
4.5 Hydrology and Water Quality

4.5.1 Introduction

This section presents an analysis of the potential of the proposed Project to result in impacts to hydrology and water quality in relation to alteration of drainage patterns, particularly in relation to Waters of the United States, and other waters of the State. Based on the information contained in the Initial Study (IS), the proposed Project would result in a “less than significant” or “no impact” to the following topics, and thus, no further analysis of these topics in an EIR is required.

- Wastewater discharge requirements
- Groundwater
- Flooding
- Inundation by seiche, tsunami, or mudflow

The analysis presented in this section characterizes the baseline conditions for hydrology and water quality in relation to drainage patterns, describes methods used in the evaluation of drainage patterns, summarizes the regulatory framework that guides the evaluation of hydrology and water quality, addresses potential impacts to hydrology and water as a result of alterations to drainage patterns associated with the proposed Project, and provides feasible mitigation measures capable of avoiding or reducing the significant effects of the proposed Project. The focus of Chapter 4.5 is the alteration of drainage pattern as it relates to hydrology and water quality. All of the other Hydrology and Water Quality environmental subtopics are summarized in Chapter 6.0 Other CEQA Considerations, Section 6.4 Less than Significant Effects.

4.5.2 Methodology

4.5.2.1 Resources Used

Federal, state, and local statutes regulating water resources were reviewed for the analysis of potential water quality impacts. The applicable statutes establish water quality standards; control discharges and pollution sources; protect drinking water systems; prevent or minimize the loss of wetlands; and protect aquifers and other sensitive ecological areas. The Detailed Study Area (DSA) is located within the jurisdictions of the County of Los Angeles Flood Control District and the Los Angeles Regional Water Quality Control Board (LARWQCB). Reports and documents previously prepared by LAWA were used to assess whether the proposed Project would impact water quality and water resources. These included:

- Diaz Yourman & Associates, *Geotechnical Services Runway 6L-24R Rehabilitation And Runway Safety Area Improvements Los Angeles International Airport*, Los Angeles, California, November 13, 2013.
- Sapphos Environmental, Inc., *Preliminary Results of Delineation of Areas Subject to the Jurisdiction of the U.S. Army Corps of Engineers and the California Department of Fish and Game at Argo Ditch*, Los Angeles International Airport, City of Los Angeles, California, 1997.

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- Sapphos Environmental, Inc., *Jurisdictional Delineation Report Los Angeles International Airport Proposed Runway 6L-24R and Runway 6R-24L Safety Area and Associated Improvements Project*, January 2014.
- URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.
- URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, 30% Design Submittal, Project Design Drawings*, November 26, 2013.
- Parsons, Brinckerhoff, Quade, Douglas, Inc., *Draft Preliminary Design Report for LAX North Perimeter Storm Drain*, December, 2001. This report contains preliminary hydrology analyses for the portion of LAX tributary to the 'North Storm Drain' which drains to the Argo Channel.
- Parsons, Brinckerhoff, Quade, Douglas, Inc., *Revised Hydrology Report for LAX North Perimeter Storm Drain*, June 2002. This report is an update to the 2001 North Storm Drain report.
- Parsons, Brinckerhoff, Quade, Douglas, Inc., *Final On-Site Hydrology Report for LAX*, October 2002. This report contains preliminary hydrology analyses for the entire LAX site except for the portion tributary to the North Storm Drain.
- CDM, *Storm Drain System Survey LAX*, September 2003. This report summarizes existing storm drain infrastructure based on field surveys.
- City of Los Angeles, Los Angeles World Airports, *Stormwater Pollution Prevention Plan (SWPPP) Stormwater Monitoring Program Plan (SWMPP) Associated with Industrial Activities for LAX*, September 2003. This SWPPP addresses the DSA's compliance with the general industrial permit.
- City of Los Angeles, Los Angeles World Airports, *Annual monitoring reports for LAX, Van Nuys and Ontario Airports, 1999-2003*. These annual monitoring reports fulfill requirements of the general industrial permit.

4.5.2.2 Design Criteria

The surface water hydrology analysis considered potential changes to stormwater runoff and drainage due to the change in pervious surfaces with implementation of the proposed Project. Existing impervious areas and locations within the DSA were reviewed to evaluate potential direct and indirect impacts to surface water resources due to stormwater runoff. Direct effects include increased turbidity and erosion during construction and increased runoff during operations. Indirect effects can occur when changes in the planned development of an area result in increased water needs or reduced water quality.

Details for the application of Best Management Practices (BMPs) at LAX properties are contained in LAWA's *Sustainable Airport Planning, Design and Construction Guidelines Version 5 (LSAG)* and in the City of Los Angeles Green Building Code (LAGBC). On an annual basis, LAWA manages the LAX Master Plan Mitigation Monitoring and Reporting Program (MMRP),

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including the mitigation commitments that implement LSAG and the LAGBC,¹ which monitors the progress of BMPs during a project's lifespan. The City of Los Angeles requirements, along with previous airport reports and documents, provide the tools and guidance on addressing potential effects on water resources.

The recommended storm design flow for the proposed Project is a 25-year frequency design storm which is in conformance with LACDWP Hydrology Manual, Chapter 4.3 (pg. 30), LACDWP, January 2006. Under this requirement, existing on-airport drainage facilities that have the capacity to convey at least the 25-year storm event flow based on the future Master Plan project conditions would not need upgrading. Existing facilities that could not convey at least a 25-year flow would be replaced or updated to convey at least the 25-year storm event flow to prevent any on-airport flooding under this condition.

For drainage impacts, peak flow rates for the proposed Project drainage were calculated and compared with the existing drainage capacity. The Modified Rational Method (MODRAT) was used to calculate drainage rates for flows into the Argo Drain Sub-Basin. These calculations took into account the peak discharge, in cubic feet per second (cfs), the MODRAT runoff coefficient, rainfall intensity (in inches per hour), and the drainage area (in acres). The Rational Method runoff coefficient (c) is a function of the soil type, land use, and drainage basin slope. The MODRAT runoff coefficient was calculated for both existing and proposed Project conditions based on land uses, and their associated changes in impervious surfaces.

A hydrology evaluation was performed to determine the flow rates and volumes from each sub-area for the water quality design storm, or Water Quality Volume (WQV) - defined as a "first-flush" or 3/4-inch rain event and 25-year storm event.

Hydrology area was modeled using the updated LACDPW MODRAT Method, in accordance with the LACDPW Hydrology Manual. The soil type used is No. 10 and the 50-year, 24-hour isohyet is 5 inches per Appendix B Sheet 1-H1.7 of LACDPW Hydrology Manual (2006). The isohyets for WQV and 25-year storms are converted by multiplication factors per Table 5.3.1 of LACDPW Hydrology Manual. The imperviousness for different land uses are selected from the LACDWP Hydrology Manual Appendix D. The area, the composite imperviousness percentage, flow path length and slope are measured and calculated from the CAD files and summarized in the Engineer's Report for pre- and post-development. Design flow rates and time of concentration, calculated using the LACDPW - Tc calculator program, are also summarized in the Engineer's Report for both pre- and post-development conditions after the runway safety area improvements.²

¹ City of Los Angeles, Department of Building and Safety Codes website, online at <http://ladbs.org/LADBSWeb/codes.jsf>, accessed March 2012.

² URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.

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4.5.3 Existing Conditions

4.5.3.1 Regulatory Setting

Development that discharges stormwater runoff into and/or results in encroachment upon natural drainages, wetlands, and/or floodplains is subject to the requirements of federal, state, and local agencies, including the United States Environmental Protection Agency (USEPA) and United States Army Corp of Engineers (USACE), pursuant to the Clean Water Act (CWA); the State Water Resources Control Board (SWRCB), and the Los Angeles Regional Water Quality Control Board (LARWQCB) pursuant to the Porter-Cologne Water Quality Control Act; the California Department of Fish and Wildlife (CDFW) pursuant to the Fish and Game Code; and the Los Angeles County Department of Public Works (LACDPW) pursuant to the Level of Flood Protection and Drainage Protection Standards.

Federal

Clean Water Act of 1972

The Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. The statute employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. The nationwide implementation of the CWA is the responsibility of the USEPA.

Section 402 of the CWA, National Pollutant Discharge Elimination System Program

The CWA makes it illegal to discharge pollutants from a point source to Waters of the U.S. Section 402 of the CWA creates the National Pollutant Discharge Elimination System (NPDES) regulatory program. This is the primary implementation program for regulating discharges of pollutants into Waters of the U.S. Point sources must obtain a discharge permit from the proper authority (usually a state, but sometimes the USEPA, a tribe, or a territory). Though the CWA does contain a long-range goal of zero discharge of pollutants, the NPDES permits set limits on the amount of various pollutants that a source can discharge at a given time. In addition, through the NPDES regulatory program, an NPDES permit is required for stormwater discharge from storm drain systems, construction sites that disturb one acre or more, and industrial facilities (which includes airports).

Section 404 of the CWA, Discharge of Dredge and Fill Material

Jurisdictional waters under the Clean Water Act (CWA) (federal waters) fall into two categories: wetlands and other waters of the U.S. Wetlands include marshes, meadows, seep areas, floodplains, basins, and other areas experiencing inundation or saturation for a duration long enough to support vegetation adapted to saturated soil conditions. The U.S. Army Corps of Engineers (USACE) typically takes jurisdiction over wetlands only when they lie within or adjacent to navigable waters, or tributaries of such waters where those tributaries bear an ordinary high water mark. An ordinary high water mark is defined as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a

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clear, natural line impressed on the bank, shelving, changes in soil character, destruction of terrestrial vegetation, presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding areas.”

State

Porter-Cologne Water Quality Control Act

Division 7 of the California Water Code, also known as the Porter-Cologne Water Quality Control Act, contains provisions that cover water quality protection and management for Waters of the State. The Porter-Cologne Water Quality Control Act establishes the SWRCB and the nine RWQCBs as the principal state agencies responsible for the protection, and, where possible, the enhancement of water quality. The SWRCB sets statewide policy, and together with the RWQCBs, implements state and federal laws and regulations pertaining to water quality. In California, the NPDES permit program is administered by the SWRCB and the RWQCBs.

NPDES General Industrial Permit

The NPDES permit programs in California are administered by the SWRCB and by nine RWQCBs that issue NPDES permits and enforce regulations within their respective region. LAX is located within the jurisdiction of the Los Angeles Regional Water Quality Control Board (LARWQCB). A statewide General Permit for Discharges of Stormwater Associated with Industrial Activities (SWRCB Water Quality Order No. 97-09-DWQ) may apply to the proposed Project. Qualifying industrial sites are required to prepare Storm Water Pollution Prevention Plans (SWPPPs) that describe the Best Management Practices (BMPs) that will be employed to protect water quality. Industrial facilities are required to use best practicable control technology (BCT) for control of conventional pollutants and best available technology economically achievable (BAT) for toxic and non-conventional pollutants. Monitoring of runoff leaving the site is also required. For transportation facilities, the General Industrial Permit only applies to vehicle maintenance shops and equipment-cleaning operations. The SWRCB has posted the Final Draft Industrial General Permit for public comment. Changes to the General Industrial Permit are expected to include the establishment of numeric action levels (NALs) that reflect the USEPA benchmark values for selected parameters, a compliance storm event (the 10-year, 24-hour event), minimum BMP requirements, a revised monitoring protocol, and three levels of corrective actions if an NAL is exceeded.

NPDES General Construction Activity Stormwater Permit (GCASP)

The SWRCB adopted a General Construction Activity Stormwater Permit (GCASP) on September 2, 2009 for projects that disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres. Projects are required to obtain coverage under the GCASP for Discharges of Stormwater Associated with Construction Activity (Construction General Permit, 2009-0009-DWQ). The GCASP permit became effective on July 1, 2010. All dischargers are required to obtain coverage under this GCASP. Construction activities subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation. The SWRCB permits all regulated construction activities under NPDES GCASP for stormwater

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discharges associated with construction activity (Order No. 98-08-DWQ (1999)). Order No. 98-08-DWQ requires that, prior to beginning any construction activity, the permit applicant must obtain coverage under the NPDES GCASP by preparing and submitting a Notice of Intent (NOI) and appropriate fee to the SWRCB. Additionally, coverage would not occur until an adequate SWPPP has been prepared. A separate NOI needs to be submitted to the SWRCB for each construction site.

The NPDES GCASP requires the development and implementation of a site-specific SWPPP. The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of stormwater discharges and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges. BMPs are intended to diminish impacts to the Maximum Extent Practicable (MEP), a standard developed by Congress to allow regulators the flexibility needed to shape programs to the site-specific nature of municipal stormwater discharges. Reducing impacts to the MEP generally relies on BMPs that emphasize pollution prevention and source control, with additional structural controls as needed.

The SWPPP must include BMPs that address source control, and, if necessary, must also include BMPs that address specific pollutant control. Dischargers are also required to inspect their construction sites before and after storms to identify stormwater discharge associated with construction activity and to identify and implement controls where necessary. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Section A of the GCASP describes the elements that must be contained in a SWPPP.

The NPDES GCASP requires the analysis of risk based on the soil characteristics that covers the DSA, the receiving water risk (beneficial uses) and any impaired water bodies for sediment. The selection of BMPs needs to be based on the proposed Project's overall risk assessment. Projects that exceed 30 acres are required to conduct biological assessment monitoring before and after the project.

A Rain Event Action Plan (REAP) is also required to cover the DSA throughout the rainy season(s). The proposed Project developer is required to submit a copy of the proposed Project's documents (i.e. SWPPP, Notice of Intent [NOI], Risk Assessments) to the Stormwater Multi-Application, Reporting, and Tracking System (SMARTS).

As of September 2, 2012, all projects located outside of a Phase I Municipal Separate Storm Sewer Systems (MS4) permitted jurisdiction that do not require a permanent water quality management plan are required to provide permanent water quality BMPs in the SWPPP. The required measures include Low Impact Development (LID) design and water conservation practices.

Section 1600 of the State Fish and Game Code

The CDFW regulates alterations to the flow, bed, channel, or bank of rivers, streams, and lakes. The Fish and Game Code, Section 1600 states, unless proper coordination occurs and requirements are met:

An entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake,

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or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.³

Regional/Local

LARWQCB Order No. R4-2012-0175/NPDES Permit No. CAS004001

The LARWQCB reissued the County of Los Angeles Municipal NPDES Permit (Order No. R4-2012-0175), which became effective on December 28, 2012. This Order supersedes Order No. 01-182 (the old MS4 Permit), and will serve as the NPDES Permit for MS4 storm water and non-storm water discharges within the County of Los Angeles. Order No. R4-2012-0175 includes prohibitions on Non-Stormwater Discharges, effluent limitations, and receiving water limitations. Effluent limitations include Technology Based Effluent Limitations to reduce pollutants in storm water discharges from the MS4s to the MEP and Water Quality-Based Effluent Limitations (WQBELs) consistent with the assumptions and requirements of all available total maximum daily loads (TMDL) waste load allocations assigned to discharges from the County of Los Angeles MS4.

The NPDES MS4 Permit covers an area of approximately 3,100 square miles and serves a population of about 10 million (2012 census). The County of Los Angeles and 84 incorporated cities are the listed permittees. The County of Los Angeles Municipal Stormwater NPDES Permit contains a requirement for permittees to develop and implement programs for stormwater management within the County of Los Angeles. One specific requirement from the Development Planning Model Program is to develop a Standard Urban Stormwater Mitigation Plan (SUSMP). The SUSMP serves as a model guidance document for use by builders, land developers, engineers, planners, and others in selecting post-construction BMPs and in obtaining municipal approval for the urban storm water runoff mitigation plan for a designated project prior to the issuance of building and grading permits.

Projects including commercial development of 100,000 square feet or more, parking lots of 5,000 square feet or more, and redevelopment in which land-disturbing activity results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface require implementation of a County of Los Angeles MS4 Permit SUSMP. The County of Los Angeles MS4 Permit also requires the City of Los Angeles and the County of Los Angeles to implement these measures for their own projects.

The proposed Project is under the jurisdiction of the City of Los Angeles and, as such, treatment-control BMPs for the catchments associated with new connections may be required. Such treatment control BMPs, if required, include volume-based treatment control BMPs and flow-based treatment control BMPs.

³ State of California, California Department of Fish and Wildlife, *Fish and Game Code Sections 1600-1616*. Effective January 1, 2004.

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Basin Plan for the California Regional Water Quality Control Board, Los Angeles Region (Basin Plan)

The proposed Project is within the jurisdiction of the LARWQCB. Under Section 303(d) of the CWA, the LARWQCB is responsible for protecting surface waters and groundwater from both point and non-point sources of pollution within the DSA and for establishing water quality standards and objectives in its Basin Plan that protect the beneficial uses of various waters. The state has developed TMDLs, which are a calculation of the maximum amount of a pollutant that a water body can have and still meet Water Quality Objectives (WQOs) established in the Basin Plan, in order to protect the valuable uses of its waters.

The Basin Plan applies to all waters of the Los Angeles Region (including surface waters, wetlands, and ground waters.) On October 28, 1968, the SWRCB adopted Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," establishing a non-degradation policy for the protection of water quality. This policy, referred to in this Basin Plan as the Non-degradation Objective, requires continued maintenance of existing high quality waters. Whenever the existing quality of water is better than the quality of water established in this Basin Plan as objectives (both narrative and numerical), such existing quality shall be maintained unless appropriate findings are made under the policy. The USEPA, Region IX, has also issued detailed guidelines for implementation of federal anti-degradation regulations for surface waters (40 CFR § 131.12).

The LARWQCB Basin Plan contains both numeric and narrative surface water quality objectives. The discharge of waste into receiving surface waters must not violate either of these objectives. **Table 4.5-1** lists the various narrative water quality objectives applicable to all inland surface waters and enclosed bays and estuaries.⁴

Table 4.5-1

Narrative & Numeric Water Quality Objectives for Watershed Receiving Waters

Parameter	Objective
Ammonia	Ammonia concentrations in receiving waters shall not exceed values listed in the Basin Plan (Tables 3-1 to 3-4, calculated for specific pH and temperature).
Bacteria, Coliform	In waters designated for noncontact water recreation (REC-2), the fecal coliform concentration shall not exceed 200/100 mL, based on a minimum of not less than four samples for any 30-day period, nor shall more than 10 percent of total samples during any 30-day period exceed 4000/10 mL.
Biostimulatory Substances	No biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.
Biochemical Oxygen Demand (BOD)	No substances that result in increases in the biochemical oxygen demand that adversely affect beneficial uses.

⁴ Los Angeles Regional Water Quality Control Board, *Water Quality Control Plan for the Los Angeles Region*, June 1994.

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Table 4.5-1

Narrative & Numeric Water Quality Objectives for Watershed Receiving Waters

Parameter	Objective
Chemical Constituents	No concentrations of chemical constituents in amounts that adversely affect any designated beneficial use. Chemical constituents in excessive amounts in drinking water are harmful to human health. Chemical constituents in excess of limits contained in Title 22 of the California Code of Regulations are prohibited.
Chlorine	Chlorine residual shall not be present in surface water discharges at concentrations that exceed 1.0 milligram per liter (mg/L) or impair beneficial uses.
Color	No coloration that causes nuisance or adversely affects beneficial uses.
Exotic Vegetation	Exotic vegetation shall not be introduced around stream courses to the extent that such growth causes nuisance or adversely affects beneficial uses.
Floating Material	No floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affects beneficial uses.
Dissolved Oxygen	Waters shall be free of substances that result in increases in the BOD, which adversely affect beneficial uses. At a minimum, the mean annual dissolved oxygen concentration for all waters shall be greater than 7mg/L and no single determination shall be less than 5.0mg/L, except when natural conditions cause lesser concentrations. Dissolved oxygen content for all surface waters designated as WARM shall not be depressed below 5mg/L as a result of waste discharges. Dissolved oxygen content of all surface waters designated as COLD shall not be depressed below 6mg/L as a result of waste discharges. Dissolved oxygen content of all surface waters designated as both COLD and SPWN shall not be depressed below 7mg/L as a result of waste discharges.
Methylene Blue Activated Substances (MBAS)	No MBAs in concentrations greater than 0.5-mg/L in waters designated municipal water use (MUN). ^a
Mineral Quality	There are no waterbody specific mineral quality objectives identified for this watershed in the Basin Plan.
Nitrogen	Nitrogen levels shall not exceed 10 mg/L (nitrate-nitrogen plus nitrite-nitrogen), 45 mg/L (as nitrate), 10 mg/L (as nitrate-nitrogen), or 1 mg/L (as nitrite-nitrogen).
Oil and Grease	No oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, cause nuisance, or otherwise adversely affect beneficial uses.
Polychlorinated Biphenyls (PCBs)	The purposeful discharge of PCBs to waters of the Region, or at locations where the waste can subsequently reach waters of the Region, is prohibited.
Pesticides	Waters designated as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the limiting concentrations contained in Title 22 of the California Code of Regulations, listed in Table 3-7 of the Basin Plan. ¹
pH	Not less than 6.5 or more than 8.5. No changes in normal ambient pH levels to exceed 0.2 unit from natural conditions as a result of waste discharge.
Radioactivity	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
Suspended Material	No suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

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Table 4.5-1

Narrative & Numeric Water Quality Objectives for Watershed Receiving Waters

Parameter	Objective
Settleable Material	No settleable material that causes nuisance or adversely affects beneficial uses.
Tastes and Odors	No taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible aquatic resources, cause nuisance, or adversely affect beneficial uses.
Temperature	The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperatures does not adversely affect beneficial uses.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are toxic to or produce detrimental physiological responses to human, plant, or aquatic life.
Turbidity	Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20 percent. Where natural turbidity is greater than 50 NTU, increases shall not exceed 10 percent. ²

Notes:

- 1 Municipal and Domestic Use is identified as a 'potential' use for this watershed.
- 2 The Los Angeles Water Board may issue specific Waste Discharge Requirements (WDRs) permit allowing higher concentrations within zones of dilution.

Source: California Regional Water Quality Control Board, Chapter 3, *Water Quality Control Plan for the Los Angeles Region*, June 1994

Regulatory and Permitting Requirements for TMDLs

Section 303(d) of the CWA requires that states make a list of waters that are not attaining established water quality standards after technology-based limits are initiated. The regulation requires states to develop TMDLs for all sources of the pollutants that caused the water to be listed. Water bodies on the CWA Section 303(d) list require additional controls to maintain their established water quality standards. **Table 4.5-2** presents receiving waters on the 2010 CWA Section 303(d) List of Water Quality Limited Segments.

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Table 4.5-2

2010 303(d) List of Water Quality Limited Segments

Receiving Water Body	Listing Details	Source
Santa Monica Beach	Indicator Bacteria	Unspecified Nonpoint Source
Santa Monica offshore/Nearshore	DDT (tissue and Sediment)	Unspecified Point and Nonpoint Source
	Debris	Unspecified Point and Nonpoint Source
	Fish Consumption Advisory. The Fish Consumption Advisory is due to DDT and PCBs.	Unspecified Point and Nonpoint Source
	PCBs (Polychlorinated biphenyls) (tissue & sediment)	Unspecified Point and Nonpoint Source
	Sediment Toxicity	Unspecified Point and Nonpoint Source
Dominguez Channel (lined portion above Vermont Ave.)	Ammonia	Nonpoint/Point Source
	Copper	Nonpoint/Point Source
	Dieldrin (tissue)	Nonpoint/Point Source
	Indicator bacteria	Nonpoint/Point Source
	Lead (tissue)	Nonpoint/Point Source
	Sediment Toxicity	Source Unknown
	Zinc (sediment)	Nonpoint/Point Source

Source: California 303(d) List Of Water Quality Limited Segments, 2010.

TMDL Program

A TMDL is a calculation of the maximum amount of a pollutant that a body of water can receive and still meet water quality standards. A TMDL is determined by summing the individual pollutant point sources, nonpoint sources,⁵ and natural background conditions while taking into account an appropriate margin of safety. Under Section 303(d) of the CWA,⁶ states are required to identify a list of impaired waters, ranked by priority, each with calculated TMDLs. Part 130 of Title 40 of the CFRs, Section 130.7 contains the regulatory framework currently governing the TMDL Program, issued in 1992. TMDL standards are regularly updated. While the NPDES program focuses on reducing the discharge of pollutants through BMPs, the TMDLs provide a quantitative analytical basis for controlling water quality.

A 303(d) list is an individual water body's list of priority pollutants and their respective TMDLs that is updated and re-adopted on a regular basis to maintain constant knowledge of the water

⁵ Discharges originating from single sources, like power and wastewater treatment plants, are referred to as point source discharges, while stormwater and/or urban runoff are non-point sources of water pollution since their origins cannot be attributed to a single identifiable source.

⁶ 33 U.S.C. §1251 et seq. section 303(d), 1972

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quality of individual water bodies. According to the Santa Monica Bay's and Dominguez Channel's 2007 and 2010 303(d) lists, both non-point and point sources of pollution are degrading the Santa Monica Bay's and Dominguez Channel's water quality.⁷ The TMDLs that have been completed and those in progress of being developed by the LARWQCB for Santa Monica Bay and Dominguez Channel are shown in **Table 4.5-3**.

Table 4.5-3

List of TMDLs Applicable to the Study Area

Location	Pollutant	Status
Santa Monica offshore/nearshore	DDT (tissue and Sediment)	Expected TMDL completion in 2019
	Debris	Expected TMDL completion in 2019
	Fish Consumption Advisory. The Fish Consumption Advisory is due to DDT and PCBs.	Expected TMDL completion in 2019
	PCBs (Polychlorinated biphenyls) (tissue & sediment)	Expected TMDL completion in 2019
	Sediment Toxicity	Expected TMDL completion in 2019
Santa Monica Beach	Indicator Bacteria	USEPA TMDL approved in 2003
Dominguez Channel (lined portion above Vermont Ave.)	Ammonia	Expected TMDL completion in 2019
	Copper	Expected TMDL completion in 2019
	Dieldrin (tissue)	Expected TMDL completion in 2019
	Indicator bacteria	In Progress
	Lead (tissue)	Expected TMDL completion in 2019
	Sediment Toxicity	Expected TMDL completion in 2021
	Zinc (sediment)	Expected TMDL completion in 2019

Source: *California 303(d) List Of Water Quality Limited Segments, 2010*.

City of Los Angeles Stormwater Program

NPDES requirements mandate that stormwater BMPs be implemented during the proposed Project's construction into SWPPPs and during the proposed Project's operation into SUSMPs. The requirements are enforced through the City's plan review and approval process. During the review process, the proposed Project's plans are reviewed for compliance with the City of Los

⁷ California State Water Resources Control Board (SWRCB), *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 at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml, Accessed February 5, 2012.

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Angeles' General Plan, zoning ordinances, and other applicable local ordinances and codes, including stormwater requirements. Plans and specifications are reviewed to ensure that the appropriate BMPs are incorporated to address stormwater pollution prevention goals. The purpose of the SWPPP is to identify potential pollutant sources that may affect the quality of discharge associated with construction activity, identify non-stormwater discharges, and design the use and placement of BMPs to effectively prohibit the entry of pollutants from the site into the public storm drain system during construction. The purpose of SUSMP is to reduce the discharge of pollutants in stormwater by outlining BMPs which must be incorporated into the design plans of new development and redevelopment. The SUSMP provisions that are applicable to the proposed Project include, but are not limited to, peak stormwater runoff discharge rate and design standards for structural or treatment control BMPs.

4.5.3.2 Existing Hydrology Setting

According to the Earth/Geology Report conducted for the LAX Master Plan EIS/EIR in January 2001, semi-perched, discontinuous groundwater exists at LAX in unconfined clay lenses at depths of approximately 20 to 60 feet below ground surface (bgs).⁸ In this vicinity, the Gage Aquifer water level is observed at depths of approximately 100 to 10 feet bgs.⁹

The major surface drainage features within the boundaries of LAX consists of five stormwater Sub-Basins: Argo, Culver, Dominguez, Imperial, and Vista del Mar Sub-Basins (**Figure 4.5-1**). The DSA drains from north to south into four stormwater Sub-Basins: Dominguez Channel, Argo, Culver, and Imperial Sub-Basins.

Dominguez Channel Sub-Basin

The Dominguez Channel Sub-Basin is bounded generally by Sepulveda Boulevard to the west, Interstate 405 to the east, Manchester Boulevard to the north, and Interstate 105/Imperial Highway to the south. Approximately 1,100 acres of LAX property drain into the Dominguez Channel Sub-Basin. The Dominguez Channel Sub-Basin is part of the Dominguez Channel Watershed. Surface runoff within the Dominguez Watershed is collected via a series of paved ditches and closed pipe systems before being discharged to the concrete-lined Dominguez Channel. All of the stormwater from the Dominguez Channel Watershed ultimately discharges to an outfall off San Pedro Harbor, located approximately 17 miles southeast of LAX, which is under the jurisdiction of the Los Angeles County Flood Control District (LACFCD).

The portion of the DSA that drains into the Dominguez Channel Sub-Basin includes the area east of Sepulveda Tunnel to the property boundary. The outfall for the area of LAX in the Dominguez Channel Sub-Basin is an 8-foot by 8-foot reinforced concrete box (RCB) culvert located south of Taxiway A. The box culvert flows east where it turns to the south and runs under the west side of Aviation Boulevard. This RCB is fed by an upstream concrete-lined trapezoidal channel that parallels the Burlington North-Santa Fe (BNSF) rail line (Harbor Subdivision) that runs on the west side of Aviation Boulevard.

⁸ Camp, Dresser & McKee, Inc., LAX Master Plan EIS/EIR Technical Report, 12. *Earth/Geology Technical Report*, January 2001.

⁹ *Ibid.*

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Argo Sub-Basin

The Argo Sub-Basin drains west of Sepulveda Boulevard and discharges directly into Santa Monica Bay. This Sub-Basin is generally bounded by Sepulveda Boulevard to the east, the Imperial and Culver Sub-Basins to the west, Manchester Avenue to the north, and the Imperial Sub-Basin to the south.

The Argo storm drain carries runoff from approximately 1,100 acres of the northern portion of LAX as well as smaller portion of the south central portion of the airport. Storm water runoff initially drains into a grassy drainage swale via catch basins, flows west to the Argo storm drain (Argo Ditch) and continues several miles off-shore through a 10-foot diameter pipe into the Pacific Ocean. The Argo Ditch is an open earth bottom ditch that is subject to CDFW and USACE jurisdiction. The offsite storm runoff from north of the airport enters the Argo Ditch through a large dual box culvert and continues in the subsurface under Pershing Drive and off the airport. Storm water collected within the Argo Ditch consists primarily of non-industrial runoff from runways and taxiways, and the northern greenbelt and golf course north of Westchester Parkway. Storm water runoff from a 95-acre portion of runways 25R-7L and 25L-7R at the south central portion of the airport near Sepulveda Boulevard is pumped north, through a subsurface storm drain passing through the Sepulveda tunnel, and eventually into the Argo Ditch.¹⁰ Santa Monica Bay is the primary receiving water body for runoff from LAX west of Sepulveda Boulevard. The Santa Monica Bay is located 0.5 miles west of the DSA and the Santa Monica Bay Watershed extends from Malibu to the north to El Segundo to the south.

The portion of the DSA that drains into the Argo Sub-Basin drains to an existing 9.2-foot-wide by 11-foot-high RCB owned by City of Los Angeles, via a 45-inch RCP owned by LAWA.¹¹ All flows converge to a 90-inch RCP ocean outfall owned by the County of Los Angeles. The South Airfield drainage system under portions of the Imperial Sub-Basin requires improvements.¹²

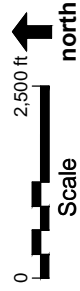
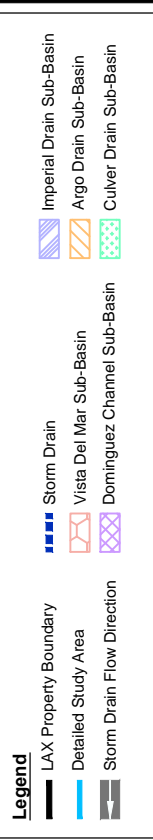
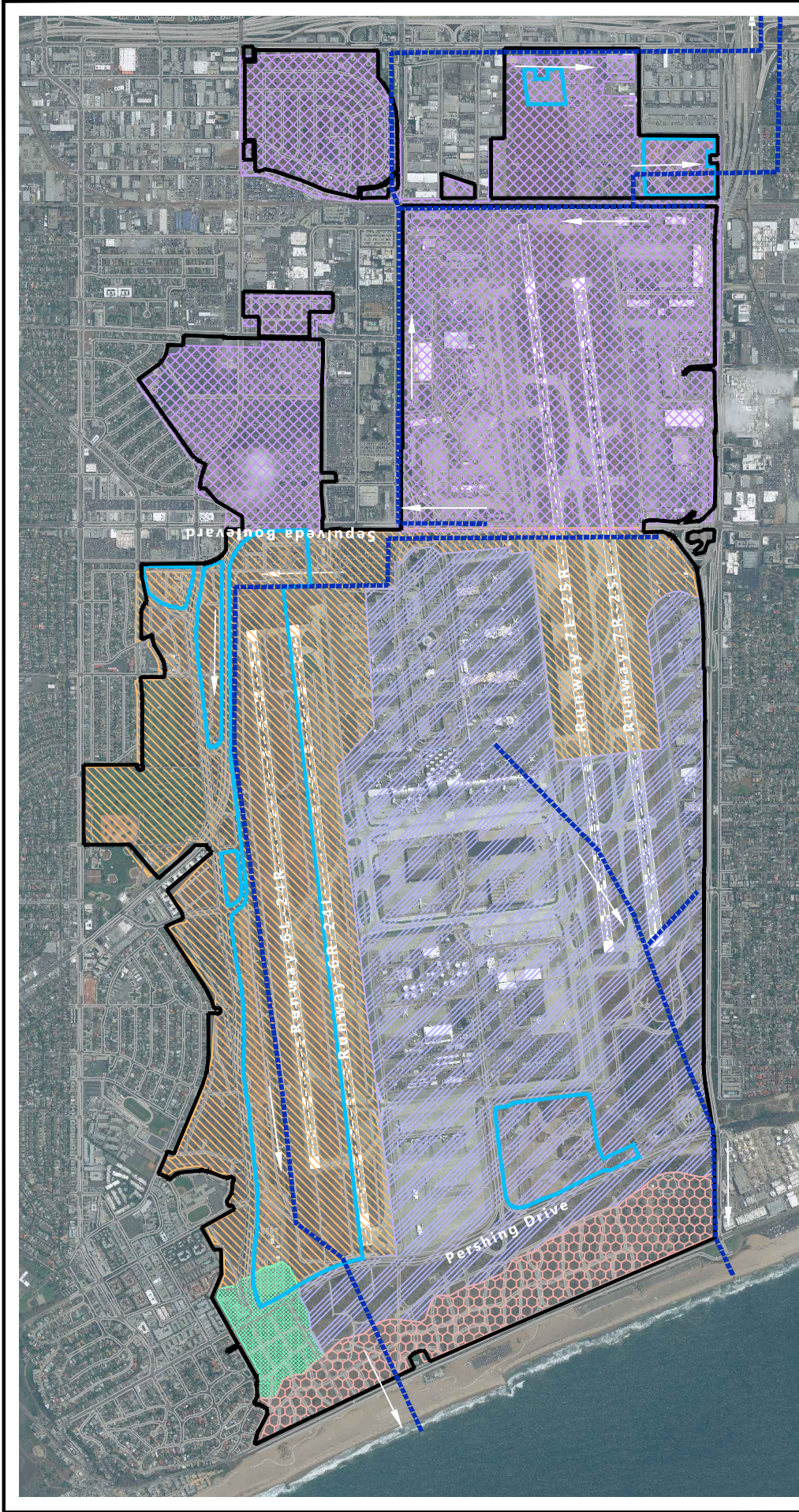
Imperial Sub-Basin

The Imperial Sub-Basin drains west of Sepulveda Boulevard and discharges directly into Santa Monica Bay. This Sub-Basin is generally bounded by the Argo Sub-Basin and Sepulveda Boulevard to the east, the El Segundo Blue Butterfly Habitat Area to the west, the Argo and Culver Sub-Basins to the north, and Imperial Highway to the south.

¹⁰ City of Los Angeles, Los Angeles World Airports, *Storm Water Pollution Prevention Plan, Storm Water Monitoring Program Plan, Associated with Industrial Activities*, September 2009.

¹¹ URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.

¹² URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.



Source: Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography).
 Prepared by: Ricondo & Associates, Inc., May 2014.

LAX Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Draft EIR

Stormwater Detention Sub-Basins within the Detailed Study Area

Figure 4.5-1

4.5 Hydrology and Water Quality

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4.5 Hydrology and Water Quality

Approximately 1,300 acres of LAX property drain into the Imperial Sub-Basin. Storm water runoff discharged to Imperial (County) Storm Drain is collected within dozens of catch basins covering the central and southwest portion of LAX. This system drains runoff from a majority of the industrial areas at LAX. Two main interceptor storm sewers form the main arteries of this drainage basin: one which runs west along World Way West and then south along Pershing Drive, and the second which drains the CTA and flows southwest under the southern runways. These interceptors merge near the southwestern property boundary. These two interceptors convey flow from a total drainage area encompassing 1,299 acres. During low flow (dry weather) conditions and the first surge from a storm event, drainage from the two interceptors flows directly to a concrete-lined 2 million-gallon detention basin. The runoff that accumulates within the detention basin is pumped at a rate of approximately 150 gallons per minute (gpm) through a 36-foot by 10'-foot by 6-foot clarifier to the nearby Hyperion Wastewater Treatment Plant (operated by the City of Los Angeles). Under high flow (wet weather) conditions when influent to the basin exceeds the 150 gpm pumping capacity to Hyperion, the storm water detention basin fills, triggers closure of sluice gates, and diverts the excess (untreated) flow directly to the Santa Monica Bay via the Imperial (County) Storm Drain.¹³ The Santa Monica Bay is located 0.5 miles west of the DSA and the Santa Monica Bay Watershed extends from Malibu to the north to El Segundo to the south.

Impervious Surfaces

As shown in **Figure 4.5-2** and **Table 4.5-4**, the majority of the DSA is permeable (355 acres or 69 percent of the total acreage of 516 acres). The Project area (where the RSA improvements are proposed) is approximately 62% permeable. Additionally, the construction staging areas are primarily permeable (76 percent of the total construction staging area acreage). Existing impermeable surfaces include paved runways, taxiways, and roads. The portions of the DSA that contain permeable surfaces are either used as unpaved roads or unused areas with ground cover species.

¹³ City of Los Angeles, Los Angeles World Airports, *Storm Water Pollution Prevention Plan, Storm Water Monitoring Program Plan, Associated with Industrial Activities*, September 2009.

4.5 Hydrology and Water Quality

Table 4.5-4
Existing Permeability of DSA

DSA Area	Impermeable		Permeable		Total
	Acres	% of Total	Acres	% of Total	Acres
Project Area	100.55	38%	165.45	62%	265
Construction Staging Areas	61	24%	190	76%	250
Total	161	31%	355	69%	516

Source: URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.

4.5.3.3 Existing Water Quality Setting

The 2010 Integrated Report prepared by the SWRCB assessed water quality in the Los Angeles Region, including LAX and the Santa Monica Bay and Dominguez Channel Watersheds. The LARWQCB added 57 water body pollutant combinations to the 2006 California 303(d) List. This list includes water bodies determined to contain pollutants at levels that exceed protective water quality criteria and standards. The Santa Monica Bay and the Dominguez Channel Watersheds are the primary receiving water body for runoff from LAX. At LAX the watershed boundary for these two receiving water bodies is located generally along Sepulveda Boulevard, with areas west of Sepulveda Boulevard draining to the Santa Monica Bay and areas east draining to Dominguez Channel.

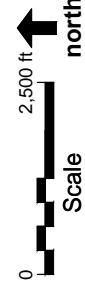
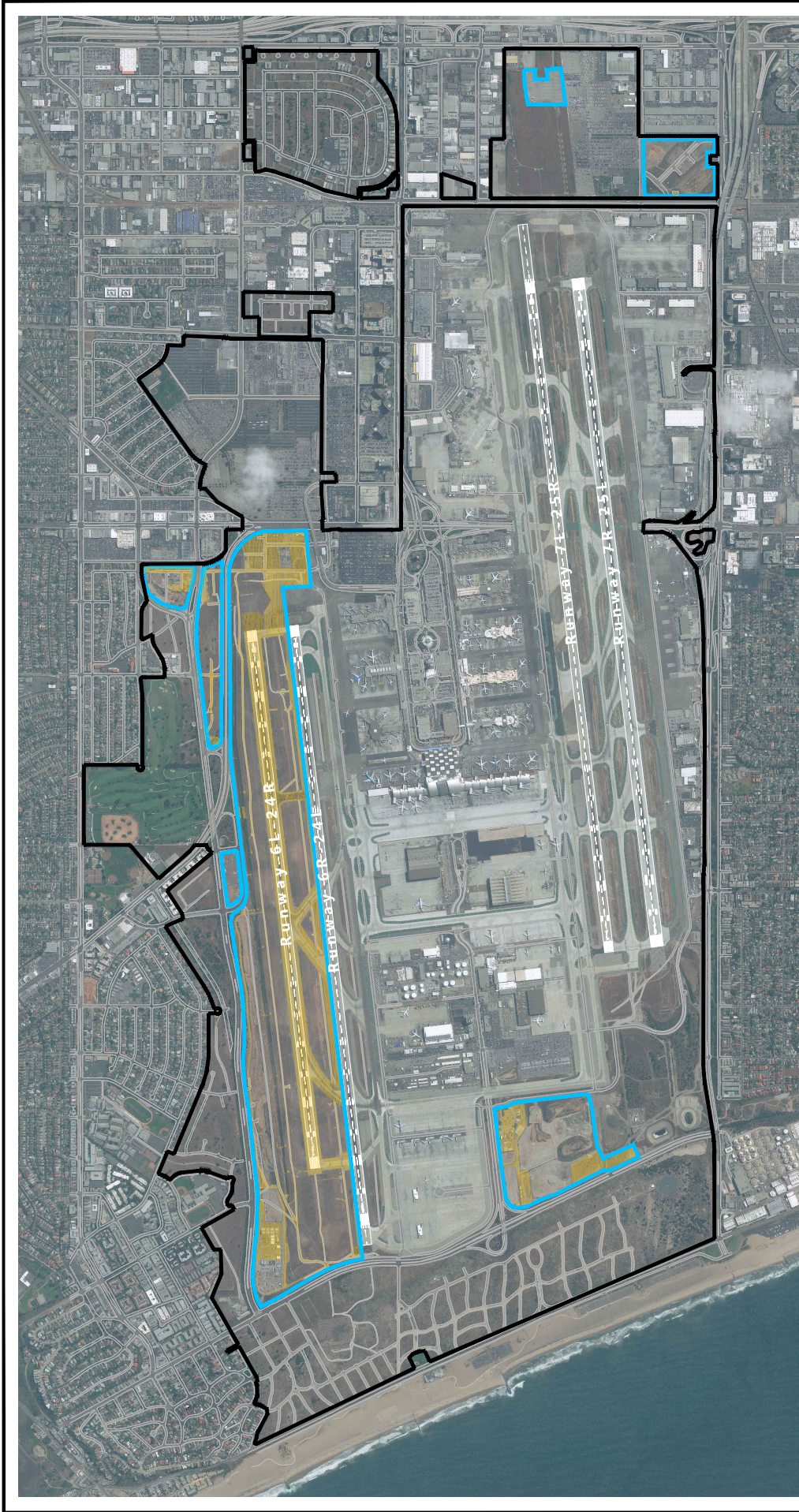
The Santa Monica Bay Watershed encompasses approximately 575 square miles (368,153 acres) of area in the Los Angeles region.¹⁴ The overall area covered by the Argo and Imperial Drainage Sub-Basins represent approximately 3,750 acres or 1-percent of the Santa Monica Bay Watershed (this includes areas of the Argo Sub-Basin outside of the LAX property). The Santa Monica Bay includes 19 pollutants of concern. Ten of these pollutants were identified as potential stormwater runoff from LAX, and include total suspended solids, phosphorous, copper, lead, zinc, biochemical oxygen demand, chemical oxygen demand, oil and grease, Kjeldahl¹⁵ nitrogen, and pathogenic bacteria (fecal coliform, fecal enterococcus, and coliform bacteria).¹⁶

The Dominguez Channel collects storm water from a 46,000-acre watershed before ultimately discharging into San Pedro Harbor. Runoff from LAX into the Dominguez Channel Sub-Basin encompasses approximately 1,100 acres or 2.4 percent of the overall Dominguez Channel watershed. The proposed Project DSA encompasses approximately 516 acres, including all potential construction staging areas, roughly 14 percent of the overall LAX property.

¹⁴ Los Angeles County, GIS Data Portal, *National Hydrography Dataset, Watershed Boundaries*, Accessed online, April 2014: <http://egis3.lacounty.gov/dataportal/2011/05/09/watershed-boundaries>.

¹⁵ The measure of both the ammonia and the organic forms of nitrogen.

¹⁶ City of Los Angeles, Los Angeles World Airports, *South Airfield Improvements Project EIR*, 2006.



Source: Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography).
 Prepared by: Ricondo & Associates, Inc., May 2014.

- Legend**
- LAX Property Boundary
 - Detailed Study Area
 - Impervious Surface

LAX Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Draft EIR

Detailed Study Area Permeability (Existing Conditions)

Figure 4.5-2

4.5 Hydrology and Water Quality

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4.5 Hydrology and Water Quality

Regionally, urban and industrial land uses comprise most of the Dominguez Channel Watershed. The subarea of the watershed within which LAX is located has been designated as impaired due to point source discharges from industrial and municipal activities, 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.¹⁷

The Los Angeles RWQCB Basin Plan identifies the following beneficial uses for Santa Monica Bay and Dominguez Channel (**Table 4.5-5**). Note that these uses are not necessarily in the vicinity of the DSA or LAX.

**Table 4.5-5
Beneficial Uses per the LARWQCB Basin Plan**

Use Category	Definition	Santa Monica Bay	Dominguez Channel
MUN	Waters used for community, military, municipal, or individual water supply systems. Uses may also include drinking water supply.	Existing Beneficial Uses	Potential Beneficial Use
IND	Waters used for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.	Existing Beneficial Uses	N/A
PROC	Waters used for industrial activities that depend primarily on water quality.	Existing Beneficial Uses	N/A
AGR	Waters are used for farming, horticulture or ranching. Uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.	Existing Beneficial Uses	N/A
NAV	Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.	Existing Beneficial Uses	N/A
COMM	Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.	Existing Beneficial Uses	N/A
REC-1	Water contact recreation waters, used for recreational activities involving body contact with water where ingestion of water is reasonably possible. Uses may include swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and use of natural hot springs.	Potential Beneficial Uses	Potential Beneficial Use

¹⁷ City of Los Angeles, Los Angeles World Airports, *South Airfield Improvements Project EIR*, 2006.

4.5 Hydrology and Water Quality

Table 4.5-5

Beneficial Uses per the LARWQCB Basin Plan

Use Category	Definition	Santa Monica Bay	Dominguez Channel
REC-2	Non-contact water recreation waters, used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include picnicking, sunbathing, hiking, beachcombing, camping, boating, sightseeing, and aesthetic enjoyment in conjunction of the above activities.	Intermittent Beneficial Uses	Existing Beneficial Use
MAR	Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).	Existing Beneficial Uses	N/A
SPWN	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.	Existing Beneficial Uses Most frequently used by grunion to spawn.	N/A
WARM	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.	-	Potential Beneficial Use
WILD	Wildlife habitat waters support wildlife habitats that may include the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.	Existing Beneficial Uses	Potential Beneficial Use
SHELL	Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sports purposes.	Existing Beneficial Uses	N/A
MIGR	Uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.	Existing Beneficial Uses	N/A
WET	Uses of water that support wetland ecosystems, including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions which enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants.	Not Applicable	N/A

4.5 Hydrology and Water Quality

Table 4.5-5

Beneficial Uses per the LARWQCB Basin Plan

Use Category	Definition	Santa Monica Bay	Dominguez Channel
RARE	Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.	N/A	Existing Beneficial Use

Source: California Regional Water Quality Control Board, Chapter 2, *Water Quality Control Plan for the Los Angeles Region*, June 1994 (revised table November 2011).

Existing water quality pollutants from the DSA include typical discharges from aircraft and related vehicle operations. The majority of the DSA is currently used for Airport-related uses. Contaminants are industrial in nature, including fuel, oil, and other aircraft and machinery-related chemicals, as well as metals and debris associated with aircraft maintenance, deicing, and more.

4.5.4 Thresholds of Significance

4.5.4.1 Hydrology

A significant hydrology impact would occur if the direct and indirect changes in the environment that may be caused by the proposed Project 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.

Hydrologic analyses in CEQA/NEPA documents consider potential changes in stormwater runoff resulting from the proposed Project by assessing changes in land use, which would produce a change in the amount of impervious area and a potential corresponding change in stormwater peak flow rates. Land use classifications were obtained from the Westchester - Playa Del Rey Community Plan of the City of Los Angeles. Corresponding impervious factors were obtained from the 1973 *City of Los Angeles Storm Drain Design Manual*.

4.5 Hydrology and Water Quality

4.5.4.2 Water Quality

As noted in the Initial Study, for the purposes of this EIR, and in accordance with Appendix G of the CEQA Guidelines, an impact to Hydrology and Water Quality is considered significant if the proposed Project would:

- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

Based on the 2006 City of Los Angeles CEQA Thresholds Guide, the City of Los Angeles would normally find an impact to be significant if discharges associated with the proposed Project would:

- Create pollution, contamination, or nuisance as defined in Section 13050 of the Water Code; or
- Cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body.

4.5.5 Project Design Features

The majority of the proposed Project will be developed on existing impermeable surfaces used for runways and taxiways. The proposed Project would include uses that already exist on the Airport property but would not increase operational capacity at the airport.

4.5.5.1 Argo Ditch Design Features¹⁸

- Removal of the existing headwalls and outlet structures of the two double RCB's.
- Removal of associated bar screens and 4-foot high chain link fence.
- Removal of interfering portion of the existing double RCB flowing into the open channel from the north.
- Removal of an interfering portion of existing over pour structure on the south side of the open channel.
- Construction of approximately 720-feet of cast-in-place triple RCB able to support FAA Airplane Design Group VI aircraft, such as the A380, loading with dimensions and hydraulic sections matching the combined spans of the two existing double RCB's flowing into the open channel.
- Construction of a curved transition from the existing double RCB from the north to the 8-foot by 12-foot portion of the new triple RCB.
- Construction of a new headwall with bar screens and chain link fence atop.
- Construction of a new reinforced concrete-lined outlet structure.
- Earthen-fill of approximately 720-feet of the open section of channel.

¹⁸ URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.

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- Soil removal of the bottom of the existing channel downstream of the new outfall structure to remove excess debris and sediments and to provide sufficient slope for the outfall.

4.5.5.2 Treatment Best Management Practices¹⁹

The surface grading that allows the stormwater to enter the existing storm drains was reviewed. Each pipeline has surface catch basin inlets that allow surface drainage to enter the storm drain pipelines. All new and existing storm drain pipelines drain into the Argo Channel, either by pipeline directly to the open channel or connection to an existing trunk storm drain, with the exception of the pipeline serving Tributary Area 1. The implementation of Treatment BMPs would be in accordance with the City of Los Angeles' *Reference Guide for Stormwater Best Management Practices*, dated July 2000 and with the *LAX Wildlife Hazard Management Plan*.²⁰ Treatment BMPs could include:

- Infiltration/Retention such as infiltration trench, infiltration basin, cisterns, wet (retention) pond, dry (extended detention) pond, dry well.
- Pavements such as asphalt porous pavements, modular concrete block porous pavements, structural soil or boarding/course screens.
- Catch Basin Systems such as generic catch basin filters, fossil filter, Aqua Guard, Ultra-Urban Filter, Enviro-Drain or HydroKleen.
- Vortex/Hydrodynamic Systems such as generic hydrodynamic systems, Downstream Defender,
- Vortechincs, V2B1, Continuous Deflective Separation (CDS), StormTreat, Stormceptor or Aqua-Filter.
- Clarifiers such as generic clarifiers, clarifiers with rain diversion, oil/water separator, Jensen Interceptor, Teichert Interceptor, BaySaver and Isolater.
- End-of-Pipe Systems such as diversion to sewer, disinfection and water reclamation.

Treatment Control BMPs suitable and feasible to the DSA conditions will be considered by the design team involved in the preparation of future design submittals.

The recommended treatment BMP for the proposed Project will use the catch basin inserts (mechanical type) for drop inlets and screens (mechanical type) for curb side inlets. These systems will include oil absorbents and are recommended based on several factors such as:

- The pollutants of concerns are mostly oil/gas spills, fuel exhaust and rubbers due to the roadway operations.

The recommended BMPs can be installed to intercept trash, particles and rubbers, etc. City of Los Angeles, Bureau of Sanitation (BOS) may require a hydrodynamic separation system and

¹⁹ URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.

²⁰ Los Angeles World Airports, *Los Angeles International Airport (LAX) Wildlife Hazard Management Plan*, November 2011.

4.5 Hydrology and Water Quality

oil/water separator installed to follow the pre-treatment to remove fuel exhaust and oil/gas spills. This is suggested and should be considered as an option in future submittals by design teams.

4.5.5.3 Applicable LAX Master Plan Commitments and Mitigation Measures

As part of the LAX Master Plan Environmental Impact Statement/Environmental Impact Report (EIS/EIR), LAWA committed to implementing the following commitment and mitigation measure pertaining to hydrology and water quality to avoid or reduce environmental impacts. Since the DSA is located within the LAX Master Plan boundaries, LAWA will also fulfill the commitments it has made in the LAX Master Plan for the proposed Project. The following commitments are applicable to the proposed Project and are considered in the Hydrology and Water Quality analysis herein.

- **HWQ-1. Develop Detailed Drainage Plan.** Once a Master Plan alternative is selected, and in conjunction with its preliminary design, LAWA will develop a detailed drainage plan of the area within the boundaries of the alternative. The purpose of the drainage plan will be to assess site-specific drainage flows at a design level of detail in order to select the most appropriate mitigation measures, from those identified in this EIS/EIR. LAWA will develop this drainage plan and evaluate drainage capacity using the Peak Rate Method specified in Part G - Storm Drain Design of the City of Los Angeles' Bureau of Engineering Manual. In areas within the boundary of the selected alternative where the surface water runoff rates are found to exceed the capacity of the stormwater 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 stormwater runoff and prevent flooding by adhering to the procedures set forth by the Peak Rate 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 stormwater detention structures
 - Diverting runoff to pervious areas (reducing directly-connected pervious areas)
 - Diverting runoff to outfalls with additional capacity (reducing the total drainage area for an individual outfall)
 - Redirecting stormwater flows to increase the time of concentration

Measures to increase drainage capacity could include:

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

LAWA will also evaluate the effect of the selected Master Plan alternative on surface water quality using the LARWQCB's SUSMP. 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. LAWA will comply with these provisions by designing the stormwater system to meet the requirements of the SUSMP through incorporation of both structural and treatment control BMPs. These BMPs would be applied to both existing and

4.5 Hydrology and Water Quality

future sources with the goal of achieving no net increase in loadings of pollutants of concern. The following list includes some of the BMPs that could be employed to infiltrate or treat stormwater runoff and control peak flow rates:

- Vegetated swales and strips
- Oil/Water Separators
- Clarifiers
- Media Filtration
- Catch Basins Inserts and Screens
- Continuous Flow Deflective Systems
- Bioretention and Infiltration
- Detention Basins
- Manufactured treatment units

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.

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 and that incorporates BMPs to minimize the effect of airport operations on surface water quality and to prevent a net increase in pollutant loads in surface water resulting from the selected Master Plan alternative.

4.5.6 Impact Analysis

4.5.6.1 Construction

Construction activities would require coverage under the State Water Resources Control Board's (SWRCB) National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, 2009-0009-DWQ as amended by 2010-0014-DWQ (General Permit). To obtain coverage under the permit, LAWA would submit Permit Registration Documents that include a Notice of Intent (NOI) to comply with the General Permit; a risk assessment to address project sediment risk and receiving water risk; post-construction calculations; a site map; and a project-specific SWPPP for construction activities, submitted with the appropriate fees.

4.5 Hydrology and Water Quality

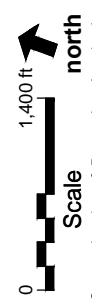
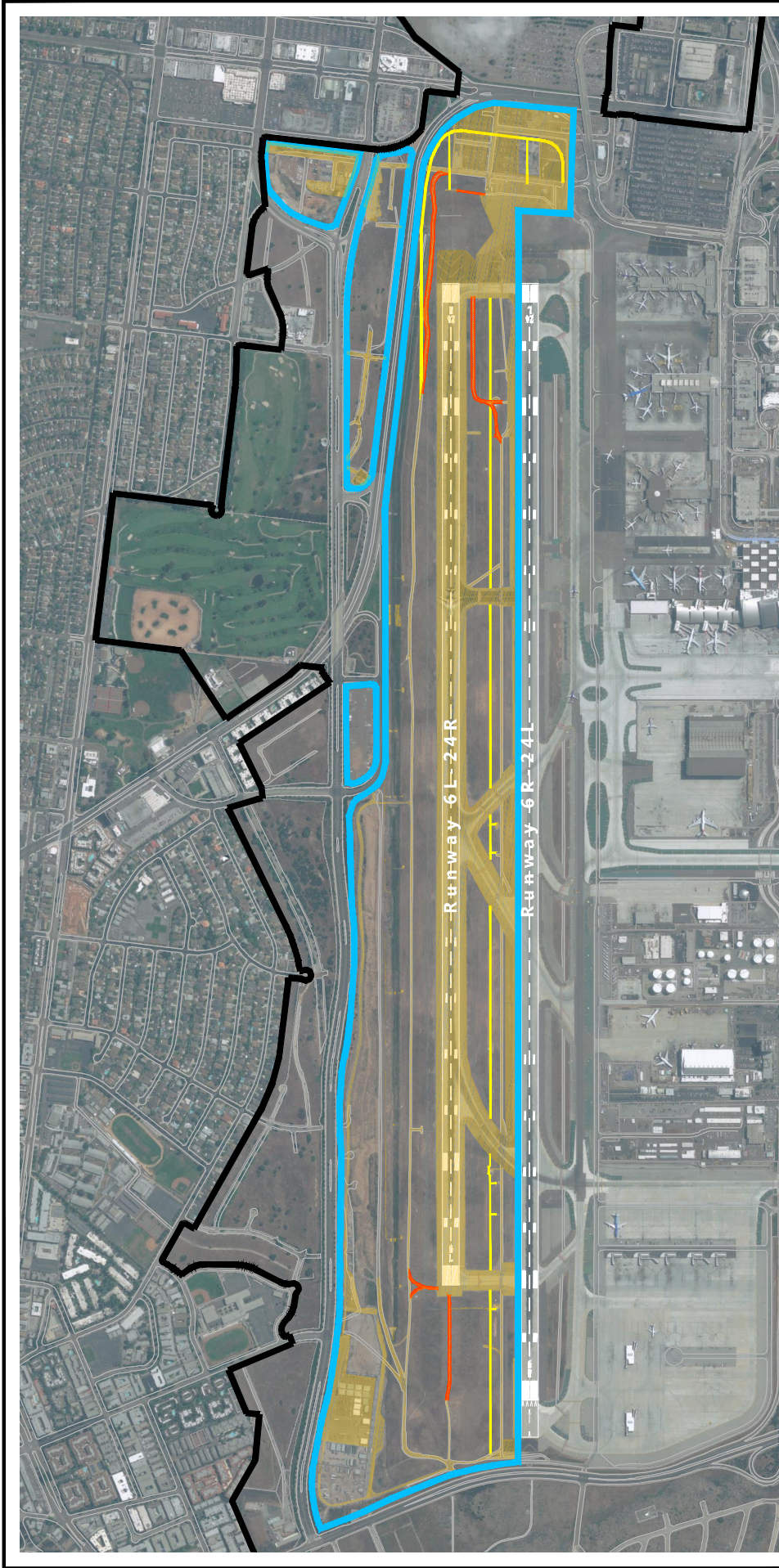
4.5.6.1.1 Hydrology

RSA Improvements

The proposed RSA improvements would increase the amount of impermeable surfaces located in the DSA (**Figure 4.5-3**). During construction, these areas would be, for the most part, permeable until asphalt or Portland Cement Concrete is laid down. Existing drainage patterns would remain although topography would be changed during grading and excavation activities.

As maximum excavation and grading associated with the proposed improvements would be substantially above the historic high groundwater elevation, no impacts related to hydrology would occur as a result of construction of the proposed Project.

Construction of the proposed Project may also require a permit from the City of Los Angeles. The proposed Project would involve grading, excavation, and paving of approximately 2.0 additional undeveloped acres to relocate service roads. City criteria require any disturbed area greater than 1-acre to conform to the SUSMP. This ordinance requires stormwater from initial storm flow or first flush to be treated by one or more of the approved BMPs. Through implementation of LAX Master Plan Commitments and BMPs, construction of the proposed Project would conform to the SUSMP and thus, would not have a significant impact on project site hydrology.



Source: Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography).
 Prepared by: Ricondo & Associates, Inc., May 2014.

Legend

- LAX Property Boundary
- Detailed Study Area
- Service Road Pavement to be Constructed
- Service Road Pavement to be Demolished
- Impervious Surface

LAX Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Draft EIR

Detailed Study Area Permeability (Proposed Conditions)

Figure 4.5-3

4.5 Hydrology and Water Quality

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Pavement Reconstruction

All areas that would involve pavement reconstruction within the DSA are already paved. During construction, some of these areas may be temporarily permeable due to excavation and grading activities. However, these activities would be short-term and would not substantially increase the amount of runoff during construction. In addition, during construction, BMPs would be implemented to reduce the amount of runoff. There are no permeable areas in this part of the DSA that would be made impermeable under the proposed Project. Therefore, construction impacts related to hydrology due to increased runoff would not occur.

Argo Ditch Covering

The proposed Project would cover approximately 720 linear feet of the Argo Ditch at the eastern end of Runway 6L-24R with a culvert drainage structure, constructed in-place. This structure would be designed to handle current stormwater demands and withstand the passage of an Airbus A380 in order to accommodate applicable RSA standards.

The 2013 Jurisdictional Delineation of the Argo Ditch identified seven wetland areas within the man-made Argo Ditch for a total of 1.02 acres of wetlands (Appendix D). Most of these wetlands were associated with culverts or concrete areas within the Argo Ditch. All of these wetlands were within the man-made ditch and are subject to periodic clearing of vegetation under current permits. Impacts pertaining to wetlands and jurisdictional waters of the U.S. are covered in greater detail in Section 4.2, Biological Resources.

The Argo Ditch is a man-made flood control structure that falls under the jurisdiction of USACE and CDFW. In 1998, USACE exerted jurisdiction over the Argo Ditch because it ultimately discharges to the storm drainage system, which outfalls to the Pacific Ocean, a navigable water body pursuant to Section 404 of the CWA. USACE and CDFW agreed to allow LAWA to perform clearance of 0.99-acre of vegetation within the Argo Ditch and to maintain the ditch clear of vegetation. The proposed Project would result in removal of 0.093-acre of wetland vegetation within the area previously cleared for channel clearing, for which mitigation has been successfully completed as documented in a letter dated December 9, 2004.

During construction of the proposed Project, grading and excavation of the previously delineated 0.093 acres of wetlands would occur. These wetlands would then be covered with the concrete box channel to allow conveyance of the Argo Ditch flow. The proposed Project would be an allowable activity pursuant to Nationwide Permit No 39. The USACE has issued nationwide permits for activities that would have a minimal effect on the aquatic environment. No substantial alteration to hydrology, floodwater, or stormwater retention would occur as a reduction of 0.093 acres of wetlands as a result of the proposed Project. All construction activities for the proposed Project would follow all applicable local, state, and federal permits and regulations.

Construction Staging

Usage of the construction staging areas would not change the permeable surface area or the topography of this portion of the DSA and, thus would not increase the amount of runoff generated by this portion of the DSA. Storage of equipment, vehicles, and materials would not

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significantly affect the staging areas' permeability. Therefore, construction impacts related to hydrology due to increased runoff would not occur.

4.5.6.1.2 Water Quality

RSA Improvements

Construction activities for the proposed RSA Improvements would include site preparation, demolition, excavation, grading, and paving. Construction activities may transport sediment, dust, and particles, and construction vehicles and equipment may leak fuels and oils. In addition, demolition of existing pavement (prior to reconstruction), excavation, grading, and paving would create debris on-site. Construction of the proposed Project would be required to conform to the SUSMP. The City of Los Angeles ordinance requires stormwater from initial storm flow or first flush to be treated by one or more of the approved BMPs. Construction BMPs would be implemented to minimize the effects of sediment transport and leakage of fluids from vehicles and equipment. BMPs to control sediment and debris transport include the use of gravel bag filters and filter basins. Pollution prevention and waste management plans will be adopted from the LAX Master Plan Commitments as well as the LAX SWPPP to address the storage, handling, and disposal of fuel, oils, and other wastes from construction. The implementation of BMPs and pollution prevention plans would reduce surface water quality impacts of waters receiving runoff from the DSA.

The construction areas adjacent to Runway 6L-24R would be subject to significant jet blast and aircraft exhaust due to aircraft operations during construction. Jet blast and aircraft exhaust could compromise the effectiveness of many temporary BMP measures, including fiber roll, mulching, temporary seeding, and gravel bags. All temporary construction BMPs would require approval from LAWA Operations to address the need for proper anchorage to prevent compromise, damage, and displacement of BMPs caused by jet blast and aircraft exhaust. Guidelines for the application of specific BMPs are referenced in the LSAG and the LAGBC.

Construction activities would require coverage under the General Construction Permit. To obtain coverage under the permit, LAWA would submit Permit Registration Documents that include a NOI to comply with the SWRCB NPDES General Permit; a risk assessment to address project sediment risk and receiving water risk; post-construction calculations; a site map; and a project-specific SWPPP for construction activities, submitted with the appropriate fees. The SWPPP would incorporate BMPs and ensure that stormwater runoff regulations are followed during construction of the proposed Project. The proposed Project would not provide substantial additional sources of polluted runoff due to the compliance with the regulatory requirements and implementation of construction treatment BMPs and LAX Master Plan Commitments, as required. Therefore, construction impacts related to water quality would be less than significant.

Pavement Reconstruction

Construction activities would be similar to those discussed for the proposed RSA Improvements and would include demolition, grading, and paving. Construction activities may transport sediment, dust, and particles, and construction vehicles and equipment may leak fuels and oils, which would potentially impact water quality and resources. In addition, demolition of existing pavement (prior to reconstruction), excavation, and paving would create debris and wastes onsite. As such, there is potential for similar impacts to runoff during construction, including

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discharge of sediments, while paved earth is temporarily exposed, and debris from pavement demolition is generated. The General Construction Permit and SWPPP required by regulations, as well as the construction treatment BMPs and LAX Master Plan Commitments discussed in Sections 4.5.5.2 and 4.5.5.3, respectively, would apply to this portion of the proposed Project as well. Therefore, construction impacts related to water quality would be less than significant.

Argo Ditch Covering

As discussed above, the proposed Project would result in removal of 0.093-acre of wetland vegetation within the area previously cleared for channel clearing. The Argo Ditch is a man-made flood control structure that falls under the jurisdiction of USACE and CDFW. These wetlands would then be covered with the concrete box channel to allow conveyance of the Argo Ditch flow. The proposed Project would be an allowable activity pursuant to Nationwide Permit No 39. The USACE issues nationwide permits for projects that would have a minimal effect on the aquatic environment. No substantial alteration to hydrology, floodwater, or stormwater retention would occur as a reduction of 0.093 acres of wetlands as a result of the proposed Project. Nor would the wetland's ability to protect water quality, or quantity of municipal water supplies occur. All construction activities for the proposed Project would follow all applicable local, state, and federal permits and regulations.

Construction Staging

Storage of equipment, vehicles, and materials can result in discharge of pollutants to a construction staging area due to accidental leaks and spills, such as gasoline or motor oil. However, the proposed construction staging area is currently utilized as a construction staging area for other LAX projects and, as such, there are BMPs, SWPPPs, and other measures already in place. Therefore, construction impacts related water quality would be less than significant.

4.5.6.2 Operational

Implementation of the proposed Project would not cause a change in aircraft operations or routes, or any other operations at LAX. Components of the proposed Project would add a minimal amount of new impermeable airfield pavement; however, as discussed, drainage patterns would not be substantially altered. Furthermore, the proposed Project would not introduce uses that do not already exist at LAX or increase uses that would increase the potential for pollutant release. Therefore, minimal impacts related to hydrology and water quality are anticipated from the operations of the proposed Project. **Table 4.5-5** below lists the increase in overall flows and impermeable paved areas within the Argo Sub-Basin that would result from implementation of the proposed Project.

4.5.6.2.1 Hydrology

RSA Improvements

Although the proposed Project would increase the amount of impervious surfaces at the northeastern end of Runway 6L-24R, it would not substantially modify existing drainage

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patterns, and the DSA would continue to flow to the Argo Sub-Basin, as under existing conditions (Figure 4.5-3).

Table 4.5-5

Summary of Pre- and Post-Development Overall Flows and Paved Areas

Design Storm	Pre-Development	Post-Development	Net Change
Water Quality Volume Flow Rate (cfs)	23.59	23.95	+0.36
25-Year Storm Flow Rate (cfs)	252.47	254.32	+1.85
Paved Areas (AC)	100.55	102.57	+2.02

Source: URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.

The proposed Project would result in a net increase in the impervious areas of 2.0 acres in the area northeast of Runway 6L-24R (see Table 4.5-5), resulting in an increase of 0.36 cfs in the water quality volume between pre- and post-development conditions.²¹ The proposed Project would also result in a net increase in stormwater runoff for a 25-year storm²² of 1.85 cubic feet per second (cfs). This represents an increased flow of less than 1 percent over the without Project conditions, which has a flood discharge of 252 cfs. As the capacity of the Argo Ditch is greater than 3,500 cfs,²³ the proposed Project would not exceed the capacity of existing or planned stormwater drainage systems.

The proposed Project includes the following Project Design Features that would ensure runoff does not substantially change:

- Construction of new storm drain pipeline segments, inlets, and storm treatment filters.
- Stormwater runoff conveyance structures that accommodate any increased runoff volume generated by the proposed Project.

With implementation of these Project Design Features, construction impacts related to hydrology due to increased runoff would be less than significant. Additionally, the proposed Project would be subject to LAX Master Plan Commitments and Mitigation Measures HWQ-1

²¹ URS Corporation, *Runway 6L-24R & 6R-24L Runway Safety Area (RSA) Improvements And Runway Rehabilitation, Los Angeles International Airport, Engineers Design Report, 30% Design Submittal, Appendix 2 Drainage Report*, November 26, 2013.

²² The recommended storm design flow for the proposed Project is a 25-year frequency design storm which is in conformance with LACDWP Hydrology Manual, Chapter 4.3 (pg. 30), LACDWP, January 2006.

²³ City of Los Angeles, Los Angeles World Airports, *South Airfield Improvements Project EIR, Appendix A*, 2006.

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and MM-HWQ-1. Proposed Project elements would be designed to accommodate any additional future flows as a result of the proposed Project.

Argo Ditch Covering

The proposed Project would involve covering a portion of the Argo Ditch approximately 720 feet in length with a permanent concrete box-channel. This would result in removal of 0.093-acre of wetland vegetation within the area previously cleared for channel clearing. The proposed Project would be an allowable activity pursuant to Nationwide Permit No 39. The USACE issues nationwide permits for projects that would have a minimal effect on the aquatic environment. No substantial alteration to hydrology, floodwater, or stormwater retention would occur as a reduction of 0.093 acres of wetlands as a result of the proposed Project.

Pavement Reconstruction

All areas within the DSA that would involve pavement reconstruction are already paved. No increase in impermeable surfaces would occur in these areas. Consequently, runoff under the proposed Project would be similar as under existing conditions. Therefore, significant impacts related to increased runoff would not occur.

4.5.6.2.2 Water Quality

RSA Improvements

The proposed Project would have the potential to increase pollutant loads in stormwater runoff due to the increased paved area discharging stormwater. Operations of the proposed Project would consist of continued operations on Runway 6L-24R and Runway 6R-24L, which generates unique pollutants, such as heavy metals, organic compounds, tire materials, and fuel exhaust. However, the amount of pollutants during operations would not be greater than current conditions since the proposed Project would not increase operational capacity or the number or type of aircraft operations. Furthermore, pollutant discharge into the stormwater drainage system is highly regulated at LAX, and all operations would be required to follow established measures to meet the requirements of the NPDES permit. Therefore, operational impacts related to hydrology would be less than significant.

Additionally, all applicable LAX Master Plan mitigation commitments and existing regulations, including BMPs, would be applied to pollutant runoff at this site (including, but not limited to vegetated swales and strips, oil/water separators, clarifiers, media filtration, catch basin inserts and screens, continuous flow deflective systems, bio-retention and infiltration, and detention basins). Therefore, no significant effects related to water quality are anticipated as a result of operations of the proposed Project.

Argo Ditch Covering

The proposed Project would involve covering a portion of the Argo Ditch approximately 720 feet in length with a permanent concrete box-channel. This would result in removal of 0.093-acre of wetland vegetation within the area previously cleared for channel clearing. The Argo Ditch

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wetlands were delineated in 1997 and previously mitigated in conjunction with the channel clearing that was authorized by USACE pursuant to Nationwide Permit No. 31 in 1998.²⁴ USACE determined that mitigation was complete and successful on December 9, 2004.²⁵ The proposed Project would be an allowable activity pursuant to Nationwide Permit No 39. The USACE has issued nationwide permits for activities that would have a minimal effect on the aquatic environment.

Pavement Reconstruction

This component of the proposed Project would only replace existing features with new materials and the function of this portion of the DSA would remain the same. As the proposed Project would not alter the number of flights, no increased amount of pollutants would be generated compared to existing conditions. Furthermore, pollutant discharge into the stormwater drainage system is highly regulated at LAX, and all operations would be required to follow established measures to meet the requirements of the NPDES permit. Therefore, operational impacts related to water quality would be less than significant.

4.5.7 Cumulative Impacts

Generally, hydrology and water quality impacts related to increased runoff tend to be site-specific. In other words, although under the proposed Project a net increase of 2.0 acres of permeable area would become impermeable, this would not cause another DSA to modify its permeability such that it would increase/decrease that project's runoff. Additionally, as discussed above, the proposed Project would not substantially modify existing drainage patterns, and the DSA would continue to flow to the Argo Sub-Basin, as under existing conditions. Taken all together, if other projects also have increased runoffs, there is the potential to all contribute cumulatively to impacts related to runoff. However, as discussed above, all LAWA projects would be required to implement BMPs, follow regulations, and apply project design features and LAX Master Plan EIS/EIR Commitments. The proposed Project includes project design features and Treatment BMPs specifically designed to reduce hydrology and water quality impacts to less than significant. Therefore, impacts related to increased runoff under the proposed Project are not cumulatively considerable, and cumulative impacts would be less than significant.

4.5.8 Mitigation Measures

No significant impacts related to hydrology and water quality are anticipated due to Project Design Features, with compliance with regulations, and by implementing Treatment BMPs and LAX Master Plan Commitments. No project-specific mitigation measures are required.

²⁴ California Department of Fish and Game. *Notification No. 5-480-97 (revision 2)*. February 9, 1998. Agreement Regarding Proposed Alteration to Argo Ditch. Executed by Mr. John Driscoll, Executive Director, Los Angeles World Airports, and Ms. Leslie McNair, Environmental Specialist II, California Department of Fish and Game.

²⁵ U.S. Army Corp of Engineers. 9 Dec. 2004. *Letter to Mr. Brown regarding the status of wetland mitigation*. December 9, 2004.

4.5.9 Level of Significance After Mitigation

Impacts related to hydrology and water quality would not require any project-specific mitigation measures and would remain less than significant.

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