeter Storm Drain. Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., December 2001.

[385] City of Los Angeles, Los Angeles World Airports, Final On-Site Hydrology Report for Los Angeles International Airport, Prepared by Parsons, Brinkerhoff, Quade & Douglas, Inc., October 2002.

modeled pollutants of concern would decrease as industrial, commercial, and residential land uses within the acquisition areas are converted to airport operations and airport open space for which percent imperviousness is, on the average, lower. The complete model results are presented in Table S5, Revised Estimated Average Annual Pollutant Load No Action/No Project Alternative, of Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report.*

LAX Northside and Continental City would be required to comply with the SUSMP requirements. The storm water system would be designed to meet the requirements in the SUSMP through incorporation of source control, structural, and treatment control BMPs. These BMPs would be designed with the goal of reducing impacts to water quality to the maximum extent practicable.

Dry Weather Flows

Under the No Action/No Project Alternative, sources for dry weather flows at LAX would be similar to baseline conditions. Most of the airport-related activities that have the potential to generate these flows would continue to be performed within the Imperial sub-basin where the Imperial detention basin would continue to detain the flows for treatment at Hyperion Treatment Plant. Dry weather flows generated outside of the Imperial sub-basin that enter the storm drain system would continue to discharge either to the Dominguez Channel or to the Santa Monica Bay untreated. The conversion of LAX Northside and Continental City from open space to mixed use development could potentially increase the occurrence of dry weather flows and degrade water quality. However, as stated in Section 4.23, *Hazardous Materials*, compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of spills of hazardous material and minimize the effects of their release. In addition, newly developed and redeveloped areas would incorporate source, structural, and treatment control BMPs.

Construction Effects

Under the No Action/No Project Alternative, construction of LAX Northside and Continental City, as well as other improvements at LAX, would create sources of pollution that could potentially affect water quality. As these construction activities would affect an area greater than one acre, LAWA's existing construction policy would require the development of a construction SWPPP in compliance with the state's construction permit. Temporary construction Best Management Practices (BMPs) specified in LAWA's existing Construction SWPPP for LAX include:

- Soil stabilization (erosion control) techniques such as seeding and planting, mulching, and check dams
- Sediment control methods such as detention basins, silt fences, and dust control
- Contractor training programs
- Material transfer practices
- Waste management practices such as providing designated storage areas and containers for specific waste for regular collection
- Roadway cleaning/tracking control practices
- Vehicle and equipment cleaning and maintenance practices
- Fueling practices

4.7.6.2 Alternative A - Added Runway North

Under Alternative A, the building area dedicated to terminal, cargo, and ancillary airport uses would increase and the building area for maintenance uses would decrease compared to baseline conditions. Alternative A would also include development of Westchester Southside and conversion of industrial, commercial, and residential land uses in the acquisition areas to airport uses. Existing uses in the acquisition areas would be demolished. Uses within the ANMP properties -- Belford and Manchester Square -- will be demolished as part of a separate action being undertaken by LAWA. The land within the acquisition areas and Belford would be incorporated into the Master Plan.

Hydrology

Drainage

Under Alternative A in 2015, the total impervious area within the HWQSA would increase by 120 acres as compared to baseline conditions of 3,510 acres. The total impervious area within the study area would increase by 48 acres when compared to No Action/No Project Alternative of 3,582 acres. Since much of the area surrounding the airport in both the Santa Monica Bay and Dominguez Channel watersheds is developed (i.e., impervious) under baseline conditions, this change would represent a marginal increase in regional impervious area.

The changes in impervious area would not be evenly distributed between the Santa Monica Bay and Dominguez Channel watersheds when compared to baseline conditions. The impervious area within the Santa Monica Bay Watershed would increase 209 acres or 10 percent, while the impervious area within the Dominguez Channel Watershed would decrease by 89 acres or six percent.

Recent studies indicate that, under existing conditions, the conveyance capacity of drainage infrastructure within the Argo and Imperial sub-basins is adequate for the LADPW 50-year storm, while the Dominguez Channel sub-basin infrastructure would flood under these same conditions.[386, 387] When the capacity of the Argo sub-basin was assessed assuming development of Westchester Southside, no flooding problems were identified. Neither of the studies evaluated the impacts of other development associated with Alternative A. Increases in impervious area and the associated increase in storm water peak flow rates could potentially exceed the capacity of the storm water facilities in these sub-basins, resulting in flooding. This would be a potentially significant impact.

In order to prevent the increase in impervious area under Alternative A from causing flooding, LAWA would implement Master Plan Commitment HWQ-1, Conceptual Drainage Plan (Alternatives A, B, C, and D). As part of the commitment, LAWA would perform a comprehensive, airport-wide drainage analysis addressing current and projected future drainage and flooding problems. This evaluation would be conducted using the LADPW's Peak Rate Method or the Los Angeles County Modified Rational Method. In areas where a potential for flooding is identified, LAWA would either reduce peak flow rates to over-capacity drainage facilities or increase the drainage capacities of the facilities. Peak flow rates to these facilities could be reduced using BMPs designed to maximize the on-site detention of storm water using the measures described in subsection 4.7.5, *Master Plan Commitments*. The capacities of the drainage facilities receiving runoff from LAX could also be increased by either increasing the size of the drainage facilities or constructing additional drains and outfalls. In areas where new drainage facilities are required, the facilities would be designed using the procedures of the LADPW Peak Rate Method or Los Angeles County Modified Rational Method. With implementation of Master Plan Commitment HWQ-1, potential impacts from flooding under Alternative A would be less than significant.

All facilities receiving and conveying storm water from the airport would be concrete lined under Alternative A and, therefore, any increases in storm water peak flow rates or changes in the drainage infrastructure would not result in substantial erosion or siltation either on-site or off-site. Therefore, the impact of erosion or siltation due to runoff from the airport would be less than significant.

LAX Expressway improvements could potentially increase the amount of impervious area and redirect surface water runoff. As indicated in Appendix K, *Supplemental Environmental Evaluation for LAX Expressway and State Route 1 Improvements*, only a nominal impact on localized drainage or downstream areas would occur.

Surface Recharge

Under Alternative A, in 2015, the volume of surface recharge within the HWQSA would decrease by approximately 29 acre-feet/year to 142 acre-feet/year as compared to baseline conditions, and approximately 12 acre-feet/year when compared to the No Action/No Project Alternative.

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[386] City of Los Angeles, Los Angeles World Airports, Revised Hydrology Report for Los Angeles International Airport North Perimeter Storm Drain, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., December 2001.

[387] City of Los Angeles, Los Angeles World Airports, Final On-Site Hydrology Report for Los Angeles International Airport, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., October 2002.

The reduction in surface recharge would represent a change of less than 0.1 percent in the total groundwater inflows estimated for the West Coast Basin as compared to baseline conditions. This reduction would not substantially change groundwater storage or groundwater elevations. As indicated previously, no groundwater production occurs within the Master Plan boundaries relative to the beneficial uses designated for the West Coast Groundwater Basin. Therefore, the impact of the projected reduction in the volume of surface recharge would be less than significant.

Water Quality

Storm Water Pollutant Loads

Under Alternative A, in 2015, the estimated annual total pollutant load generated within the HWQSA would increase for some constituents and decrease for others compared to baseline conditions. Specifically, greater estimated loading is predicted for total copper, total lead, total zinc, oil and grease, ammonia, and total coliform bacteria when compared to baseline conditions. The increases in these constituents would range from 0.3 percent for ammonia to 11 percent for copper. Estimated loading for total suspended solids, total phosphorus, total Kjeldahl Nitrogen, 5-day Biochemical Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD), fecal coliform bacteria, and fecal enterococcus bacteria would all decrease relative to baseline. When compared to the No Action/No Project Alternative, estimated loading for Alternative A in 2015 would be from 5 percent lower for total zinc to 29 percent lower for total suspended solids. Total copper, oil and grease, and total and fecal coliform bacteria estimated loads would increase from between less than 1 percent to 7 percent, when compared to the No Action/No Project Alternative. Pollutant loads within the Santa Monica Bay Watershed would increase for all constituents in 2015 when compared to baseline conditions. Within the Dominguez Channel Watershed, pollutant loads would increase for some constituents and decrease for others when compared to baseline conditions. The complete model results are presented in Table S7, Revised Estimated Average Annual Pollutant Load Alternative A - Added Runway North (2015), of Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report.* The increases in pollutant loads would be a potentially significant impact.

In order to prevent an increase in pollutant loads generated under Alternative A, LAWA would implement Master Plan Commitment HWQ-1, which would require the development of a conceptual drainage plan. As part of the drainage plan, LAWA would design the storm water system to meet the requirements in the SUSMP through incorporation of source control, structural, and treatment control BMPs. These BMPs would be designed with the goal of reducing impacts to water quality to the maximum extent practicable and achieving no net gain in pollutant loads discharged to receiving water bodies. Due to the relatively large area that would be redeveloped as part of Alternative A, substantial opportunities would exist to replace existing facilities with ones that incorporate water quality control BMPs into their design, construction and operations, thereby reducing total LAX-related pollutant loads. By implementing Master Plan Commitment HWQ-1, the impact associated with the increased pollutant loads would be reduced to a level that is less than significant.

The existing source control BMPs currently employed by LAWA as identified in the LAX SWPPP would also serve to decrease the potential for additional pollutant loading as a result of intensification of airport activities. Routine maintenance such as sweeping and inspections would be performed more frequently and in direct proportion to the increase in frequency of airport activities. As with the other build alternatives, with implementation of Master Plan Commitment HWQ-1, the LAX SWPPP would be amended to incorporate additional source control BMPs, if warranted, as well as changes in the frequency at which source control BMPs will be performed. As a result, the potential impact associated with increased pollutant loads due to increased industrial activity would be reduced to a level that is less than significant.

State Route 1 and LAX Expressway improvements could potentially increase the pollutant load discharged to receiving water bodies. However, compliance with existing local, federal and state regulations, including implementation of BMPs, would ensure that no significant impact would occur. Additional discussion is provided in Appendix K, *Supplemental Environmental Evaluation for LAX Expressway and State Route 1 Improvements*.

Dry Weather Flows

Under Alternative A, heavy maintenance activities at LAX would decrease, thereby reducing a major source of dry weather flows and pollutant discharge from the airport when compared to baseline conditions. However, as indicated in Section 4.23, *Hazardous Materials*, airport-related activities would intensify under this alternative, potentially resulting in a greater likelihood of spills and leaks of hazardous materials. In addition, under Alternative A, the Imperial retention basin would be removed. As a result, dry weather flows that enter the storm water conveyance system from the Imperial drainage area would not be detained for treatment and all flows entering the storm drain system would discharge to either the Dominguez Channel or the Santa Monica Bay untreated. The increased potential for spills and leaks associated with intensification of land use under Alternative A and the removal of the Imperial retention basin could result in an increase in pollutant loads. This would be a potentially significant impact.

Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges, including hazardous material spills, and would minimize the effects of their release should such discharges occur. Incorporation of the source control, structural and treatment BMPs into the design and construction of drainage facilities under Master Plan Commitment HWQ-1 would further reduce the potential for pollutants to enter the storm drain system and affect receiving water bodies. With implementation of this commitment, the pollutant load generated from dry weather flows would not be expected to increase and the associated impact would be less than significant.

Construction Effects

Construction proposed under Alternative A could create sources of pollution that could potentially affect water quality. Since the proposed improvements under this build alternative would affect an area of greater than one acre, LAWA's existing construction policy would require the development of a project-specific construction SWPPPs in compliance with the state's construction permit. Temporary construction BMPs specified in LAWA's existing Construction SWPPP for LAX to minimize the effects of construction activities on water quality include:

- Soil stabilization (erosion control) techniques such as seeding and planting, mulching, and check dams
- Sediment control methods such as detention basins, silt fences, and dust control
- Contractor training programs
- Material transfer practices
- Waste management practices such as providing designated storage areas and containers for specific waste for regular collection
- Roadway cleaning/tracking control practices
- Vehicle and equipment cleaning and maintenance practices
- Fueling practices

By following the procedures outlined in the SWPPP and employing the appropriate BMPs from the list above, impacts to water quality associated with construction activities would be less than significant.

4.7.6.3 Alternative B - Added Runway South

As with Alternative A, Alternative B would increase the building area dedicated to terminal, cargo, and ancillary airport uses, and decrease building area for maintenance uses compared to baseline conditions. Alternative B would also include development of Westchester Southside. Existing uses in the acquisition areas would be demolished. As with Alternative A, uses within the ANMP properties -- Belford and Manchester Square -- will be demolished as part of a separate action being undertaken by LAWA. These areas would be incorporated into the Master Plan.

Hydrology

Drainage

Under Alternative B, in 2015, the total impervious area within the HWQSA would increase by 71 acres as compared to baseline conditions of 3,510 acres. However, when compared to the No Action/No Project Alternative, the total impervious area within the HWQSA would decrease by 1 acre.

When compared to baseline conditions, the changes in impervious area would be marginal on a regional scale and evenly distributed between the Santa Monica Bay and Dominguez Channel watersheds. Locally, the impervious area within the Santa Monica Bay Watershed would increase 144 acres (seven percent), while the impervious area within the Dominguez Channel Watershed would decrease by 73 acres (five percent).

As indicated previously, under existing conditions, conveyance capacity within the Dominguez Channel sub-basin would be exceeded for a LADPW 50-year design storm while capacity would not be exceeded within the Argo and Imperial sub-basins under the same conditions.[388, 389] Capacity of the Argo sub-basin would not be exceeded assuming development of Westchester Southside. Neither of the studies evaluated the impacts of other development associated with Alternative B. Increases in impervious area and the associated increase in storm water peak flow rates could potentially exceed the capacity of the storm water facilities in these sub-basins, resulting in flooding. This would be a potentially significant impact.

In order to prevent the increase in impervious area under Alternative B from potentially causing flooding, LAWA would implement Master Plan Commitment HWQ-1, Conceptual Drainage Plan (Alternatives A, B, C, and D). As with Alternative A, with implementation of this commitment, potential impacts from flooding would be less than significant.

Under Alternative B, the on-site fuel farm would be relocated to either the Scattergood Generating Station or the oil refinery located south of the airport. The Scattergood Fuel Farm site would be upgraded to consist entirely of impervious surfaces and all storm water would be detained on-site. The land use at the oil refinery would not change under baseline conditions and, therefore, the percentage of impervious area would not change. Consequently, development of an off-site fuel farm at either site would not be expected to result in any flooding impacts.

As with Alternative A, facilities receiving and conveying storm water from the airport would continue to be concrete lined under Alternative B and potential increases in storm water peak flow rates or changes in the drainage infrastructure would not result in substantial erosion or siltation either on-site or off-site. Therefore, the impact associated with erosion or siltation due to runoff from the airport would be less than significant.

Surface Recharge

Under Alternative B, in 2015, the estimated volume of surface recharge within the HWQSA would decrease by approximately 17 acre-feet/year to 154 acre-feet/year as compared to baseline conditions, while the volume of surface recharge would be the same when compared to the No Action/No Project Alternative.

As with Alternative A, the reduction in surface recharge would not substantially change groundwater storage or groundwater elevations beneath the HWQSA as compared with baseline conditions. Moreover, groundwater production would not be affected. Therefore, the impact of the projected reduction in the volume of surface water recharge would be less than significant.

As mentioned previously, the off-site fuel farm located at Scattergood Generating Station would be upgraded and consist entirely of impervious surfaces and surface water recharge would not occur. However, the groundwater below the site is composed effectively of seawater since it is directly adjacent to the Santa Monica Bay and is therefore not used to support the beneficial uses designated for the

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388 City of Los Angeles, Los Angeles World Airports, Revised Hydrology Report for Los Angeles International Airport North Perimeter Storm Drain, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., December 2001.

389 City of Los Angeles, Los Angeles World Airports, Final On-Site Hydrology Report for Los Angeles International Airport, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., October 2002.

Basin. At the oil refinery site, land use and the amount of pervious surfaces would not change. Therefore, the impact of the change in surface recharge would be less than significant.

Water Quality

Storm Water Pollutant Loads

Under Alternative B, in 2015, the estimated annual total pollutant load generated within the HWQSA would increase for total copper, oil and grease and total coliform bacteria as compared to baseline conditions. The increases in these constituents would range from 1 percent for total coliform bacteria to 9 percent for total copper. All other pollutant loads would decrease relative to baseline conditions by between 1 percent and 44 percent. When compared to the No Action/No Project Alternative, estimated average annual pollutant loading from the project in 2015 would decrease for all constituents except total copper, oil and grease, and total coliform bacteria, which would increase by 6 percent, 2 percent, and less than 1 percent, respectively. As with Alternative A, pollutant loads within the Santa Monica Bay Watershed would increase for all constituents when compared to baseline loads. Within the Dominguez Channel Watershed, some constituents would increase and others would decrease when compared to baseline loads. The complete model results are presented in Table S9, Revised Estimated Average Annual Pollutant Load Alternative B - Added Runway South (2015), of Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*. The increases in pollutant loads would be a potentially significant impact.

In order to prevent an increase in pollutant loads generated under Alternative B, LAWA would implement Master Plan Commitment HWQ-1, which would require the development of a conceptual drainage plan. As part of the drainage plan, LAWA would design the storm water system to meet the requirements in the SUSMP through incorporation of source control, structural, and treatment control BMPs. These BMPs would be designed with the goal of reducing impacts to water quality to the maximum extent practicable and achieving no net gain in pollutant loads discharged to receiving water bodies. Due to the relatively large area that would be redeveloped as part of Alternative B, substantial opportunities would exist to replace existing facilities with ones that have water quality control BMPs incorporated into their design, construction and operation thereby reducing total LAX-related pollutant loads. By implementing Master Plan Commitment HWQ-1, the impact associated with the increased pollutant loads would be reduced to a level that is less than significant.

As with Alternative A, existing source control BMPs currently employed by LAWA as identified in the LAX SWPPP would also serve to decrease the potential for additional pollutant loading as a result of intensification of airport activities. Routine maintenance such as sweeping and inspections would be performed more frequently and in direct proportion to the increase in frequency of airport activities. As with the other build alternatives, with implementation of Master Plan Commitment HWQ-1, the LAX SWPPP would be amended to incorporate additional source control BMPs, if warranted, as well as changes in the frequency at which source control BMPs will be performed. As a result, the potential impact associated with increased pollutant loads due to increased industrial activity would be reduced to a level that is less than significant.

Dry Weather Flows

As with Alternative A, under Alternative B, heavy maintenance activities at LAX would decrease, thereby reducing a major source of dry weather flows and pollutant discharge from the airport. However, as indicated in Section 4.23, *Hazardous Materials*, the intensification of airport-related activities would potentially result in a greater likelihood of spills and leaks of hazardous materials. As with Alternative A, the Imperial retention basin would be removed and all dry-weather flows entering the storm drain system would potentially discharge untreated to the Dominguez Channel or Santa Monica Bay. The increased potential for spills and leaks under Alternative B and the removal of the Imperial retention basin could result in an increase in pollutant loads. This would be a potentially significant impact.

Under Alternative B, the off-site fuel farm would be relocated to either the Scattergood Generating Station or the oil refinery located south of the airport. Relocating the fuel farm to either proposed location would not result in a change in land use that would be expected to adversely affect water quality. All surface water generated within the proposed Scattergood facility would be contained by secondary containment measures, in conjunction with an on-site overflow detention basin. Surface waters collected in the containment area and the detention basin would be pumped to the Hyperion Treatment Plant for treatment. Surface water generated at the oil refinery would continue to be treated by the on-site water treatment facility. Discharges from the proposed fuel farm site would continue to be treated and regulated under the existing NPDES permit. For these reasons, the impact of the off-site fuel farm on water quality would be less than significant.

Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce potential impacts associated with dry weather discharges, including hazardous materials spills. Incorporation of source control, structural, and treatment BMPs into the design and construction of the drainage facilities under Master Plan Commitment HWQ-1 would further reduce the potential for pollutants to enter the storm drain system and affect receiving water bodies. With implementation of this commitment pollutant load generated from dry weather flows would not be expected to increase and the associated impact would be less than significant.

Construction Effects

Construction proposed under Alternative B could create sources of pollution that could potentially affect water quality. As with Alternative A, the proposed improvements under Alternative B would affect an area of greater than one acre, requiring LAWA to develop project-specific construction SWPPPs in compliance with the state's construction permit for the project. To minimize the effect that the construction activities would have on water quality, the SWPPPs would specify appropriate temporary construction BMPs from the list identified above under Alternative A.

By following the procedures outlined in the SWPPP and employing appropriate temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.7.6.4 Alternative C - No Additional Runway

Under Alternative C, the building area dedicated to terminal, cargo, and ancillary airport uses would increase, and the building area for maintenance uses would decrease, compared to baseline conditions. Alternative C would also include development of Westchester Southside. Existing uses in the acquisition areas would be demolished. As with Alternatives A and B, uses within the ANMP properties -- Belford and Manchester Square -- will be demolished as part of a separate action being undertaken by LAWA. These areas would be incorporated into the Master Plan.

<u>Hydrology</u>

Drainage

Under Alternative C, in 2015, the total impervious area within the HWQSA would increase by 77 acres as compared to baseline conditions, and five acres as compared to the No Action/No Project Alternative, resulting in a marginal increase on a regional scale.

When compared to baseline conditions, local changes in impervious area would not be evenly distributed between the Santa Monica Bay and Dominguez Channel watersheds. The impervious area within the Santa Monica Bay Watershed would increase 174 acres (eight percent), while the impervious area within the Dominguez Channel Watershed would decrease by 97 acres (seven percent).

The increase in impervious area within the Santa Monica Bay Watershed would occur in the Argo and Imperial sub-basins. As indicated previously, a recent study evaluated the flooding potential of the Argo sub-basin. This study considered full development of the Westchester Southside development under Alternative C.[390] No flooding problems were identified. Similar studies are not available for the Imperial or Dominguez Channel sub-basin that assume Alternative C conditions. However, the recent studies indicate that the capacity of the Dominguez Channel Sub-basin would be exceeded for an LADWP 50-year design storm under existing conditions. Increases in impervious area and the associated increase in storm water peak flow rates could potentially exceed the capacity of the storm water facilities in these sub-basins, resulting in flooding. This would be a potentially significant impact.

In order to prevent the increase in impervious area under Alternative C from causing flooding, LAWA would implement Master Plan Commitment HWQ-1, Conceptual Drainage Plan (Alternatives A, B, C, and

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390 City of Los Angeles, Los Angeles World Airports, <u>Revised Hydrology Report for Los Angeles International Airport North Perimeter Storm Drain</u>. Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., December 2001.

D). With implementation of this commitment, potential impacts from flooding would be less than significant.

As with Alternative A and B, all facilities receiving and conveying storm water from the airport would continue to be concrete lined and potential increases in storm water peak-flow rates or changes in the drainage infrastructure associated with Alternative C would not result in substantial erosion or siltation. Therefore, the impact associated with erosion or siltation due to runoff from the airport would be less than significant for areas both on- and off-site.

As with Alternative A, LAX Expressway improvements could potentially increase the amount of impervious area and redirect surface water runoff. As indicated in Appendix K, *Supplemental Environmental Evaluation for LAX Expressway and State Route 1 Improvements*, only a nominal impact on localized drainage or downstream areas would occur.

Surface Recharge

Under Alternative C, in 2015, the estimated volume of surface recharge would decrease by approximately 19 acre-feet/year as compared to baseline conditions and 2 acre-feet/year as compared to the No Action/No Project Alternative.

The effect of this decrease would be the same as Alternatives A and B. When compared to baseline conditions, as with those alternatives, the reduction in surface recharge would not substantially change groundwater storage or groundwater elevations beneath the Master Plan boundaries. Moreover, groundwater production would not be affected. Therefore, the impact of the projected reduction in the volume of surface water recharge would be less than significant.

Water Quality

Storm Water Pollutant Loads

Under Alternative C, in 2015, the estimated average annual total pollutant load generated within the HWQSA would decrease by between 1 percent and 41 percent for all modeled constituents except total copper, total lead, total zinc, oil and grease, and total coliform bacteria, which would increase from 1 percent to 9 percent. These same constituents would increase when compared to the No Action/No Project Alternative, with the exception of total lead and total zinc, which would decrease by 23 and 5 percent, respectively. Estimated annual pollutant load decreases relative to the No Action/No Project Alternative for the other modeled constituents range from 2 percent to 27 percent. Estimated annual pollutant loading to the Santa Monica Bay Watershed would exceed that discharged to the Dominguez Channel Watershed. The complete model results are presented in the Table S11, Revised Estimated Average Annual Pollutant Load Alternative C - No Additional Runway (2015), of Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*. The increases in pollutant loads would be a potentially significant impact.

In order to prevent an increase in pollutant loads generated under Alternative C, LAWA would implement Master Plan Commitment HWQ-1, which would require the development of a conceptual drainage plan. As part of the drainage plan, LAWA would design the storm water system to meet the requirements in the SUSMP through incorporation of source control, structural, and treatment control BMPs. These BMPs would be designed with the goal of reducing impacts to water quality to the maximum extent practicable and achieving no net gain in pollutant loads discharged to receiving water bodies. Due to the relatively large area that would be redeveloped as part of Alternative C, substantial opportunities would exist to replace existing facilities with ones that incorporate water quality control BMPs into their design, construction, and operations thereby reducing total LAX-related pollutant loads. By implementing Master Plan Commitment HWQ-1, the impact associated with the increased pollutant loads would be reduced to a level that is less than significant.

As with Alternatives A and B, existing source control BMPs currently employed by LAWA as identified in the LAX SWPPP would also serve to decrease the potential for additional pollutant loading as a result of intensification of airport activities. Routine maintenance such as sweeping and inspections would be performed more frequently and in direct proportion to the increase in frequency of airport activities. As with the other build alternatives, with implementation of Master Plan Commitment HWQ-1, the LAX SWPPP would be amended to incorporate additional source control BMPs, if warranted, as well as changes in the frequency at which source control BMPs will be performed. As a result, the potential impact associated with increased pollutant loads due to increased industrial activity would be reduced to a level that is less than significant.

State Route 1 and LAX Expressway improvements could potentially increase the pollutant load discharged to receiving water bodies. However, compliance with existing local, federal, and state regulations, including implementation of BMPs, would ensure that no significant impact would occur. Additional discussion is provided in Appendix K, *Supplemental Environmental Evaluation for LAX Expressway and State Route 1 Improvements*.

Dry Weather Flows

As with Alternatives A and B, heavy maintenance activities at LAX would decrease under Alternative C, although to a lesser degree than under those two alternatives. This would reduce a major source of pollutants from dry weather flows at the airport. This could be offset by a potential increase in spills and leaks of hazardous materials due to an overall intensification of use at LAX. Also, as with Alternatives A and B, under Alternative C the Imperial retention basin would be removed and dry weather flows entering the storm drain system would have the potential to discharge untreated to the Santa Monica Bay or Dominguez Channel water bodies. The increased potential for spills and leaks combined with the removal of the Imperial retention basin could result in an increase in pollutant loads. This would be a potentially significant impact.

Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce potential impacts associated with dry weather discharges, including hazardous materials spills. Incorporation of source control, structural and treatment BMPs under Master Plan Commitment HWQ-1 would further reduce the potential for pollutants to enter the storm drain system and affect receiving water bodies. With implementation of this commitment, the pollutant load generated from dry weather flows would not be expected to increase and the associated impact would be less than significant.

Construction Effects

Construction of the proposed improvements under Alternative C would affect an area greater than one acre. In compliance with LAWA's current construction policy and the requirements of the state's construction permit, project-specific construction SWPPPs would be developed to minimize the effect that the construction activities would have on water quality. Potential BMPs that may be included would be the same as those identified under Alternative A.

By following the procedures outlined in the SWPPPs and employing appropriate temporary construction BMPs, impacts to water quality from construction activities would be less than significant.

4.7.6.5 Alternative D - Enhanced Safety and Security Plan

Alternative D would provide a new landside GTC and ITC to the east of the existing CTA. Overall, the building area dedicated to terminal, cargo, and ancillary airport uses would increase, and the building area for maintenance uses would decrease compared to baseline conditions. Alternative D would also include build-out of LAX Northside. As with the other build alternatives, uses within the Aircraft Noise Mitigation Program (ANMP) properties -- Belford and Manchester Square -- will be demolished as a separate action by LAWA. The Manchester Square area would be incorporated into the Master Plan.

<u>Hydrology</u>

Drainage

Under Alternative D, in 2015, the total impervious area within the HWQSA would be 3,673 acres. This represents an increase in total impervious area of 163 acres as compared to baseline conditions and an increase of 91 acres when compared to the No Action/No Project Alternative in 2015. Since much of the area surrounding the airport in both the Santa Monica Bay and Dominguez Channel watersheds is developed (i.e., impervious), this change would represent a marginal increase in regional impervious area.

Impervious area would increase by 6 percent in the Santa Monica Bay Watershed and by 3 percent in the Dominguez Channel Watershed in 2015 compared to baseline conditions. The increase within the Santa Monica Bay Watershed would be largely due to the development of LAX Northside. The increase within the Dominguez Channel Watershed would be attributable to the implementation of substantial land side facilities east of Sepulveda Boulevard. When compared to the No Action/No Project Alternative, the impervious area would be 1 percent lower within the Santa Monica Watershed and 7 percent greater within the Dominguez Channel Watershed in 2015.

The increase in impervious area within the Santa Monica Bay Watershed would occur in the Argo and Imperial sub-basins. In addition to evaluating existing conveyance capacity, the hydrologic analyses discussed previously evaluated the performance of the Imperial and Dominguez Channel sub-basins under the LADPW 50-year design storm for Alternative D and found that, while no flooding would occur in the Imperial sub-basin, flooding would occur in the Dominguez Channel sub-basin.[391, 392] Detailed analysis of the Argo sub-basin capacity under this design storm for Alternative D was not conducted. Increases in impervious area and the associated increase in storm water peak flow rates could potentially exceed the capacity of the storm water facilities in these sub-basins, resulting in flooding. This would be a potentially significant impact.

In order to prevent the increase in impervious area under Alternative D from causing flooding, LAWA would implement Master Plan Commitment HWQ-1, Conceptual Drainage Plan (Alternatives A, B, C, and D). As part of this commitment, LAWA would perform a comprehensive, airport-wide drainage analysis addressing current and projected future drainage and flooding problems. In areas where a potential for flooding is identified, LAWA would either reduce peak flow rates to over-capacity drainage facilities or increase the drainage capacities of the facilities. These measures are further described in subsection 4.7.5, *Master Plan Commitments*. With implementation of Master Plan Commitment HWQ-1, potential impacts from flooding would be less than significant.

As with the other build alternatives, all facilities receiving and conveying storm water from the airport would be concrete lined under Alternative D and, therefore, any increase in storm water peak flow rates or changes in the drainage infrastructure would not result in substantial erosion or siltation either on-site or off-site. Therefore, the impact of erosion or siltation due to runoff from the airport would be less than significant.

Surface Recharge

Under Alternative D, in 2015, the volume of surface recharge within the HWQSA would decrease by approximately 40 acre-feet/year to 131 acre-feet compared to baseline conditions. When compared to the No Action/No Project Alternative, the volume of recharge within the HWQSA would decrease by 23 acre-feet/year. The effect of this decrease would be the same as for the other build alternatives in that the reduction of surface recharge would not substantially change groundwater storage or groundwater elevations beneath the HWQSA as compared to baseline conditions. Moreover, groundwater production would not be affected. Therefore, the impact of the projected reduction in the volume of surface water recharge would be less than significant.

Water Quality

Storm Water Pollutant Loads

Estimated average annual pollutant loads in 2015 under Alternative D would increase over baseline conditions for all parameters except total suspended solids (TSS) and fecal enterococcus bacteria, which would decrease by 8 percent and 30 percent, respectively. The increase in estimated pollutant loading for all other constituents would be less than 10 percent. When compared to the No Action/No Project Alternative, estimated pollutant loads of some constituents would increase while others would decrease as a result of Alternative D. Decreases ranging from 1 percent to 18 percent would occur for total suspended solids, total Kjeldahl nitrogen, total lead, BOD_5, COD, ammonia, and fecal enterococcus bacteria. Increased loads ranging from less than 1 percent to 5 percent would result for the other modeled constituents in 2015 when compared to the No Action/No Project Alternative. The changes in pollutant loads would not be evenly distributed between the two watersheds. Estimated average annual pollutant loading to the Santa Monica Bay Watershed would exceed that discharged to the Dominguez Channel Watershed under this alternative in 2015. The complete model results are presented in Table

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391 City of Los Angeles, Los Angeles World Airports, Revised Hydrology Report for Los Angeles International Airport North Perimeter Storm Drain, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., December 2001.

392 City of Los Angeles, Los Angeles World Airports, Final On-Site Hydrology Report for Los Angeles International Airport, Prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc., October 2002.

S12, Estimated Average Annual Pollutant Load Alternative D - Enhanced Safety and Security Plan (2015), of Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*. The increases in pollutant loads would be a potentially significant impact.

Similar to the other build alternatives, in order to prevent an increase in pollutant loads generated under Alternative D, LAWA would implement Master Plan Commitment HWQ-1, which would require the development of a conceptual drainage plan and design of a storm water system to meet the requirements in the SUSMP through incorporation of source control, structural, and treatment control BMPs. By implementing Master Plan Commitment HWQ-1, the impact associated with the increased pollutant loads would be reduced to a level that is less than significant.

In addition, existing source control BMPs currently employed by LAWA as identified in the LAX SWPPP would also serve to decrease the potential for additional pollutant loading as a result of intensification of airport activities. Routine maintenance such as sweeping and inspections would be performed more frequently and in direct proportion to the increase in frequency of airport activities. As with the other build alternatives, with implementation of Master Plan Commitment HWQ-1, the LAX SWPPP would be amended to incorporate additional source control BMPs, if warranted, as well as changes in the frequency at which source control BMPs will be performed. As a result, the potential impact associated with increased pollutant loads due to increased industrial activity would be reduced to a level that is less than significant.

Dry Weather Flows

As with Alternatives A, B, and C, sources of dry weather flows within the HWQSA are associated with activities that include outdoor maintenance of vehicles; building and grounds maintenance; aircraft and ground vehicle fueling, painting, stripping, and washing; limited deicing; and chemical and fuel transport and storage. The intensification of these airport-related activities under Alternative D could result in release of spills and leaks of hazardous materials to the Dominguez Channel and Santa Monica Bay watersheds. Unlike the other build alternatives, under Alternative D, the Imperial retention basin would not be removed. Nevertheless, the increased potential for spills and leaks could result in an increase in pollutant loads to receiving water bodies. This would be a potentially significant impact.

Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and the potential impacts associated with hazardous materials spills. Incorporation of source control, structural and treatment BMPs under Master Plan Commitment HWQ-1 would further reduce the potential for pollutants to enter the storm drain system and affect receiving water bodies. With implementation of this commitment, the pollutant load generated from dry weather flows would not be expected to increase and the associated impact would be less than significant.

Construction Impacts

Construction of the proposed improvements under Alternative D would affect an area greater than one acre, thus requiring LAWA to develop project-specific construction SWPPPs in compliance with the state's construction permit. To minimize the effect that the construction activities would have on water quality, the SWPPPs would specify temporary construction BMPs that would be selected from the list as identified under Alternative A. By following the procedures contained in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.7.7 Cumulative Impacts

The cumulative impacts to hydrology and water quality under the No Action/No Project Alternative and Alternatives A, B, C, and D, in combination with other past, present, and probable future events, are discussed below. As discussed under subsection 4.7.6, *Environmental Consequences*, drainage infrastructure capacity in some sub-basins may be exceeded under the No Action/No Project and Alternatives A, B, C, and D. Water quality impacts to receiving waters could also occur as a result of the alternatives. With implementation of Master Plan Commitment HWQ-1, however, the impacts associated with drainage and water quality would be less than significant. The reduction of recharge as a result of the No Action/No Project and Alternatives A, B, C, and D would not be significant.

4.7.7.1 No Action/No Project Alternative

Hydrology

Drainage

Under the No Action/No Project Alternative, LAX Northside would be developed in accordance with its existing entitlements (i.e., 4.5 million square feet of office and light industrial uses). Such development would increase impervious surfaces within the Argo sub-basin and, to a limited extent, within the Culver sub-basin, with a resulting increase in surface water runoff and peak storm water discharge rates. Similarly, development of Continental City would result in increases within the Dominguez Channel sub-basin. As indicated above, the Dominguez Channel sub-basin is currently over capacity as a result of development associated with past projects; hence, increased surface water runoff and peak storm water discharge rates resulting from development under the No Action/No Project Alternative would exacerbate the existing potential for localized flooding.

Relative to drainage, the most notable major project in proximity to LAX is the Playa Vista project. Implementation of Playa Vista would result in the conversion of a substantial amount of land from existing vacant use to proposed urban uses, resulting in increased impervious area and alteration in existing drainage characteristics. It is anticipated that implementation of the Playa Vista project would include the construction of drainage improvements necessary to meet City and County requirements. The drainage impacts, and associated drainage improvements, for Playa Vista would occur within different watersheds and sub-basins than LAX. The geographic area that contributes runoff to the same sub-basins as LAX is largely impervious, and future projects are not anticipated to contribute notable additional surface water runoff. Nevertheless, small infill projects could result in incremental changes in amounts of existing impervious surface area and/or changes to existing drainage characteristics.

Increased surface water runoff and peak storm water discharge rates resulting from the No Action/No Project Alternative, in conjunction with past projects and small cumulative projects within the Dominguez Channel sub-basin, would result in cumulative increases in runoff volumes and peak flows that would not be able to be accommodated by existing drainage infrastructure.

Surface Recharge

As described above, under the No Action/No Project Alternative, LAX Northside and Continental City would be developed in accordance with existing entitlements. As these areas are presently vacant, development would cause impervious area to increase, reducing the amount of area available for surface recharge. Surface recharge comprises approximately 13 percent of the total groundwater inflows within the West Coast Groundwater Basin, in which LAX is located; the reduction in surface recharge within the project boundaries under the No Action/No Project Alternative would represent a change of less than 0.1 percent of total groundwater inflows estimated for the Basin compared to baseline conditions. Sources for this recharge include precipitation, surface water streams, irrigation water from fields and lawns, and industrial and commercial wastes.

Relative to recharge, like drainage, the most notable major project in proximity to LAX is the Playa Vista project. Implementation of Playa Vista would result in the conversion of a substantial amount of land from existing vacant use to proposed urban uses, resulting in an increase in impervious area. However, only half of the Playa Vista property resides in the West Coast Basin. Changes in impervious area at the Playa Vista project are not expected to substantially reduce the amount of recharge, and reductions that do occur would most likely be offset with increased irrigation and unlined surface water features. The same net effect would also be expected for other future projects.

At LAX under baseline conditions, the volume of recharge is limited by the highly developed, relatively impervious land uses overlying the airport property and the relatively impermeable aquitards that reside beneath the surface and the regional groundwater aquifers. Since land uses overlying the Basin are already highly developed, major changes in land use would not be expected with cumulative development such that the total amount of pervious surface area within the Basin would change. Decreased surface recharge volumes resulting from the No Action/No Project Alternative in conjunction with the minor changes in land use patterns within the West Coast Basin would not substantially reduce the volume of water recharging groundwater from the surface.

Water Quality

Continued development within the Santa Monica Bay and Dominguez Channel watersheds, including development associated with the No Action/No Project Alternative, could potentially contribute increased pollutant loads to Santa Monica Bay, an impaired water body, and the Dominguez Channel. In light of continued regional water quality impacts, the LARWQCB, which is the agency with jurisdiction over surface water quality, implemented the SUSMP regulations. These regulations, which were adopted through a process that was subject to public review and comment, provide specific requirements aimed at reducing storm water pollutant loads. The SUSMP regulations require maximizing the use of structural and treatment BMPs to reduce water quality impacts. Implementation of these requirements will avoid or substantially lessen cumulative water quality impacts to Santa Monica Bay and Dominguez Channel.

As with drainage and recharge, the most notable major project near LAX is the Playa Vista project, which, if implemented, would convert open space land uses to urban uses. This would have the potential to increase the pollutant loads discharged from the Playa Vista property ultimately to the Santa Monica Bay. However, like LAX, the Playa Vista project would be required to implement BMPs to reduce the effect that development would have on water quality and comply with the SUSMP regulations. These BMPs are expected to be incorporated into the construction of the project.

Development of LAX Northside and Continental City under the No Action/No Project Alternative would be required to comply with the SUSMP requirements by designing the storm water system to meet the requirements in the SUSMP through incorporation of source control, structural and treatment control BMPs. These BMPs would be designed with the goal of reducing impacts to water quality to the maximum extent practicable.

4.7.7.2 Alternatives A, B, and C

Hydrology

Drainage

As previously discussed in subsection 4.7.6, *Environmental Consequences*, similar to the No Action/No Project Alternative, development associated with Alternatives A, B, and C would increase impervious surface area, and resultant surface water runoff and peak flows, within the Dominguez Channel and Argo sub-basins. Development associated with Alternatives A, B, and C would also affect the Imperial and Culver sub-basins. Master Plan-related improvements occurring with any of the build alternatives would be designed so that flooding within the boundary of the selected alternative would be controlled to acceptable levels.

In addition to the direct impacts associated with each alternative, as summarized above, existing drainage systems outside of the study area could be affected by any new development resulting from the relocation of residences and business within the acquisition areas, and/or from "induced" growth associated with the project. To the extent that such relocated uses or induced growth is accommodated within existing developed areas, there would be little, if any, potential for impacts on drainage; however, new development engendered by such relocated uses or induced growth would pose the potential for increased impervious area and alteration(s) of existing drainage characteristics.

Cumulative impacts could also occur as a result of future development in the vicinity of LAX. As indicated above, the most notable major project in proximity to LAX is Playa Vista. The drainage impacts associated with Playa Vista would occur within different watersheds and sub-basins than LAX and, therefore, would not contribute to cumulative drainage impacts. However, smaller infill projects within closer proximity to LAX could result in incremental increases in surface water runoff and peak storm water discharge rates, including the probable development of Manchester Square with light industrial uses under Alternative A, which, unlike Alternatives B and C, does not incorporate the property into the Master Plan.

The combined effects of the direct and indirect impacts of Alternatives A, B, and C, in conjunction with the effects of both past and probable future projects, could result in cumulative impacts. As described above, Master Plan-related improvements would be designed to address flooding within the boundary of the selected alternative; however, increased surface water runoff and peak flows resulting from the build alternatives, in conjunction with runoff and peak flows from past and future projects, may not be able to be accommodated by the regional drainage infrastructure, particularly that serving the- Dominguez Channel Watershed. This would be a significant cumulative impact.

As indicated below in subsection 4.7.8, *Mitigation Measures*, the responsibility for mitigating such an impact lies with the LACDPW and/or the City of Los Angeles Department of Public Works, Bureau of Engineering. If the agencies with jurisdiction do not resolve deficiencies in regional drainage infrastructure identified as having insufficient capacity to convey storm water, this cumulative impact would remain significant.

Surface Recharge

While pervious area would decrease under Alternatives A, B, and C, compared to baseline conditions due to development proposed as part of the alternatives, most notably the development of Westchester Southside and Continental City, the reduction in surface recharge within the project boundaries would represent a change of less than 0.1 percent of total groundwater inflows estimated for the West Coast Groundwater Basin compared to baseline conditions.

The nearby Playa Vista project would also result in reduced pervious area, but only half of the Playa Vista property is located within the West Coast Basin. The loss of recharge area that would occur within the West Coast Basin is likely to be offset by recharge via the unlined surface water features of the development and the increased irrigation associated with this project.

The sources of inflows within the Basin include precipitation, surface water streams, irrigation water, industrial and commercial wastes, and other applied surface waters. Cumulative development would have the potential to affect only a small portion of the inflows and, as such, are not expected to substantially reduce the amount of recharge that occurs. As a result, cumulative impacts on recharge would be less than significant.

Water Quality

As with the No Action/No Project Alternative, continued development within the Santa Monica Bay and Dominguez Channel watersheds, including development associated with Alternatives A, B, and C, could potentially contribute increased pollutant loads to Santa Monica Bay, an impaired water body, and Dominguez Channel. In light of continued regional water quality impacts, the LARWQCB, which is the agency with jurisdiction over surface water quality, implemented the SUSMP regulations. These regulations, which were adopted through a process that was subject to public review and comment, provide specific requirements aimed at reducing storm water pollutant loads. The SUSMP regulations require maximizing the use of source control, structural and treatment control BMPs to reduce the discharge of pollutants from storm water conveyance systems to the maximum extent practicable. Implementation of these requirements will avoid or substantially lessen cumulative water quality impacts to Santa Monica Bay and the Dominguez Channel.

Cumulative impacts could also occur as a result of future development around LAX. As indicated above, the most notable major project in proximity to LAX is Playa Vista. Runoff from the Playa Vista project would also discharge to the Santa Monica Bay and, therefore, could contribute to cumulative water quality impacts if increased pollutant loads are not mitigated. Other small infill projects within the Santa Monica Bay and/or the Dominguez Channel could also potentially result in incremental increases in pollutant loads discharged from the project. However, most of these projects would be required to conform to SUSMP regulations, which were designed to address the cumulative effects of continued development on water quality.

The Master Plan would be required to comply with the provisions in the SUSMP. These provisions would be met by implementing Master Plan Commitment HWQ-1, which would require the development of a conceptual drainage plan, and incorporation of source control, structural and treatment control BMPs for all new development projects and those redevelopment projects that exceed impervious surface area criteria as defined by SUSMP. As part of the drainage plan, BMPs would be designed with the goal of reducing impacts to water quality of the Santa Monica Bay and the Dominguez Channel to the maximum extent practicable. By incorporating BMPs, additional pollutant loads would be reduced and cumulative water quality impacts would be less than significant.

4.7.7.3 Alternative D - Enhanced Safety and Security Plan

Hydrology

Drainage

The combined effects of the indirect impacts of Alternative D, in conjunction with the effects of both past, present, and probable future projects, could result in cumulative drainage impacts. As described above, Alternative D would be designed to address flooding within the boundary of this alternative. However, increased surface water runoff and peak flows resulting from Alternative D, in conjunction with runoff and peak flows from past, present, and probable future projects, may not be able to be accommodated by the regional drainage infrastructure, particularly that serving the Dominguez Channel watershed. This would be a significant cumulative impact.

As indicated below in subsection 4.7.8, *Mitigation Measures*, the responsibility for mitigating such an impact lies with LACDPW and/or the City of Los Angeles Department of Public Works, Bureau of Engineering. If the agencies with jurisdiction do not resolve deficiencies in regional drainage infrastructure identified as having insufficient capacity to convey storm water, this cumulative impact would remain significant.

Surface Recharge

While pervious area would decrease under Alternative D compared to baseline conditions due to development proposed as part of the alternative, most notably the development of LAX Northside, the reduction in surface recharge within the project boundaries would represent a change of less than 0.1 percent of total groundwater inflows estimated for the West Coast Groundwater Basin as compared to baseline conditions.

The nearby Playa Vista project would also result in reduced pervious area, but only half of the Playa Vista property is located within the West Coast Basin. The loss of recharge area that would occur within the West Coast Basin is likely to be offset by recharge via the unlined surface water features of the development and the increased irrigation associated with this project.

The sources of inflows within the Basin include precipitation, surface water streams, irrigation water, industrial and commercial wastes, and other applied surface waters. Cumulative development would have the potential to affect only a small portion of the inflows and, as such, are not expected to substantially reduce the amount of recharge that occurs. As a result, cumulative impacts on recharge would be less than significant.

Water Quality

Development within the Santa Monica Bay and Dominguez Channel watersheds under Alternative D, in conjunction with the nearby Playa Vista project and future small infill projects, could potentially result in increased pollutant loads to these water bodies. Alternative D would be required to comply with the provisions in the SUSMP. These provisions would be met by implementing Master Plan Commitment HWQ-1, which would require preparation of a conceptual drainage plan, and incorporation of source control, structural and treatment control BMPs for all new development projects and those redevelopment projects that exceed impervious surface area criteria as defined by SUSMP. These BMPs would be designed with the goal of reducing impacts to water quality of the Santa Monica Bay and the Dominguez Channel, to the maximum extent practicable. By incorporating BMPs, additional pollutant loads would be reduced and cumulative water quality impacts would be less than significant.

4.7.8 Mitigation Measures

Hydrology

Drainage

With the implementation of Master Plan Commitment HWQ-1, Conceptual Drainage Plan (Alternatives A, B, C, and D), Alternatives A, B, C, and D would not have any significant impacts relative to drainage and the potential for flooding. No project-level mitigation would be required.

The following mitigation measure is recommended to reduce cumulative drainage impacts within the Argo, Imperial, and Dominguez Channel sub-basins.

- **MM-HWQ-1. Upgrade Regional Drainage Facilities (Alternatives A, B, C, and D).**

  Regional drainage facilities should be upgraded, as necessary, in order to accommodate current and projected future flows within the watershed of each storm water outfall resulting from cumulative development. This could include upgrading the existing outfalls, or building new ones. The responsibility for implementing this mitigation measure lies with the Los Angeles County Department of Public Works and/or the City of Los Angeles Department of Public Works, Bureau of Engineering. A portion of the increased costs for the upgraded flood control and drainage facilities would be paid by LAX tenants and users in accordance with the possessory interest tax laws and other legal assessments, consistent with federal airport revenue diversion laws and regulations and in compliance with state, county and city laws. The new or upgraded facilities should be designed in accordance with the drainage design standards of each agency.

Surface Recharge

Alternatives A, B, C, and D would not have any significant impacts relative to surface recharge and no mitigation would be required.

Water Quality

With the implementation of Master Plan Commitment HWQ-1, which identifies BMPs to reduce pollutant discharges as part of the conceptual drainage plan and resulting project-specific SUSMP, Alternatives A, B, C, and D would not have any significant impacts relative to water quality and no mitigation would be required.

4.7.9 Level of Significance After Mitigation

4.7.9.1 Alternatives A, B, and C

Cumulative drainage impacts resulting from development of Alternative A, B, or C, in conjunction with past, present, and probable future projects, could be mitigated through implementation of Mitigation Measure HWQ-1. If the agencies with jurisdiction do not resolve deficiencies in regional drainage infrastructure identified as having insufficient capacity to convey storm water, this cumulative impact would remain significant.

4.7.9.2 Alternative D - Enhanced Safety and Security Plan

Cumulative drainage impacts resulting from development of Alternative D, in conjunction with past, present, and probable future projects, could be mitigated through implementation of Mitigation Measure HWQ-1. If the agencies with jurisdiction do not resolve deficiencies in regional drainage infrastructure identified as having insufficient capacity to convey storm water, this cumulative impact would remain significant.

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