4.8 Hydrology/Water Quality

4.8.1 Introduction

The hydrology analysis below addresses the potential for flooding to occur as a result of actions under any of the SPAS alternatives. The water quality analysis below addresses impacts to the quality of storm water runoff and dry weather flows as a result of actions under any of the SPAS alternatives. Detailed information that supports the analyses, such as impervious area by land use, average annual runoff, and estimated pollutant loads generated, is provided in Appendix H, *Hydrology and Water Quality*.

Impacts related to groundwater supply and recharge, and inundation by seiche, tsunami, and mudflow, were addressed in the revised LAX SPAS EIR Notice of Preparation/Initial Study (October 2010), included as Appendix A, *Notice of Preparation/Scoping*. As discussed therein, groundwater beneath LAX is not used for municipal or agricultural purposes. Construction and operation of the SPAS alternatives would not require the use of groundwater and, thus, would not deplete groundwater supplies. Although the SPAS alternatives would result in a net increase in impervious area (described further below in this section) and an associated decrease in the volume of surface recharge within the LAX area when compared to baseline conditions, the reduction in surface recharge would not substantially change the groundwater storage or groundwater elevation beneath LAX. Moreover, groundwater production would not be affected. Therefore, impacts to groundwater supply and recharge would be less than significant, and no mitigation measures are required. Accordingly, no further analysis of groundwater supply and recharge is provided in this section.

As indicated in the 2010 revised LAX SPAS EIR Notice of Preparation/Initial Study, the project site is located approximately one-half mile east of the Pacific Ocean and is not delineated as a potential inundation or tsunami impacted area in the City of Los Angeles Inundation and Tsunami Hazard Areas map. Mudflows are not a risk as the project site is located on, and is surrounded by, relatively level terrain and urban development. Therefore, no impacts resulting from inundation by seiche, tsunami, or mudflow would occur, and no mitigation measures are required. Accordingly, no further analysis of impacts related to inundation by seiche, tsunami, and mudflow is provided in this section.

4.8.2 Methodology

The various sources and methodologies used for the hydrology and water quality analyses are consistent with the methodologies as applied in Technical Report 6, *Hydrology and Water Quality Technical Report*, and Technical Report S-5, *Supplemental Hydrology and Water Quality Technical Report*, of the LAX Master Plan Final EIR. Relevant portions of those documents are incorporated by reference and summarized in this section (see Section 1.6 in Chapter 1, *Introduction and Executive Summary*, regarding where these documents are available for public review).

This analysis compares drainage and water quality conditions projected for the SPAS alternatives to baseline (2010) conditions. The analysis estimates baseline conditions for the airport, as well as for areas proposed to be acquired as part of the SPAS alternatives, collectively referred to here as the Hydrology and Water Quality Study Area (HWQSA).

The acreage and location of land required for the SPAS alternatives differ among the alternatives. Consequently, the future boundaries of LAX would differ, depending upon the alternative. To compare baseline conditions with conditions under the SPAS alternatives, a single HWQSA was used. The HWQSA for this analysis includes the existing LAX property, the Manchester Square area, which is part of a voluntary property acquisition under LAWA's Aircraft Noise Mitigation Program,[413] and areas adjacent to LAX that would be acquired under certain of the SPAS alternatives (see Section 2.3.1.11 for description of acquisition areas).

[413] Similar to Manchester Square, the Belford residential area is also being acquired under the Aircraft Noise Mitigation Program; however, the Belford Area is not included in the hydrology and water quality analysis because none of the SPAS alternatives propose a future reuse of that area.

As described in Chapter 2, *Project Description*, Alternatives 1 through 4 include airfield, terminal, and ground access improvements. Alternatives 5 through 7 focus on airfield and terminal improvements, and Alternatives 8 and 9 focus on ground access improvements only. Alternatives 1 and 2 include the same ground access improvements, whereas the ground access improvements associated with Alternatives 3, 4, 8, and 9 are each unique. The airfield/terminal improvements associated with Alternatives 1, 2, 5, 6, and 7 could be paired with the ground access improvements associated with Alternatives 1, 2, 8, or 9. Similarly, the ground access improvements associated with Alternatives 1, 2, 8, and 9 could be paired with the airfield improvements associated with Alternatives 1, 2, 5, 6, or 7. The full impacts of any alternative must consider airfield, terminal, and ground access contributions. The airfield, terminal, and ground access improvements associated with Alternatives 3 and 4 are specific to each of those alternatives and cannot be paired with other alternatives.

Relative to hydrology and water quality, although the ground access improvements associated with Alternatives 1 and 2 differ from Alternative 8 or Alternative 9, changes in impervious area and land use types would be consistent among these alternatives and, consequently, storm water runoff and pollutant loads would be the same. As impacts associated with Alternatives 8 and 9 would be the same as the impacts associated with the ground access components of Alternatives 1 and 2, specific calculations for Alternatives 8 and 9 were not conducted. However, impacts from the ground access improvements associated with these alternatives are discussed qualitatively.

As noted above, in order to identify the full impacts of Alternatives 5 through 7, the contributions of airfield, terminal, and ground access components must be considered. Therefore, the impacts analysis for these alternatives considers storm water runoff and pollutant loads related to the specific airfield and terminal modifications associated with these alternatives as well as the storm water runoff and pollutant loads common to the ground access components of Alternatives 1, 2, 8, and 9, with which any of Alternatives 5 through 7 could be paired.

Using the common HWQSA identified above, impervious area, storm water runoff, and pollutant loads within the HWQSA were calculated (as described below) for baseline conditions and for Alternatives 1 through 7. Impacts associated with Alternatives 8 and 9 were not specifically calculated, because they would be the same as impacts associated with the ground access components of Alternatives 1 and 2.

For each of the SPAS alternatives, it is assumed that all existing buildings and infrastructure within the acquisition areas of the SPAS improvements would be demolished. Each SPAS alternative proposes a different configuration of land acquisition; that is, not all land within the HWQSA would be acquired under each alternative. While the total land area evaluated varies between alternatives, the methodology for comparison of impacts allows for an equivalent comparison.

Water quality impacts associated with dry weather flows and construction activities are evaluated qualitatively. Dry weather flows from urbanized land uses such as those at LAWA, as well as flows associated with construction activities, are largely prohibited by storm water permits and/or are intermittent and therefore not possible to quantify in an analysis.

Hydrology

The analysis of hydrology considered changes in storm water runoff (i.e., drainage flows) resulting from the SPAS alternatives. The methodology used in this analysis is described below.

The objective of the drainage analysis is to assess the potential for localized flooding to occur under any of the SPAS alternatives when compared to baseline conditions. In contrast to typical methods of evaluating drainage, this comparison is made indirectly, by using changes in impervious surface area. Typically when evaluating drainage, the peak flow rate generated from the particular land use and area 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. This method was selected in light of the fact that for all of the SPAS alternatives, the change in total impervious surface area for the entire HWQSA is relatively small (less than 5 percent) compared to the total impervious surface area of the study area under 2010 baseline conditions. As peak flow rates generated directly correlate with

impervious surface areas, and land use changes under the SPAS alternatives are available and can be compared with baseline conditions, any change in peak flow rates would also be of the same order of magnitude. Therefore, it was not necessary to conduct a detailed analysis of the entire drainage system in order to evaluate the relative significance of the various alternatives.

For this analysis, the impervious area was quantified for the areas within the HWQSA draining to the Santa Monica Bay and Dominguez Channel receiving water bodies. 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 be expected to 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, which could exceed the design capacity of the existing drainage system serving the tributary drainage area, and thereby increasing the likelihood of flooding. Therefore, for the purposes of this analysis, changes in impervious area are used as a surrogate to assess 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*.[414] 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 in the layouts of the baseline conditions and the SPAS alternatives. Details regarding the development of impervious factors used in this analysis are presented in Technical Report 6, *Hydrology and Water Quality Technical Report*, of the LAX Master Plan Final EIR.

Water Quality

The water quality analysis compares the estimated surface water pollutant loads discharged under the SPAS alternatives to surface water pollutant loads discharged under baseline conditions. The baseline conditions analysis estimates the existing on-airport pollutant load, as well as that associated with other related areas within the HWQSA. Pollutant loads associated with wet weather flows were estimated quantitatively, while pollutant loads due to dry weather flows and construction activities were addressed qualitatively by characterizing the practices that contribute to these flows. As noted previously, dry weather flows from urbanized land uses such as those at LAWA are largely prohibited by storm water permits and/or are intermittent and therefore not possible to quantify in an analysis. Both dry weather and wet weather runoff from construction activities are managed under the General Construction Permit and are also typically not quantitatively analyzed due to the short-term and transitory nature of construction.

Construction Impacts

Construction activities can create pollutant sources and can potentially affect water quality. Pollutants of concern generated during construction activities include erosion-induced sediment, nutrients, trace metals, toxic chemicals, and miscellaneous waste. Examples of pollutant sources can include exposed soil, landscaping fertilizer, vehicle fuel, and lumber. In the short-term, construction activities can adversely affect the water quality of the Santa Monica Bay and Dominguez Channel.

Operational Impacts

Wet Weather Flows

Estimating the mass of pollutant load discharged 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 HWQSA by wet weather flows are the result of non-point pollution sources. A commonly accepted method is to estimate pollutant loads on an average annual basis using average pollutant concentration data from relevant published storm water investigations and monitoring, combined with estimates of annual average runoff from the project area. The U.S. 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

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

events.[415] 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).[416] 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[417] for highways and the American Association of Airport Executives (AAAE) and the Airport Research and Development Foundation for airports.[418]

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.[419,420] 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. These data are the most current LACDPW EMCs. 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*, of the LAX Master Plan Final EIR. The EMCs used in this analysis are still valid as both the LACDPW and AAAE data sets were derived from extensive and statistically validated monitoring programs, and represent conditions similar to those that are found in the urban setting and on airports at the present time.

Implementation of the SPAS alternatives would involve both changes in land use as well as an increase in frequency of activities currently associated with existing land uses, such as increased number of aircraft or increased traffic flow. As previously discussed, the available storm water monitoring data that are used to characterize runoff typically do not account for ranges of intensity of use among similar types of land use. This is a function of the high variability of storm water runoff and quality and the ability to collect a sufficient number of samples to gain statistically significant data for a single land use type. It should be noted that the published data are generally taken from multiple similar sites that represent a range of intensity of uses. For these reasons, the quantification of annual storm water 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*,[421] 19 pollutants of concern have been identified for the Santa Monica Bay. The Santa Monica Bay Restoration Commission (SMBRC)[422] issued a Santa Monica Bay Restoration Plan in 2008,[423] which continues to identify 19 pollutants of concern for

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

416 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.

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

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

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

420 Los Angeles County, Department of Public Works, Stormwater Quality Summary Data 1994-2000, July 2002, Available: http://www.ladpw.org/wmd/NPDES/wq_data.cfm, accessed February 1, 2012.

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

422 In 2003, the Santa Monica Bay Restoration Project formally became the Santa Monica Bay Restoration Commission (SMBRC). The commission is an independent non-regulatory state agency consisting of a coalition of governments, scientists, industry, and the public.

423 Santa Monica Bay Restoration Commission, Santa Monica Bay Restoration Plan, 2008.

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 and are commonly found in runoff from urbanized land uses and/or airport land and activities based on the monitoring data previously discussed. Other pollutants of concern in the Bay are typically not detected in urban runoff. 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;[424] 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 storm water at LAX. In addition to the above pollutants, the Santa Monica Bay has also been listed for nearshore debris (trash). Pollutant loads discharged to the Santa Monica Bay and the Dominguez Channel receiving water bodies for all of the above pollutants except debris 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.[425] Debris is not easily quantified for pollutant load modeling, but is discussed and evaluated qualitatively. 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*, of the LAX Master Plan Final EIR, which is incorporated by reference (see Section 1.6 in Chapter 1, *Introduction and Executive Summary*, regarding where this information is available for public review).

Dry Weather Flows

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; building and grounds maintenance; aircraft and ground vehicle fueling, painting, stripping, and washing; limited de-icing; 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*, of the LAX Master Plan Final EIR. These include such potential pollutants as lubricating oils, hydraulic oils, degreasers, and other cleaning products; diesel and gasoline fuel; paint and painting-related materials (e.g., thinners, solvents), and the particulates from sand blasting and paint stripping; aircraft and vehicle wash waters; pollutants from loading and unloading of materials and cargo; chemicals, fuels, and other hazardous wastes; and pesticide and herbicide products use for building and grounds maintenance. The types of pollutants in dry weather flows are governed by the source of the flow, are effectively prohibited by the National Pollutant Discharge Elimination System (NPDES) permits, and are addressed by Best Management Practices (BMPs) in the Storm Water Pollution Prevention Plan (SWPPP). Hence any releases are very infrequent and intermittent and cannot be quantified. In general, changes at LAX proposed under the SPAS alternatives are not anticipated to introduce new or different activities and associated pollutants compared to baseline conditions; therefore. 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 SPAS alternatives and comparing those sources with those under baseline conditions.

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

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

4.8.3 Existing Conditions

The affected environment for this evaluation includes the HWQSA. The baseline conditions for drainage and water quality are described separately below.

Hydrology

As previously noted, the only hydrology issue considered for this analysis is drainage. Drainage is discussed as it relates specifically to the management of the systems designed to convey storm water runoff to prevent flooding as well as to the potential to cause or increase the potential for erosion or siltation. The environmental setting with respect to drainage and the potential for flooding focuses on the existing drainage system at LAX, as well as the off-site drainage facilities to which the drainage system at LAX discharges and regulatory issues that apply in designing drainage and flood control structures.

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 existing drainage system at LAX consists of catch basins, subsurface storm drains and open channels, and outfalls.[426] Relative to the SPAS project area, the principal storm water outfalls for surface water captured on the airport property are the Dominguez Channel, the Argo Drain, and the Imperial Drain.[427] The service boundaries for each of these outfalls form distinct sub-basins that collect surface water runoff. Several of these sub-basins extend off airport property and collect surface water runoff from surrounding communities. Within the airport, the 2005 LAX Conceptual Drainage Plan (CDP)[428,429] divides the Imperial sub-basin into two separate sub-basins: the Imperial sub-basin and the Pershing sub-basin. The location of these sub-basins within the HWQSA is illustrated in **Figure 4.8-1**. Surface water flow from the Argo, Pershing, and Imperial sub-basins contributes to the total surface water flow in the Santa Monica Bay Watershed, whereas the Dominguez Channel sub-basin discharges to San Pedro Bay.

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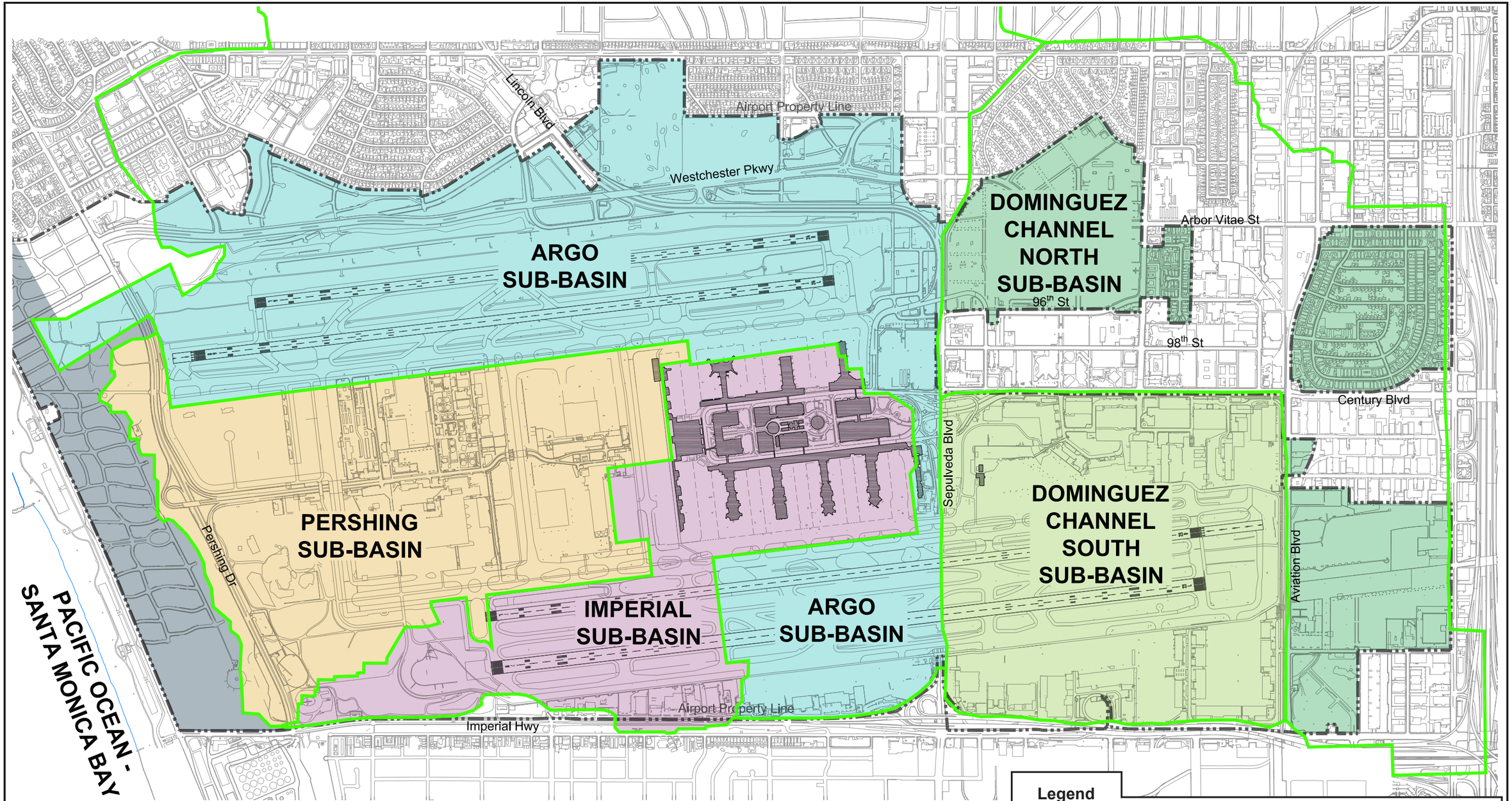
426 An outfall is the point at which drainage conveyance facilities discharge.

427 In addition to the Dominguez Channel, Argo Drain, and Imperial Drain, two other sub-basins also receive surface water runoff from airport property. These include the Culver Drain sub-basin at the northwest end of airport property and the Vista del Mar sub-basin along the western edge of airport property. These two sub-basins primarily encompass areas that were formerly developed, but are now predominantly vacant open space (i.e., the Los Angeles/El Segundo Dunes). No notable improvements are proposed within those sub-basins, other than natural habitat restoration/maintenance unrelated to SPAS; therefore, the two sub-basins are not included in the impacts analysis.

428 City of Los Angeles, Los Angeles World Airports, Los Angeles International Airport Conceptual Drainage Plan, June 2005.

429 The Conceptual Drainage Plan provides the basis by which detailed drainage improvement plans associated with LAX Master Plan projects are to be designed in conjunction with site engineering specific to each LAX Master Plan improvement project.



Source: Los Angeles World Airports, 2011.
Prepared by: CDM Smith, 2012.

LAX Specific Plan Amendment Study Draft EIR	**LAX Surface Hydrology Sub-Basins**	Figure **4.8-1**

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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 water flows from the airport. Both facilities are located in the southwest corner of the airport. Due to the small size of the water quality 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.

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*, of the LAX Master Plan Final EIR. As described in Technical Report 6, all facilities (channels, storm drain pipes, box culverts, etc.) conveying storm water flows from the airport are either below ground pipes or concrete lined channels with the exception of the on-site Argo Drainage Channel, which is partially an earthen channel. Additional descriptions of the Santa Monica Bay and San Pedro Bay receiving waters are provided in Section 4.7, *Hydrology and Water Quality*, of the LAX Master Plan Final EIR, which is incorporated by reference (see Section 1.6 in Chapter 1, *Introduction and Executive Summary*, regarding where this information is available for public review).

Previous 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 LADPW 50-year design storm under baseline conditions.[430] 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.[431] 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.

Additionally, 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 sub-basins would have been sufficient based on the hydrology studies cited. This is not likely to have been the case in the Dominquez Channel sub-basin, however, where the studies indicated conveyance capacity inadequacies, especially at the point where the Dominguez Channel sub-basin 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 Section 4.8.2 above. Using this methodology, 3,082 acres of the 3,615 acres[432] within the HWQSA (85 percent) are impervious under baseline conditions. Within the Santa Monica Bay Watershed, 1,981 acres (82 percent) are impervious and within the Dominguez Channel Watershed, 1,101 acres (91 percent) are impervious.

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.

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430 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.

431 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.

432 As noted earlier, for purposes of this analysis, the Hydrology and Water Quality Study Area includes the portions of the airport and acquisition areas that lie within the drainage sub-basins that would be potentially affected by the SPAS alternatives, namely the Argo, Pershing, Imperial, and Dominguez Channel sub-basins. As there would be no changes to hydrology or water quality associated with the Vista del Mar sub-basin or the Culver sub-basin, those sub-basins are not included in the HWQSA.

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 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 Control Plan

The agency with jurisdiction over water quality at LAX is the Los Angeles Regional Water Quality Control Board (LARWQCB). The LARWQCB developed the Water Quality Control Plan (Basin Plan) for the Los Angeles Region,[433] 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[434] (TMDL) and dry weather bacterial TMDL[435] for Santa Monica beaches. In the future, the Basin Plan will be further amended after USEPA approves recently adopted TMDLs, such as the debris TMDL for Santa Monica Bay nearshore.

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 2009, the SWRCB adopted amendments to the plan and is currently in the process of considering additional amendments that will likely be adopted in 2012.

National Pollutant Discharge Elimination System 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 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 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 system (MS4) discharges to surface waters. The airport is within the region covered by NPDES Permit No. CAS004001, last re-issued by the LARWQCB on December 13, 2001. The permit is a joint permit, with the County of Los Angeles as the "Principal Permittee" and 84 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"

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433 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.

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

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

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 associated with the NPDES Phase 1 Permit, 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 BMPs. The SUSMP program applies to specified project types.

BMPs are defined in the SUSMP as any program, technology, process, siting criteria, operational methods or measures, or engineered systems, which, when implemented, prevent, control, remove or reduce pollution.[436] The general requirements of the SUSMP include:

- Controlling peak storm water runoff discharge rates
- Conserving natural areas
- Minimizing storm water pollutants of concern
- Protecting slopes and channels
- Providing storm drain stenciling and signage
- Properly designing outdoor material storage areas
- Properly designing trash storage areas
- Providing proof of ongoing BMP maintenance

Three types of BMPs are described in the SUSMP: source control, structural, and treatment control BMPs.[437] The SUSMP also specifies design standards for structural or treatment control BMPs to either infiltrate or treat storm water runoff and to control peak flow discharge.

The Permit has been amended a number of times since 2001 to incorporate requirements of approved TMDLs and address other issues. Furthermore, the LARWQCB has been in the process of preparing a major revision and update of the MS4 Permit and adoption is currently anticipated in May 2012. One of the major changes in the New Development and Significant Redevelopment section of the Permit which will put primary emphasis on Low Impact Development (LID) practices over treatment control BMPs. LID practices place a priority on preserving the pre-development hydrology of a project site by using BMPs that store, infiltrate, evaporate, and detain runoff. Revision of the MS4 Permit will bring the Los Angeles County Permit into consistency with other MS4 permits in the state that have been adopted in the past several years.

The City of Los Angeles Board of Public Works approved the Stormwater LID Ordinance on January 15, 2010 and the ordinance was approved by the City Council on September 28, 2011. The Stormwater LID Ordinance outlines requirements for providing LID strategies for new development and redevelopment projects. Redevelopment is described as "land-disturbing activities that result in the creation, addition, or replacement of 500 square feet or more of impervious surface area on an already developed site." The ordinance requires that the site be designed to manage and capture runoff using BMPs that promote infiltration, evapotranspiration, capture and use, and/or treatment through a high removal efficiency

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436 Regional Board Executive Officer, Standard Urban Storm Water Mitigation Plan for Los Angeles County and Cities in Los Angeles County, March 8, 2000. Subsequently, the City of Los Angeles adopted an ordinance authorizing implementation of the SUSMP for public and private development projects in the City (Ordinance No. 173,494, passed by the Council of the City of Los Angeles on September 6, 2000).

437 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.

biofiltration/biotreatment system, in that order of priority, of all the runoff on-site to the maximum extent feasible. If site constraints prohibit using these methods of runoff management, other management methods are allowed, including off-site mitigation or fee payment for off-site mitigation. On July 1, 2011, the City of Los Angeles Board of Public Works adopted the *4th Edition of the Development Best Management Practices Handbook - Part B: Planning Activities* (LID Handbook), which incorporates LID principles and strategies.

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 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. For a number of years, the SWRCB has been in the process of revising and updating the Industrial Permit and a new Permit is expected to be adopted in 2012.

LAWA has prepared a SWPPP to address the permitting of storm water discharges associated with industrial activities at LAX.[438] 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 in Technical Report 6, *Hydrology and Water Quality Technical Report*, of the LAX Master Plan Final EIR.

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. The most recent update to the Construction Permit was adopted by the SWRCB in 2009 and became effective July 2010. 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.

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 TMDLs. TMDLs are the sum of the individual pollutant load allocations for point sources, nonpoint sources,[439] 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. 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. When TMDLS are adopted, particularly in California, they contain

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438 City of Los Angeles, Los Angeles World Airports, Los Angeles International Airport Storm Water Pollution Prevention Plan, September 2011.

439 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.

implementation requirements for permitted dischargers that are intended to meet the load reductions identified in the TMDL. In the case of LAX, TMDL requirements may be implemented through the MS4 Permit, the Industrial Permit, and the Construction Permit.

A list indicating which pollutants are priorities for each water body, called a 303(d) list, has been developed by the State of California, and is updated and re-adopted on a regular basis. The 303(d) list, as it has been updated over the years, indicates that both non-point and point sources of pollution degrade the water quality of Santa Monica Bay and the Dominguez Channel.[440] Once a TMDL is completed and approved for a particular water body and pollutant, it is taken off of the list at the next listing period since the implementation of the TMDL is expected to bring the water body back into compliance with the Water Quality Objectives. The TMDLs that have been completed by the LARWQCB for Santa Monica Bay and Los Angeles and Long Beach Harbors are shown in **Table 4.8-1**.

Table 4.8-1

Adopted TMDLs for Santa Monica Bay and Los Angeles/Long Beach Harbors

Water Body	Pollutant(s)	Status
Santa Monica Bay	Dry Weather Bacteria	TMDL in effect 2002
	Wet Weather Bacteria	TMDL in effect 2002
	Debris	Approved by SWRCB 2011
Los Angeles and Long Beach Harbors	Toxics and Metals	Approved by SWRCB 2012

Source: CDM Smith, 2012.

A revised 303(d) list was approved by SWRCB in July 2009. On this list, pollutants and TMDL priority schedules have been assigned that differ from the previous 303(d) list developed by the SWRCB in February 2003. The pollutants and expected TMDL completion date for Santa Monica Bay Offshore and Nearshore and the Dominguez Channel (Estuary to Vermont Avenue) are shown in **Table 4.8-2** and **Table 4.8-3**, respectively. Expected completion schedule dates were established by the SWRCB based on a combination of factors that include 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. While the 2009 list included debris for Santa Monica Bay Nearshore and metals and toxics for Los Angeles and Long Beach Harbors, these are not shown in the tables as the TMDLs have been adopted since the listing.

Table 4.8-2

Future TMDL Completion Schedule for Santa Monica Bay Offshore and Nearshore

Pollutant/Stressor	Expected Completion
Dichlorodiphenyltrichloroethane (DDT) (tissue and sediment)	01/01/2019
Fish Consumption Advisory	01/01/2019
Polychlorinated Biphenyls (PCBs) (tissue and sediment)	01/01/2019
Sediment Toxicity	01/01/2019

Source: State of California, State Water Resources Control Board, July 19, 2009.

[440] California State Water Resources Control Board, 2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) - Statewide, 2010 California 303(d) List of Water Quality Limited Segments, 2010, Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml, accessed February 5, 2012.

Table 4.8-3

Future TMDL Completion Schedule for Dominguez Channel (Estuary to Vermont Avenue)

Pollutant/Stressor	Expected Completion
Ammonia	01/01/2019
Benthic Community Effects	01/01/2019
Benzo[a]pyrene (3,4-Benzopyrene -7-d)	01/01/2019
Benzo[a]anthracene	01/01/2019
Chlordane (tissue)	01/01/2019
Chrysene (C1-C4)	01/01/2019
Coliform Bacteria	01/01/2007
DDT (tissue and sediment)	01/01/2019
Dieldrin (tissue)	01/01/2019
Lead (tissue)	01/01/2019
PCBs	01/01/2019
Phenanthrene	01/01/2019
Pyrene	01/01/2019
Sediment Toxicity	01/01/2021
Zinc (sediment)	01/01/2019

Source: State of California, State Water Resources Control Board, July 19, 2009.

Receiving Bodies of Water

There are no natural streams or rivers within the HWQSA. Surface water flows that are generated within the HWQSA 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 the Dominguez Channel. 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).[441] 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 Plan - 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.[442] These pollutants include toxic organic compounds, heavy metals, pathogens,

441 The Santa Monica Bay Restoration Project formally became the Santa Monica Bay Restoration Commission (SMBRC) in 2003.

442 Santa Monica Bay Restoration Project, Characterization Study of the Santa Monica Bay Restoration Plan - State of the Bay

nutrients, sediments, trash and debris, oil and grease, and others. A subsequent update in 2008 to the Santa Monica Bay Restoration Plan re-affirmed the 19 pollutants of concern in Santa Monica Bay as identified in the original plan. Sources for the pollutants of concern in 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.[443] Urban runoff continues to be a major source of pollutants impacting the water quality in Santa Monica Bay.[444]

According to the SWRCB 1994 *Water Body Fact Sheet* and the LARWQCB, the waters of Santa Monica Bay have been assigned an impaired rating.[445] 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 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. 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.[446]

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 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, and 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*, of the LAX Master Plan Final EIR.

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 Section 4.8.2 above, are presented in **Table 4.8-4**. Detailed pollutant load calculations for baseline conditions are presented in Appendix H, *Hydrology and Water Quality*.

1993, January 1994.

443 Santa Monica Bay Restoration Project, Taking the Pulse of the Bay - State of the Bay 1998, April 1998.

444 Santa Monica Bay Restoration Commission, Santa Monica Bay Restoration Plan, 2008.

445 State Water Resources Control Board, Water Body Fact Sheet, May 18, 1994.

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

Table 4.8-4

Average Annual Pollutant Loads, Baseline (2010) Conditions

Pollutant	Estimated Average Annual Pollutant Loads (lb/yr)		
	Santa Monica Bay	Dominguez Channel	Total Pollutant Load
Total Suspended Solids	155,356.9	112,404.4	267,761.3
Total Phosphorus	1,103.9	654.4	1,758.2
Total Kjeldahl Nitrogen	4,944.8	3,199.4	8,144.2
Total Copper	242.4	129.0	371.3
Total Lead	42.4	25.1	67.5
Total Zinc	1,250.8	737.0	1,987.8
Oil and Grease	9,823.1	5,422.0	15,245.1
5-Day Biochemical Oxygen Demand	34,319.7	21,656.4	55,976.1
Chemical Oxygen Demand	2.00E+05	120,950.1	321,324.8
Ammonia	1.28E+03	771.7	2,047.2
Total Coliform Bacteria[1]	1.66E+11	95.3E+9	2.6E+11
Fecal Coliform Bacteria[1]	7.88E+10	47.5E+9	1.3E+11
Fecal Enterococcus Bacteria[1]	7.70E+09	7.6E+9	1.5E+10

Note:

Totals may not add due to rounding.

[1] Expressed in organisms/year.

Source: CDM Smith, 2012.

Dry Weather Flows

Sources of dry weather flows for airports include outdoor maintenance of vehicles; building and grounds maintenance; aircraft and ground vehicle fueling, painting, stripping, and washing; limited de-icing; 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*, of the LAX Master Plan Final EIR.

4.8.4 Thresholds of Significance

Hydrology

A significant hydrology impact would occur if the direct and indirect changes in the environment that may be caused by the particular SPAS alternative would 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 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 are based on the L.A. CEQA Thresholds Guide and Appendix G of 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 the particular SPAS alternative would result in the following future condition:

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

The threshold is based on guidance contained in the L.A. CEQA Thresholds Guide and addresses the characteristics of the SPAS alternatives with the potential to result in water quality impacts.

4.8.5 Applicable LAX Master Plan Commitments and Mitigation Measures

As part of the LAX Master Plan, one commitment and one mitigation measure pertaining to hydrology and water quality (denoted with "HWQ") were adopted in the Alternative D Mitigation Monitoring and Reporting Program (MMRP). The commitment is applicable to the SPAS alternatives and was considered in the hydrology and water quality analysis herein.

- **HWQ-1. Conceptual Drainage Plan.**

  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 guidelines and to the satisfaction of the LADPW, 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, and 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 from which detailed drainage improvement plans will be designed in conjunction with site engineering specific to each Master Plan project. 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.[447]

  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 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

[447] Subsequent to approval of the LAX Master Plan, LAWA prepared the CDP for the LAX Master Plan in accordance with the provisions of LAX Master Plan Commitment HWQ-1.

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 stormwater 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. Performance of structural BMPs varies considerably based on their design. USEPA has published estimated ranges of pollutant removal efficiencies for structural BMPs based on substantial document review.

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.

4.8.6 Impacts Analysis

This section describes the environmental impacts specific to the SPAS alternatives as they relate to hydrology (drainage) 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, and the potential to substantially alter the existing drainage pattern of the site or area through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site. As described in Section 4.8.2 above, the drainage analysis is based on calculations of total impervious area. Detailed land use designations and impervious area calculations and results for the SPAS alternatives are presented in Appendix H, *Hydrology and Water Quality*. A summary of impervious area values by land use that are used as the indicator for potential for hydrology impacts for the baseline conditions and for each SPAS alternative are presented in **Table 4.8-5**.

The water quality analysis estimates the storm water pollutant loads 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 SPAS alternatives. As described in Section 4.8.2 above, storm water pollutant loads are based on EMC data and calculations of annual runoff volumes. Detailed land use designations, average annual runoff volumes, pollutant load calculations and results for Alternatives 1 through 7 are presented in Appendix H, *Hydrology and Water Quality*. As noted in Section 4.8.2, above, impacts of Alternatives 8 and 9 on hydrology and water quality were not calculated, as the impacts of these alternatives are accounted for in the analysis of the other alternatives. However, the effects of changes in land use and impervious area associated with these alternatives are evaluated on a qualitative basis below. A summary of the storm water pollutant loading related to the Alternatives 1 through 7 is presented in **Table 4.8-6**. Water quality impacts associated with dry weather flows and construction activities are evaluated qualitatively.

4.8.6.1 Alternative 1

Under Alternative 1, there would be improvements to the airfield, terminal, and ground access as described in Chapter 2, *Project Description*. The distinguishing changes associated with this alternative relative to hydrology and water quality are the northerly movement and westerly extension of Runway 6L/24R, conversion of the unlined Argo Drainage Channel into a concrete box culvert (9,857 linear feet), conversion of open space to accommodate the realignment of Lincoln Boulevard, conversion of industrial area for the Intermodal Transportation Facility (ITF), and conversion of the Manchester Square area to parking use.

Hydrology

Under Alternative 1, the total impervious area within the HWQSA would increase by approximately 92 acres as compared to baseline conditions of 3,082 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 (3.0 percent) 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 32 acres or 1.6 percent, occurring primarily within the Argo sub-basin due to the runway and taxiway improvements, while the impervious area within the Dominguez Channel Watershed would increase by 61 acres or 5.5 percent (see Table 4 in Appendix H, *Hydrology and Water Quality*).

Table 4.8-5

Total Impervious Area and Percent Change within the HWQSA Baseline (2010) Conditions, Alternatives 1 through 7

		Impervious Area (acres)													
Area	2010 Baseline	Alt. 1	Change from Baseline (%)	Alt. 2	Change from Baseline (%)	Alt. 3	Change from Baseline (%)	Alt. 4	Change from Baseline (%)	Alt. 5	Change from Baseline (%)	Alt. 6	Change from Baseline (%)	Alt. 7	Change from Baseline (%)
Santa Monica Bay	1,981	2,013	1.6	1,981	0.0	2,009	1.4	1,981	0.0	2,024	2.1	1,993	0.6	1,981	0.0
Dominguez Channel	1,101	1,162	5.5	1,162	5.5	1,178	7.0	1,117	1.5	1,162	5.5	1,162	5.5	1,162	5.5
HWQSA	3,082	3,174	3.0	3,143	2.0	3,187	3.4	3,098	0.5	3,185	3.3	3,155	2.4	3,143	2.0

Source: CDM Smith, 2012.

Table 4.8-6

Estimated Average Annual Pollutant Loads and Percent Change Within HWQSA - Baseline (2010) Conditions, Alternatives 1 through 7

	Total Pollutant Load (lb/yr)														
Pollutant	2010 Baseline	Alt. 1	Change from Baseline (%)	Alt. 2	Change from Baseline (%)	Alt. 3	Change from Baseline (%)	Alt. 4	Change from Baseline (%)	Alt. 5	Change from Baseline (%)	Alt. 6	Change from Baseline (%)	Alt. 7	Change from Baseline (%)
Total Suspended Solids	267,761	236,371	-11.7	239,031	-10.7	224,728	-16.1	251,139	-6.2	236,777	-11.6	235,650	-12.0	239,027	-10.7
Total Phosphorus	1,758	1,794	2.0	1,777	1.1	1,783	1.4	1,753	-0.3	1,799	2.3	1,785	1.5	1,777	1.1
Total Kjeldahl Nitrogen	8,144	8,166	0.3	8,091	-0.6	8,018	-1.6	8,028	-1.4	8,189	0.5	8,125	-0.2	8,091	-0.7
Total Copper	371	390	4.9	385	3.7	392	5.7	375	1.0	391	5.2	387	4.3	385	3.7
Total Lead	67	70	3.7	69	2.5	70	3.1	67	-0.3	70	4.1	70	3.2	69	2.5
Total Zinc	1,988	2,060	3.6	2,036	2.4	2,044	2.8	1,970	-0.9	2,066	4.0	2,049	3.1	2,026	1.9
Oil and Grease	15,245	15,997	4.9	15,798	3.6	16,058	5.3	15,364	0.8	16,045	5.2	15,910	4.4	15,719	3.1
5-Day Biochemical Oxygen Demand	55,976	55,268	-1.3	54,964	-1.8	54,456	-2.7	55,140	-1.5	55,408	-1.0	55,018	-1.7	54,737	-2.2
Chemical Oxygen Demand	321,325	328,690	2.3	325,147	1.2	325,916	1.4	320,113	-0.4	329,667	2.6	326,956	1.8	323,572	0.7
Ammonia	2,047	2,090	2.1	2,068	1.0	2,071	1.2	2,033	-0.7	2,096	2.4	2,079	1.5	2,058	0.5
Total Coliform Bacteria[1]	2.61E+11	2.72E+11	4.0	2.68E+11	2.7	2.72E+11	4.0	2.64E+11	0.9	2.73E+11	4.3	2.70E+11	3.4	2.68E+11	2.7
Fecal Coliform Bacteria[1]	1.26E+11	1.30E+11	3.0	1.29E+11	1.7	1.29E+11	2.4	1.27E+11	0.4	1.31E+11	3.3	1.29E+11	2.4	1.29E+11	1.7
Fecal Enterococcus Bacteria[1]	1.53E+10	1.40E+10	-8.0	1.39E+10	-9.0	1.30E+10	-14.6	1.50E+10	-1.5	1.41E+10	-7.8	1.40E+10	-8.5	1.39E+10	-9.0

[1] Expressed in organisms/year.

Source: CDM Smith, 2012.

Previous studies indicate that, under baseline conditions, the conveyance capacity of drainage infrastructure within the Argo sub-basin and the Imperial sub-basin (in this case, including both the Pershing and Imperial components of the sub-basin) is adequate for the LADPW 50-year storm, while the Dominguez Channel sub-basin infrastructure would flood under these same conditions.[448,449] Detailed analysis of the Argo and Imperial sub-basins and the Dominguez Channel sub-basin capacities under this design storm for Alternative 1 was not conducted, given the conceptual level of planning associated with all SPAS alternatives at this time as discussed in Section 4.8.2. As shown in **Table 4.8-5**, the increase in impervious surface in the portion of the HWQSA tributary to Santa Monica Bay, which includes both the Argo and Imperial sub-basins, is 1.6 percent, which would result in a very small net increase in peak flow rates to be conveyed by the drainage systems serving these areas. It is possible that this increase could cause one or more existing on-site or off-site storm drains to reach or exceed the design capacity, which would be a significant impact. Also as shown in **Table 4.8-5**, the increase in impervious surface in the portion of the HWQSA tributary to Dominguez Channel is 5.5 percent, which would result in a net increase in peak flow rates to be conveyed by the drainage systems serving these areas. As previously noted, the Dominguez Channel is currently over capacity off-site and downstream from LAX; therefore, a 5.5 percent increase in peak flow rates from LAX, which represents a portion of the total tributary area to the Dominguez Channel, would add to the capacity deficiency, which would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including improvements designed to address deficiencies, if any, in the drainage system that would occur at buildout of the LAX Master Plan. Such improvements would reduce flooding impacts associated with development of Alternative 1; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, flooding impacts of Alternative 1 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the hydrology impacts associated with Alternative 1 would be less than significant.

Under Alternative 1, all facilities receiving and conveying storm water from the airport would be below ground pipes or concrete lined, including the Argo Drainage Channel, which would be structurally covered to support the weight of an aircraft for its entire length. 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 and the impact of erosion or siltation due to runoff from the airport would be less than significant for all drainage facilities.

Water Quality

Storm Water Pollutant Loads

Under Alternative 1, the estimated annual total pollutant load generated within the HWQSA would increase for most constituents compared to baseline conditions. Specifically, greater estimated loads are predicted for all constituents except for total suspended solids, 5-day Biochemical Oxygen Demand (BOD_5), and fecal enterococcus bacteria when compared to baseline conditions. The increases in estimated loads would range from 0.3 percent for total Kjeldahl Nitrogen to 4.9 percent for copper and oil and grease.

With respect to debris loads, activities within airfield improvement areas are not a significant generator of debris compared to the potential load generated within ground access improvement areas (e.g., parking lots). Within the airport improvement areas, there is no public access to these areas so sources of debris are minimal compared to public access areas. Additionally, debris sources are minimized as a result of

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448 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.

449 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.

implementation of source control measures conducted by LAWA and its tenants under the SWPPP. Alternative 1 does include ground access improvements which could potentially increase debris loads. The complete model results are presented in Table 6 in Appendix H, *Hydrology and Water Quality*. The increases in pollutant loads would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce the water quality impacts associated with development of Alternative 1; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, pollutant load increases associated with Alternative 1 are assumed to be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations, including BMPs, to the specific characteristics of the selected SPAS alternative. As part of the update to the existing Conceptual Drainage Plan for LAX, LAWA would integrate the applicable BMP requirements related to SUSMP and the City's LID Ordinance. Additionally, 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. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the water quality impacts associated with Alternative 1 would be less than significant.

Dry Weather Flows

As discussed in Section 4.8.2, 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 de-icing; and chemical and fuel transport and storage. While implementation of Alternative 1, would not in itself result in an intensification of such airport-related activities, the natural growth in airport activity projected to occur by 2025 (i.e., growth from 56.5 million annual passengers (MAP) in 2009 to 78.9 MAP in 2025 under all alternatives) would increase such activities. These activities would likely result in an increase in the source of pollutants within the HWQSA and the potential for release of dry weather flows containing pollutants. However, LAWA and its tenants would continue to implement measures required under the SWPPP and periodically update the SWPPP as necessary to reflect the current conditions and level of activity to prevent or minimize the introduction of pollutants and discharge of dry weather flows.

In addition, Within the Santa Monica Bay Watershed, the Imperial retention basin is designed to capture dry weather flows. While the increase potential for spills and leaks as a result of increasing level of activity under all alternatives could result in an increase in pollutant loads to receiving water bodies, compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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

As required under the SWRCB General Permit for Construction Activities, LAWA has prepared stormwater BMP guidance instructions in the Design and Construction Handbook applicable to airport improvement projects.[450] This document outlines the procedures for preparing and implementing a construction SWPPP before beginning any construction operations so that the activities are in compliance with the general permit. These requirements include:

[450] City of Los Angeles, Los Angeles World Airports, Design and Construction Handbook, June 2011.

- Developing and implementing a construction SWPPP, specifying BMPs that will prevent all construction pollutants from contacting storm water with the intent of keeping all products of erosion from moving off-site into receiving waters
- Eliminating or reducing non-storm water discharges to storm sewer systems and surface waters
- Performing inspections of all BMPs

Temporary construction BMPs specified in the manual 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
- Contractors' 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

Construction under Alternative 1 would likely create sources of pollution that would affect water quality if not controlled through implementation of BMPs. Since the improvements under this alternative would affect an area greater than one acre, LAWA's existing construction policy would require the development of project-specific construction SWPPPs in compliance with the state's construction permit. Temporary construction BMPs that would likely be considered and incorporated into each project-specific SWPPP, as appropriate, could 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 and any additional BMPs required in project-specific construction SWPPPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.2 Alternative 2

Under Alternative 2, there would be improvements to the airfield, terminal, and ground access as described in Chapter 2, *Project Description*. Airfield improvements associated with this alternative would not result in changes in land use types or impervious areas, nor would modifications to the Argo Drainage Channel be required (other than those required under existing conditions to meet federal Runway Safety Area requirements, such as providing the necessary safety clearances at the east end of Runway 6L/24R). The distinguishing changes associated with Alternative 2 relative to hydrology and water quality include conversion of industrial uses to the uses associated with the ITF, and conversion of the Manchester Square area to parking use.

Hydrology

Under Alternative 2, the total impervious area within the HWQSA would increase by 61 acres as compared to baseline conditions of 3,082 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 (2.0 percent) in regional impervious area.

The changes in impervious area would only occur within the Dominguez Channel Watershed, and would represent an increase of 5.5 percent (see Table 7 in Appendix H, *Hydrology and Water Quality*).

Previous studies indicate that, under baseline conditions, the conveyance capacity of drainage infrastructure within the Argo sub-basin and Imperial sub-basin (including both the Pershing and Imperial components of the sub-basin) is adequate for the LADPW 50-year storm, while the Dominguez Channel sub-basin infrastructure would flood under these same conditions.[451,452] Detailed analysis of the Dominguez Channel sub-basin capacities under this design storm for Alternative 2 was not conducted, given the conceptual level of planning associated with all SPAS alternatives at this time as discussed in Section 4.8.2. As shown in **Table 4.8-5**, the increase in impervious surface in the portion of the HWQSA tributary to Dominguez Channel is 5.5 percent, which would result in a net increase in peak flow rates to be conveyed by the drainage systems serving these areas. As previously noted, the Dominguez Channel is currently over capacity off-site and downstream from LAX; therefore, a 5.5 percent increase in peak flow rates from LAX, which represents a portion of the total tributary area to the Dominguez Channel, would add to the capacity deficiency, which would be a significant impact. Since there would be no change in impervious area within the Santa Monica Bay Watershed, no increase in storm water peak flow rates would be associated with this alternative and no significant hydrology impact would occur.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including improvements designed to address deficiencies, if any, in the drainage system that would occur at buildout of the LAX Master Plan. Such improvements would reduce flooding impacts associated with development of Alternative 2; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, flooding impacts of Alternative 2 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the hydrology impacts associated with Alternative 2 would be less than significant.

Under Alternative 2, all facilities receiving and conveying storm water from the airport, with the exception of the existing Argo Drainage Channel, would be below ground pipes or concrete lined 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 for these facilities. Under this alternative, only the easterly 750 linear feet of the channel would be structurally covered. The remainder of the channel would remain unlined. However, as there would be no net increase in the area of impervious surface within the portion of the HWQSA draining to Santa Monica Bay under this alternative, the peak flow rate is not expected to increase in the Argo Drainage Channel, and the potential for erosion and siltation of the channel is not expected to change. Therefore, the impact of erosion or siltation due to runoff from the airport would be less than significant for all drainage facilities.

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451 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.

452 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.

Water Quality

Storm Water Pollutant Loads

Under Alternative 2, the estimated annual total pollutant load generated within the HWQSA would increase for most constituents except for total suspended solids, total Kjeldahl Nitrogen, BOD_5, and fecal enterococcus bacteria compared to baseline conditions. These increases would only occur within the Dominguez Channel Watershed. The estimated increased loads would range from 1.0 percent for ammonia to 3.7 percent for copper.

With respect to debris loads, activities within airfield improvement areas are not a significant generator of debris compared to the potential load generated within ground access improvement areas (e.g., parking lots). Within the airport improvement areas, there is no public access to these areas so sources of debris are minimal compared to public access areas. Additionally, debris sources are minimized as a result of implementation of source control measures conducted by LAWA and its tenants under the SWPPP. Alternative 2 does include ground access improvements which could potentially increase debris loads. The complete model results are presented in Table 9 in Appendix H, *Hydrology and Water Quality*. The increases in pollutant loads would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce the water quality impacts associated with development of Alternative 2; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, pollutant load increases associated with Alternative 2 are assumed to be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations, including BMPs, to the specific characteristics of the selected SPAS alternative. As part of the update to the existing Conceptual Drainage Plan for LAX, LAWA would integrate the applicable BMP requirements related to SUSMP and the City's LID Ordinance. Additionally, 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. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the water quality impacts associated with Alternative 2 would be less than significant.

Dry Weather Flows

Impacts associated with dry weather flows under Alternative 2 would be similar to Alternative 1. As with Alternative 1, under Alternative 2, natural growth in airport activity projected to occur by 2025 could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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 improvements under Alternative 2 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 identified under Alternative 1. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.3 Alternative 3

Under Alternative 3, there would be improvements to the airfield, terminal, and ground access as described in Chapter 2, *Project Description*. This alternative reflects the improvements of the approved LAX Master Plan and consists of implementation of all components of the LAX Master Plan, including the "Yellow Light Projects" and associated improvements. The distinguishing changes associated with this alternative relative to hydrology and water quality are the conversion of airport open space for the West Employee Parking facility and westerly extension of Runway 6L/24R, industrial area for a portion of the Consolidated Rental Car Facility (CONRAC), the Manchester Square area for the Ground Transportation Center (GTC), and the Continental City area for the Intermodal Transportation Center (ITC). There would be no modifications to the Argo Drainage Channel (other than those required under existing conditions to meet federal Runway Safety Area requirements, such as providing the necessary safety clearances at the east end of Runway 6L/24R) or Lincoln Boulevard under this alternative.

Hydrology

Under Alternative 3, the total impervious area within the HWQSA would increase by 105 acres as compared to baseline conditions of 3,082 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 (3.4 percent) 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 28 acres or 1.4 percent, occurring primarily within the Argo sub-basin due to the runway and taxiway improvements and also in the Pershing sub-basin due to the West Employee Parking facility, while the impervious area within the Dominguez Channel Watershed would increase by 77 acres or 7.0 percent (see Table 10 in Appendix H, *Hydrology and Water Quality*).

In conjunction with implementation of LAX Master Plan Commitment HWQ-1, which followed approval of Alternative D for the LAX Master Plan, the resultant Conceptual Drainage Plan identified four drainage areas that would be deficient in accommodating increased flows associated with LAX Master Plan improvements. Those areas included a storm drain within the Argo sub-basin south of Runway 6R/24L, a storm drain in the Pershing sub-basin west of TBIT, a storm drain in the Dominguez North sub-basin within 96th Street from Parking Lot C to Airport Boulevard, and storm drains in the Dominguez South sub-basin near the aircraft maintenance area and Runway 7L/25R. Recommended improvements specific to each of those future drainage deficiencies are identified in the Conceptual Drainage Plan, including replacement of specific segments of storm drain line with larger diameter lines. Such drainage system improvements would be implemented in conjunction with development of the nearby LAX Master Plan improvements. Given that the improvements assumed within Alternative 3 are the same as those of LAX Master Plan Alternative D, implementation of Alternative 3 would contribute to the drainage system deficiencies identified in the Conceptual Drainage Plan; however, drainage system improvements specific to those deficiencies are also delineated within the existing Conceptual Drainage Plan. As such, implementation of Alternative 3, with completion of the storm drain system improvements identified in the existing LAX Conceptual Drainage Plan, would not result in an increase in runoff that would cause or exacerbate flooding with the potential to harm people or damage property and there would be no significant impact related to drainage.

Under Alternative 3, all facilities receiving and conveying storm water from the airport, including the storm drain system improvements noted above, with the exception of the existing Argo Drainage Channel, would be below ground pipes or concrete lined 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 for these facilities. Under Alternative 3, only the easterly 750 linear feet of the Argo Drainage Channel would be structurally covered (converted to a concrete box culvert). The remainder of the channel would remain unlined. Under this alternative, there would be a slight (1.6 percent) increase in the impervious surface area of the portion of the area draining to Santa Monica Bay. This would result

in a slight increase in both the peak flow rate and the corresponding peak velocity of storm water runoff discharging through the channel. It is possible that this increase could result in velocities that would cause erosion of the unlined portion of the channel. For that area, the impact is assumed to be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. The Conceptual Drainage Plan Revision and Update will also examine the potential for erosion in the Argo Drainage Channel and, if necessary, develop recommendations to address erosion. With implementation of MM-HWQ (SPAS)-1, the erosion and sediment impacts associated with Alternative 3 would be less than significant.

Water Quality

Storm Water Pollutant Loads

Under Alternative 3, the estimated annual total pollutant load generated within the HWQSA would increase for most constituents except for total suspended solids, total Kjeldahl Nitrogen, BOD5, and fecal enterococcus bacteria compared to baseline conditions. The estimated increased loads would range from 1.2 percent for ammonia to 5.7 percent for copper.

With respect to debris loads, activities within airfield improvement areas are not a significant generator of debris compared to the potential load generated within ground access improvement areas (e.g., parking lots). Within the airport improvement areas, there is no public access to these areas so sources of debris are minimal compared to public access areas. Additionally, debris sources are minimized as a result of implementation of source control measures conducted by LAWA and its tenants under the SWPPP. Alternative 3 does include ground access improvements which could potentially increase debris loads. The complete model results are presented in Table 12 in Appendix H, *Hydrology and Water Quality*. The increases in pollutant loads would be a significant impact.

In order to prevent an increase in pollutant loads discharged from the LAX property under Alternative 3, LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce the water quality impacts associated with development of Alternative 3 to a level that is less than significant.

Dry Weather Flows

Impacts associated with dry weather flows under Alternative 3 would be similar to Alternative 1. As with Alternative 1, under Alternative 3, natural growth in airport activity projected to occur by 2025 could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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 improvements under Alternative 3 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 identified under Alternative 1. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.4 Alternative 4

Alternative 4 consists of limited airfield and ground access improvements. Airfield improvements associated with this alternative would not result in changes in land use types or impervious areas, nor would modifications to the Argo Drainage Channel be required (other than those required under existing conditions to meet federal Runway Safety Area requirements, such as providing the necessary safety clearances at the east end of Runway 6L/24R). The distinguishing changes associated with Alternative 4 relative to hydrology and water quality include conversion of industrial uses for the a portion of the CONRAC, and the Continental City area to parking use. There would be no modifications to Lincoln Boulevard under this alternative.

Hydrology

Under Alternative 4, the total impervious area within the HWQSA would increase by 16 acres as compared to baseline conditions of 3,082 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 (0.5 percent) in regional impervious area.

The change in impervious area would only occur within the Dominguez Channel Watershed, and would represent an increase of 1.5 percent (see Table 13 in Appendix H, *Hydrology and Water Quality*).

As noted above, previous studies indicate that, under baseline conditions, the conveyance capacity of drainage infrastructure within the Argo sub-basin and Imperial sub-basin (including both the Pershing and Imperial components of the sub-basin) is adequate for the LADPW 50-year storm, while the Dominguez Channel sub-basin infrastructure would flood under these same conditions. Since there would be no change in impervious area within the Santa Monica Bay Watershed, no increase in storm water peak flow rates would be associated with this alternative and no significant hydrology impact would occur to that watershed. However, within the Dominguez Channel Watershed, increases in impervious area and the associated increase in storm water peak flow rates would add to the capacity deficiency, which would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including improvements designed to address deficiencies, if any, in the drainage system that would occur at buildout of the LAX Master Plan. Such improvements would reduce flooding impacts associated with development of Alternative 4; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, flooding impacts of Alternative 4 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the hydrology impacts associated with Alternative 4 would be less than significant.

Under Alternative 4, all facilities receiving and conveying storm water from the airport, with the exception of the existing Argo Drainage Channel, would be below ground pipes or concrete lined 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 for these facilities. Under this alternative, only the easterly 750 linear feet of the channel would be structurally covered. The remainder of the channel would remain unlined. However, as there would be no net increase in the area of impervious surface within the portion of the HWQSA draining to Santa Monica Bay under this alternative, the peak flow rate is not expected to increase in the Argo Drainage Channel, and the potential for erosion and siltation of the channel is not expected to change. Therefore, the impact of erosion or siltation due to runoff from the airport would be less than significant for all drainage facilities.

Water Quality

Storm Water Pollutant Loads

Under Alternative 4, the estimated annual total pollutant load generated within the HWQSA would decrease for most constituents except for total copper, oil and grease, total coliform bacteria, and fecal coliform bacteria compared to baseline conditions. These increases would only occur within the Dominguez Channel Watershed. The estimated increased loads would range from 0.4 percent for fecal coliform bacteria to 1.0 percent for copper.

With respect to debris loads, activities within airfield improvement areas are not a significant generator of debris compared to the potential load generated within ground access improvement areas (e.g., parking lots). Within the airport improvement areas, there is no public access to these areas so sources of debris are minimal compared to public access areas. Additionally, debris sources are minimized as a result of implementation of source control measures conducted by LAWA and its tenants under the SWPPP. Alternative 4 does include ground access improvements which could potentially increase debris loads. The complete model results are presented in Table 15 in Appendix H, *Hydrology and Water Quality*. The increases in pollutant loads would be a significant impact.

The changes in pollutant loads under this alternative are associated with conversion of industrial uses within the acquisition areas to a portion of the CONRAC. As the CONRAC under this alternative is the same facility as that in the approved LAX Master Plan, the BMPs contained in the CDP, in conjunction with other measures, including SUSMP and LID requirements, would address water quality impacts associated with Alternative 4. LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce the water quality impacts associated with development of Alternative 4; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, pollutant load increases associated with Alternative 4 are assumed to be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations, including BMPs, to the specific characteristics of the selected SPAS alternative. As part of the update to the existing Conceptual Drainage Plan for LAX, LAWA would integrate the applicable BMP requirements related to SUSMP and the City's LID Ordinance. Additionally, 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. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the water quality impacts associated with Alternative 4 would be less than significant.

Dry Weather Flows

Impacts associated with dry weather flows under Alternative 4 would be similar to Alternative 1. As with Alternative 1, under Alternative 4, natural growth in airport activity projected to occur by 2025 could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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 improvements under Alternative 4 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 identified under Alternative 1. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.5 Alternative 5

Alternative 5 focuses on airfield and terminal improvements only. However, as noted in Section 4.8.2, for purposes of this analysis, impacts associated with ground access improvements are also considered. The distinguishing changes considered in this analysis relative to hydrology and water quality are the northerly movement and westerly extension of Runway 6L/24R, conversion of the unlined Argo Drainage Channel into a concrete box culvert (9,857 linear feet), conversion of open space to accommodate the realignment of Lincoln Boulevard, conversion of industrial area for the ITF, and conversion of the Manchester Square area to parking use.

Hydrology

Under Alternative 5, the total impervious area within the HWQSA would increase by approximately 103 acres as compared to baseline conditions of 3,082 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 (3.3 percent) in regional impervious area.

The impervious area within the Santa Monica Bay Watershed would increase by 43 acres or approximately 2.1 percent, occurring primarily within the Argo sub-basin due to the runway and taxiway improvements, while the impervious area within the Dominguez Channel Watershed would increase by 61 acres or 5.5 percent (see Table 16 in Appendix H, *Hydrology and Water Quality*).

As noted above, previous studies indicate that, under baseline conditions, the conveyance capacity of drainage infrastructure within the Argo sub-basin and Imperial sub-basin (including both the Pershing and Imperial components of the sub-basin) is adequate for the LADPW 50-year storm, while the Dominguez Channel sub-basin infrastructure would flood under these same conditions. Detailed analysis of the Argo and Dominguez Channel sub-basin capacities under this design storm for Alternative 5 was not conducted given the conceptual level of planning associated with all SPAS alternatives at this time. However, increases in impervious area in the Argo and Dominguez Channel sub-basins, and the associated increase in storm water peak flow rates, could exceed the capacity of the storm water facilities in these sub-basins, resulting in flooding. This would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including improvements designed to address anticipated deficiencies in the drainage system that would occur at buildout of the LAX Master Plan. Such improvements would reduce flooding impacts associated with development of Alternative 5; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, flooding impacts of Alternative 5 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the hydrology impacts associated with Alternative 5 would be less than significant.

Under Alternative 5, all facilities receiving and conveying storm water from the airport would be below ground pipes or concrete lined, including the Argo Drainage Channel, which would be structurally covered to support the weight of an aircraft for its entire length. 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 and the impact of erosion or siltation due to runoff from the airport would be less than significant for all drainage facilities.

Water Quality

Storm Water Pollutant Loads

Under Alternative 5, the estimated annual total pollutant load generated within the HWQSA would increase for most constituents compared to baseline conditions. Specifically, greater estimated loads are predicted for all constituents except for total suspended solids, BOD_5, and fecal enterococcus bacteria compared to baseline conditions. The increases in estimated loads would range from 0.5 percent for total Kjeldahl Nitrogen to 5.2 percent for copper and oil and grease.

With respect to debris loads, activities within airfield improvement areas are not a significant generator of debris compared to the potential load generated within ground access improvement areas (e.g., parking lots). Within the airport improvement areas, there is no public access to these areas so sources of debris are minimal compared to public access areas. Additionally, debris sources are minimized as a result of implementation of source control measures conducted by LAWA and its tenants under the SWPPP. Alternative 5 does not include ground access improvements, so debris loads are not expected to increase. The complete model results are presented in Table 18 in Appendix H, *Hydrology and Water Quality*. The increases in pollutant loads would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce water quality impacts associated with development of Alternative 5; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, pollutant load increases associated with Alternative 5 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations, including BMPs, to the specific characteristics of the selected SPAS alternative. As part of the update to the existing Conceptual Drainage Plan for LAX, LAWA would integrate the applicable BMP requirements related to SUSMP and the City's LID Ordinance. Additionally, 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. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, water quality impacts associated with Alternative 5 would be less than significant.

Dry Weather Flows

Impacts associated with dry weather flows under Alternative 5 would be similar to Alternative 1. As with Alternative 1, under Alternative 5, natural growth in airport activity projected to occur by 2025 could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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 improvements under Alternative 5 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 identified under Alternative 1. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.6 Alternative 6

Alternative 6 focuses on airfield and terminal improvements only. However, as noted in Section 4.8.2, for purposes of this analysis, impacts associated with ground access improvements are also considered. The distinguishing changes considered in this analysis relative to hydrology and water quality are the northerly movement and westerly extension of Runway 6L/24R, conversion of a portion of the unlined Argo Drainage Channel into a concrete box culvert (1,400 linear feet), conversion of open space to accommodate the realignment of Lincoln Boulevard, conversion of industrial area for the ITF, and conversion of the Manchester Square area to parking use.

Hydrology

Under Alternative 6, the total impervious area within the HWQSA would increase by 73 acres as compared to baseline conditions of 3,082 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 (2.4 percent) 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 12 acres or 0.6 percent, occurring primarily within the Argo sub-basin due to the runway and taxiway improvements, while the impervious area within the Dominguez Channel Watershed would increase by 61 acres or 5.5 percent (see Table 19 in Appendix H, *Hydrology and Water Quality*).

As noted above, previous studies indicate that, under baseline conditions, the conveyance capacity of drainage infrastructure within the Argo sub-basin and Imperial sub-basin (including both the Pershing and Imperial components of the sub-basin) is adequate for the LADPW 50-year storm, while the Dominguez Channel sub-basin infrastructure would flood under these same conditions. Detailed analysis of the Argo and Dominguez Channel sub-basin capacities under this design storm for Alternative 6 was not conducted given the conceptual level of planning associated with all SPAS alternatives at this time. However, increases in impervious area in the Argo and Dominguez Channel sub-basins, and the associated increase in storm water peak flow rates, could exceed the capacity of the storm water facilities in these sub-basins, resulting in flooding. This would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including improvements designed to address anticipated deficiencies in the drainage system that would occur at buildout of the LAX Master Plan. Such improvements would reduce flooding impacts associated with development of Alternative 6; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, flooding impacts of Alternative 6 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the hydrology impacts associated with Alternative 6 would be less than significant.

Under Alternative 6, all facilities receiving and conveying storm water from the airport, with the exception of a portion of the existing Argo Drainage Channel, would be below ground pipes or concrete lined 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 for these facilities. Under Alternative 6, the easterly 1,400 linear feet of the Argo Drainage Channel would be structurally covered (converted to a concrete box culvert). The remainder of the channel would remain unlined. Under this alternative, there would be a slight (0.6 percent) increase in the impervious surface area of the portion of the area draining to Santa Monica Bay. This would result in a slight increase in both the peak flow rate and the corresponding peak velocity of storm water runoff discharging through the channel. It is possible that this increase could result in velocities that would cause erosion of the unlined portion of the channel.

For that area, the impact is assumed to be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. The Conceptual Drainage Plan Revision and Update will also examine the potential for erosion in the Argo Drainage Channel and, if necessary, develop recommendations to address erosion. With implementation of MM-HWQ (SPAS)-1, the erosion and sediment impacts associated with Alternative 6 would be less than significant.

Water Quality

Storm Water Pollutant Loads

Under Alternative 6, the estimated annual total pollutant load generated within the HWQSA would increase for most constituents except for total suspended solids, total Kjeldahl Nitrogen, BOD_5, and fecal enterococcus bacteria compared to baseline conditions. The estimated increased loads would range from 1.5 percent for both total phosphorus and ammonia to 4.4 percent for oil and grease.

With respect to debris loads, activities within airfield improvement areas are not a significant generator of debris compared to the potential load generated within ground access improvement areas (e.g., parking lots). Within the airport improvement areas, there is no public access to these areas so sources of debris are minimal compared to public access areas. Additionally, debris sources are minimized as a result of implementation of source control measures conducted by LAWA and its tenants under the SWPPP. Alternative 6 does not include ground access improvements, so debris loads are not expected to increase. The complete model results are presented in Table 21 in Appendix H, *Hydrology and Water Quality*. The increases in pollutant loads would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce water quality impacts associated with development of Alternative 6; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, pollutant load increases associated with Alternative 6 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations, including BMPs, to the specific characteristics of the selected SPAS alternative. As part of the update to the existing Conceptual Drainage Plan for LAX, LAWA would integrate the applicable BMP requirements related to SUSMP and the City's LID Ordinance. Additionally, 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. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, water quality impacts associated with Alternative 6 would be less than significant.

Dry Weather Flows

Impacts associated with dry weather flows under Alternative 6 would be similar to Alternative 1. As with Alternative 1, under Alternative 6, natural growth in airport activity projected to occur by 2025 could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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 improvements under Alternative 6 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 identified under Alternative 1. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.7 Alternative 7

Alternative 7 focuses on airfield and terminal improvements only. However, as noted in Section 4.8.2, for purposes of this analysis, impacts associated with ground access improvements are also considered. The distinguishing changes considered in this analysis relative to hydrology and water quality are the conversion of industrial area for the ITF, and conversion of the Manchester Square area to parking use. There would be no modifications to the Argo Drainage Channel (other than those required under existing conditions to meet federal Runway Safety Area requirements, such as providing the necessary safety clearances at the east end of Runway 6L/24R) or Lincoln Boulevard under this alternative.

Hydrology

Under Alternative 7, the total impervious area within the HWQSA would increase by 61 acres as compared to baseline conditions of 3,082 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 (2.0 percent) in regional impervious area.

The changes in impervious area would only occur within the Dominguez Channel Watershed, and would represent an increase of 5.5 percent (see Table 22 in Appendix H, *Hydrology and Water Quality*).

As noted above, previous studies indicate that, under baseline conditions, the conveyance capacity of drainage infrastructure within the Argo sub-basin and Imperial sub-basin (including both the Pershing and Imperial components of the sub-basin) is adequate for the LADPW 50-year storm, while the Dominguez Channel sub-basin infrastructure would flood under these same conditions. Detailed analysis of the Dominguez Channel sub-basin capacity under this design storm for Alternative 7 was not conducted given the conceptual level of planning associated with all SPAS alternatives at this time as discussed in Section 4.8.2. As shown in **Table 4.8-5**, the increase in impervious surface in the portion of the HWQSA tributary to Dominguez Channel is 5.5 percent, which would result in a net increase in peak flow rates to be conveyed by the drainage systems serving these areas. As previously noted, the Dominguez Channel is currently over capacity off-site and downstream from LAX; therefore, a 5.5 percent increase in peak flow rates from LAX, which represents a portion of the total tributary area to the Dominguez Channel, would add to the capacity deficiency. Since there would be no change in impervious area within the Santa Monica Bay Watershed, no increase in storm water peak flow rates would be associated with this alternative. However, within the Dominguez Channel Watershed, 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 significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including improvements designed to address anticipated deficiencies, if any, in the drainage system that would occur at buildout of the LAX Master Plan. Such improvements would reduce flooding impacts associated with development of Alternative 7; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, flooding impacts of Alternative 7 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the hydrology impacts associated with Alternative 7 would be less than significant.

Under Alternative 7, all facilities receiving and conveying storm water from the airport, with the exception of the existing Argo Drainage Channel, would be below ground pipes or concrete lined 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 for these facilities. Under this alternative, only the easterly 750 linear feet of the channel would be structurally covered (converted to a concrete box culvert). The remainder of the channel would remain unlined. However, as there would be no net increase in the area of impervious surface within the portion of the HWQSA draining to Santa Monica Bay under this alternative, the peak flow rate is not expected to increase in the Argo Drainage Channel, and the potential for erosion and siltation of the channel is not expected to change. Therefore, the impact of erosion or siltation due to runoff from the airport would be less than significant for all drainage facilities.

Water Quality

Storm Water Pollutant Loads

Under Alternative 7, the estimated annual total pollutant load generated within the HWQSA would increase for most constituents except for total suspended solids, total Kjeldahl Nitrogen, BOD_5, and fecal enterococcus bacteria compared to baseline conditions. These increases would only occur within the Dominguez Channel Watershed. The estimated increased loads would range from 0.5 percent for ammonia to 3.7 percent for copper.

With respect to debris loads, activities within airfield improvement areas are not a significant generator of debris compared to the potential load generated within ground access improvement areas (e.g., parking lots). Within the airport improvement areas, there is no public access to these areas so sources of debris are minimal compared to public access areas. Additionally, debris sources are minimized as a result of implementation of source control measures conducted by LAWA and its tenants under the SWPPP. Alternative 7 does not include ground access improvements, so debris loads are not expected to increase. The complete model results are presented in Table 24 in Appendix H, *Hydrology and Water Quality*. The increases in pollutant loads would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce water quality impacts associated with development of Alternative 7; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, pollutant load increases associated with Alternative 7 would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations, including BMPs, to the specific characteristics of the selected SPAS alternative. As part of the update to the existing Conceptual Drainage Plan for LAX, LAWA would integrate the applicable BMP requirements related to SUSMP and the City's LID Ordinance. Additionally, 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. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, water quality impacts associated with Alternative 7 would be less than significant.

Dry Weather Flows

Impacts associated with dry weather flows under Alternative 7 would be similar to Alternative 1. As with Alternative 1, under Alternative 7, natural growth in airport activity projected to occur by 2025 could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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 improvements under Alternative 7 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 identified under Alternative 1. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.8 Alternatives 8 and 9

Alternatives 8 and 9 focus on ground access improvements only. The distinguishing changes of these alternatives relative to hydrology and water quality are the conversion of industrial area for the ITF and conversion of the Manchester Square area for a CONRAC and parking.

As indicated in Section 4.8.2, hydrology and water quality impacts were not calculated for Alternatives 8 and 9 because those two alternatives, which focus only on ground access system improvements that could be paired with the airfield improvements under Alternatives 1, 2, 5, 6, and 7, would have the same hydrology and water quality impacts as the ground access improvements under Alternatives 1 and 2. While Alternatives 8 and 9 include a CONRAC at Manchester Square instead of the surface parking under Alternatives 1 and 2, all four alternatives would have the same land use type (Airport Operations) relative to hydrology and water quality characteristics. Alternative 9 proposes an Automated People Mover (APM) system instead of the elevated/dedicated busway under Alternatives 1 and 2; however, all three alternatives follow the same basic alignment and are of a comparable land use type. As such, the hydrology and water quality impacts specific to ground access improvements would be the same between Alternatives 1, 2, 8, and 9. The hydrology and water quality impact calculations and discussions presented above for Alternatives 5, 6, and 7 account for those common ground access characteristics. (The ground access improvements associated with Alternatives 3 and 4 are specific to each of those alternatives and are not interchangeable with any of the other alternatives.) In summary, the hydrology and water quality impacts associated with Alternatives 8 and 9 are already accounted for in the above discussions of Alternatives 5, 6, and 7. A qualitative discussion of the impacts associated with these alternatives is provided below. As noted in Section 4.8.2, the full impacts of Alternatives 8 and 9 must consider airfield and terminal contributions (i.e., the full impacts of Alternative 8 or Alternative 9 would depend on the particular airfield improvement option it is paired with [airfield options in Alternatives 1, 2, 5, 6, and 7]), which, as discussed above, vary between most of the airfield options. However, the qualitative discussion below focuses on impacts from the ground access improvements only.

Hydrology

Under Alternatives 8 and 9, the total impervious area within the HWQSA would increase as compared to baseline conditions due to the conversion of the Manchester Square area for the CONRAC and parking. Since much of the area surrounding the airport in the Dominguez Channel Watershed is developed (i.e., impervious) under baseline conditions, the change in regional impervious area would be marginal.

As noted above, previous studies indicate that, under baseline conditions, the conveyance capacity of drainage infrastructure within the Dominguez Channel sub-basin is inadequate for the LADPW 50-year storm. Detailed analysis of the Dominguez Channel sub-basin capacity under this design storm for Alternatives 8 and 9 was not conducted given the conceptual level of planning associated with all SPAS alternatives at this time. Increases in impervious area in the Dominguez Channel sub-basin, and the associated increase in storm water peak flow rates, could potentially exceed the capacity of the storm water facilities in this sub-basin, resulting in flooding. This would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including improvements designed to address anticipated deficiencies in the drainage system that would occur at buildout of the LAX Master Plan.

Such improvements would reduce flooding impacts associated with development of Alternatives 8 and 9; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, flooding impacts of these alternatives would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, the hydrology impacts associated with Alternatives 8 and 9 would be less than significant.

Under Alternatives 8 and 9, all facilities receiving and conveying storm water from the airport would be below ground pipes or concrete lined 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 for all drainage facilities.

Water Quality

Storm Water Pollutant Loads

Under Alternatives 8 and 9, the annual total pollutant load generated within the HWQSA would increase for most pollutants when compared to baseline conditions, with the exception of total suspended solids, total Kjeldahl nitrogen, BOD_5, and fecal enterococcus bacteria, which would decrease. These increases would only occur within the Dominguez Channel Watershed. The increases in pollutant loads would be a significant impact.

LAWA would continue to implement applicable recommendations resulting from LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, including BMPs to address water quality impacts associated with increased pollutant loads from buildout of the LAX Master Plan. Such BMPs would reduce water quality impacts associated with development of Alternatives 8 or 9; however, given that those recommended improvements were designed based on the approved LAX Master Plan development program, pollutant load increases associated with these alternatives would be significant. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the Conceptual Drainage Plan recommendations, including BMPs, to the specific characteristics of the selected SPAS alternative. As part of the update to the existing Conceptual Drainage Plan for LAX, LAWA would integrate the applicable BMP requirements related to SUSMP and the City's LID Ordinance. Additionally, 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. With implementation of Mitigation Measure MM-HWQ (SPAS)-1, water quality impacts associated with Alternatives 8 and 9 would be less than significant.

Dry Weather Flows

Operation of facilities associated with Alternatives 8 and 9 could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and impacts associated with hazardous materials spills. With such continued compliance, 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 improvements under Alternatives 8 and 9 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 identified

under Alternative 1. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities would be less than significant.

4.8.6.9 Summary of Impacts

A summary of the hydrology and water quality impacts associated with the SPAS alternatives is provided in **Table 4.8-7** and in the text below.

Table 4.8-7

Summary of Hydrology and Water Quality Impacts After Mitigation

	Alternative								
	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**	**Alt. 8**	**Alt. 9**
Hydrology									
Flooding	SM	SM	LS	SM	SM	SM	SM	SM	SM
Erosion/Siltation	LS	LS	SM	LS	LS	SM	LS	LS	LS
Water Quality									
Storm Water Pollutant Loads	SM	SM	LS	SM	SM	SM	SM	SM	SM
Dry Weather Flows	LS	LS	LS	LS	LS	LS	LS	LS	LS
Construction Impacts	LS	LS	LS	LS	LS	LS	LS	LS	LS

Notes:

LS = Less Than Significant Impact
SM = Significant Impact (but mitigable to Less Than Significant)

Source: CDM Smith, 2012.

Hydrology

The total impervious area within the HWQSA compared to baseline conditions would increase under all of the SPAS alternatives. Within the HWQSA, Alternative 3 would have the largest increase in impervious area, followed by Alternatives 5 and 1. Alternative 4 would have the smallest increase. Within the Santa Monica Bay Watershed, Alternative 5, followed by Alternative 1, would have the largest increase in impervious area, due to the modifications to the north airfield and the structural modification (conversion into a concrete box culvert) of the entire Argo Drainage Channel. Within the Dominguez Channel Watershed, Alternative 3 would have the largest increase in impervious area, as this alternative includes the most extensive ground access improvements. 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, changes associated with the alternatives would represent a marginal increase in regional impervious area. However, the 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 area sub-basins, which would result in flooding in any location where capacity was exceeded.

The LAX Conceptual Drainage Plan was developed to identify measures to mitigate flooding impacts associated with the approved LAX Master Plan. As a result, under Alternative 3, with completion of these storm drain system improvements, impacts associated with flooding would be less than significant. However, under Alternatives 1, 2, and 4 through 9, the LAX Conceptual Drainage Plan improvements may not fully mitigate flooding impacts, as these improvements were not specifically designed for these alternatives. This would be a significant impact. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the LAX Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS

alternative. This measure would reduce flooding impacts associated with Alternatives 1, 2, and 4 through 9 to a level that is less than significant.

Under all alternatives, most facilities receiving and conveying storm water from the airport would be below ground pipes or concrete lined 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 in for these drainage systems. The only exception is the Argo Drainage Channel, which is currently unlined. The first 750 linear feet of the easterly end of the channel would be lined under all alternatives and, therefore, not subject to erosion or sedimentation in the future. Also, under Alternatives 1 and 5, the entire channel would be structurally covered to support aircraft and, therefore, not subject to erosion or siltation. Under Alternatives 2, 4, and 7, only the easterly end of the channel (750 linear feet) would be lined, as indicated above; however, there would be no increase in the peak flow rates through the Argo Drainage Channel under these alternatives and, therefore, no increase in the potential for erosion or sedimentation. Under Alternatives 3 and 6 portions of the Argo Drainage Channel would remain unlined and there would be an increase in peak flows to the channel, resulting in the potential for erosion and sedimentation. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the LAX Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. This measure would reduce erosion and sedimentation impacts associated with Alternatives 3 and 6 to a level that is less than significant. Therefore, the impact of erosion or siltation due to runoff from the airport would be less than significant for all drainage facilities under all alternatives.

Water Quality

Storm Water Pollutant Loads

Under all of the alternatives, the estimated annual total pollutant load generated within the HWQSA would increase for the majority of constituents compared to baseline conditions (see **Table 4.8-7**). The LAX Conceptual Drainage Plan was developed to identify BMPs to mitigate increases in pollutant loads associated with the approved LAX Master Plan. As a result, under Alternative 3, with implementation of these and other measures, including SUSMP and LID requirements, water quality impacts would be less than significant. However, under Alternatives 1, 2, and 4 through 9, these measures may not fully mitigate increases in pollutant loads, as these improvements were not specifically designed for these alternatives. This would be a significant impact. As described in Section 4.8.7 below, a new mitigation measure, MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, is proposed to tailor the LAX Conceptual Drainage Plan recommendations to the specific characteristics of the selected SPAS alternative. This measure would reduce water quality impacts associated with Alternatives 1, 2, and 4 through 9 to a level that is less than significant.

Dry Weather Flows

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 de-icing; and chemical and fuel transport and storage. While implementation of the SPAS alternatives would not in themselves result in an intensification of such airport-related activities, the natural growth in airport activity projected to occur by 2025 (i.e., growth from 56.5 MAP in 2009 to 78.9 MAP in 2025 under all alternatives) would increase such activities. These activities could result in an increased potential for spills and leaks that could, in turn, result in an increase in pollutant loads to receiving water bodies; however, compliance with existing regulations and airport procedures, particularly the LAX SWPPP, would reduce the likelihood of dry weather discharges and the impacts associated with hazardous materials spills. With such continued compliance, the pollutant load generated from dry weather flows would not be expected to increase under any of the alternatives and the associated impact would be less than significant.

Construction Impacts

Under all of the SPAS alternatives, construction of the improvements 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. By following the procedures outlined in the SWPPPs and employing temporary construction BMPs, impacts to water quality associated with construction activities under all of the alternatives would be less than significant.

4.8.7 Mitigation Measures

Hydrology and Water Quality

Compliance with the Conceptual Drainage Plan, developed in accordance with LAX Master Plan Commitment HWQ-1, would ensure that impacts to hydrology and water quality associated with Alternative 3 would be less than significant. Therefore, no mitigation specific to SPAS is required for this alternative.

To address impacts to hydrology and water quality associated with Alternatives 1, 2, and 4 through 9, the following mitigation measure specific to SPAS is proposed:

- **MM-HWQ (SPAS)-1. Conceptual Drainage Plan Revision and Update (Alternatives 1, 2, and 4 through 9).**

  In conjunction with the design of any SPAS alternative that may be selected, LAWA will revise and update the Los Angeles International Airport Conceptual Drainage Plan (CDP), to account for changes in the nature, location, design, and timing, if known, of the improvements under that alternative as compared to the LAX Master Plan approved in 2004, which is the basis for the 2005 CDP. Consistent with the requirements of LAX Master Plan Commitment HWQ-1, which established the framework for the CDP, the necessary revisions and updates will occur in accordance with FAA guidance and to the satisfaction of the City of Los Angeles Department of Public Works, Bureau of Engineering and Bureau of Sanitation - Watershed Protection Division based on the drainage/flood control and storm water quality requirements of each agency. The CDP revision and update shall take into account:

  - Changes in existing surface hydrology and water quality characteristics at LAX since preparation of the 2005 CDP;
  - Current regulatory programs related to water quality, such as the application of Standard Urban Stormwater Mitigation Plan (SUSMP) and Low Impact Development (LID) requirements by the City Bureau of Sanitation - Watershed Protection Division;
  - Surface hydrology and water quality improvements proposed separate from SPAS, such as the City of Los Angeles Bureau of Sanitation Stormwater Infiltration and Treatment Facility, but related to treatment of storm water from/at LAX; and
  - Changes in projected future area-wide drainage flows and surface water pollutant loading within the LAX Master Plan project area, as affected by the selected SPAS alternative and by other existing or proposed improvement projects at LAX that were not assumed in the 2005 CDP.

  The CDP revision and update will provide the basis and specifications by which detailed drainage improvement plans shall be designed in conjunction with site engineering specific to each improvement associated with any selected SPAS alternative, as well as the remaining LAX Master Plan improvements that would not change due to the SPAS alternative, including, if necessary, improvements to address increased erosion and sedimentation. Consistent with the requirements for the 2005 CDP, the drainage system design and identification of needed improvements shall be based upon providing flood protection for a minimum 10-year storm event. As also required in the 2005 CDP, water quality treatment BMPs, which may include infiltration basins/systems, bioretention, vegetated swales, detention/retention basins/systems, media filtration, water quality inlets, catch

basin inlet devices, and hydrodynamic separators, in addition to source control measures and good housekeeping practices, shall be incorporated to minimize the effect of airport operations on surface water quality to below the level of significance and to prevent a net increase in pollutant loads to surface water resulting from the overall LAX Master Plan improvements including if/as modified by any selected SPAS alternative.

4.8.8 Level of Significance After Mitigation

Hydrology

Implementation of Mitigation Measure MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, would reduce the hydrology impacts associated with Alternatives 1, 2, and 4 through 9 to a level that is less than significant.

Water Quality

Implementation of Mitigation Measure MM-HWQ (SPAS)-1, Conceptual Drainage Plan Revision and Update, would reduce the water quality impacts associated with Alternatives 1, 2, and 4 through 9 to a level that is less than significant.

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