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Draft Environmental Impact Report (Draft EIR)

LOS ANGELES INTERNATIONAL AIRPORT (LAX)

UNITED AIRLINES EAST AIRCRAFT MAINTENANCE AND GROUND SUPPORT EQUIPMENT PROJECT

Los Angeles World Airports

[State Clearinghouse No. 2017121019]

City of Los Angeles

Los Angeles World Airports

Los Angeles City File No. EIR-18-012-AD

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1. INTRODUCTION AND EXECUTIVE SUMMARY

This document is a Draft Environmental Impact Report (EIR) for the United Airlines (UAL) East Aircraft Maintenance and Ground Support Equipment (GSE) Project at Los Angeles International Airport (LAX). LAX is owned and operated by the City of Los Angeles, whose Board of Airport Commissioners oversees the policy, management, operation, and regulation of LAX. Los Angeles World Airports (LAWA) is a proprietary department of the City of Los Angeles charged with administering the day-to-day operations of LAX. This Draft EIR has been prepared by LAWA as the lead agency in conformance with the California Environmental Quality Act (CEQA - Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.).

A Notice of Preparation and Initial Study, included as Appendix A of this Draft EIR, was circulated for public review from December 7, 2017 to January 8, 2018. The Initial Study identified the following resource areas for further evaluation in the EIR: air quality (including human health risk), cultural resources (historical resources), greenhouse gas (GHG) emissions, and transportation/traffic, and their related cumulative impacts. As a result, these resources are evaluated further in this Draft EIR.

LAWA determined that impacts related to aesthetics, agriculture and forestry resources, biological resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, and utilities and service systems would be less than significant through the analysis in the Initial Study (see Appendix A); therefore, these topics are not analyzed further in this Draft EIR. In addition, this Draft EIR concludes that impacts to archaeological, paleontological, and tribal cultural resources would be less than significant and that no further evaluation in this Draft EIR is required. Federal, state, regional, and local agencies, as well as the public, were afforded the opportunity to comment on the findings of the Initial Study through the 30-day scoping period associated with circulation of the Notice of Preparation for this Draft EIR.

1.1 Project Objectives

Section 15124(b) of the State CEQA Guidelines states that the project description shall contain "[a] statement of the objectives sought by the proposed project." In addition, Section 15124(b) of the State CEQA Guidelines further states, "[t]he statement of objectives should include the underlying purpose of the project."

The proposed project would consolidate and modernize existing UAL aircraft maintenance and GSE facilities at LAX, which, in turn, would allow for more efficient and effective maintenance of existing aircraft and GSE at the airport. Consolidation of the maintenance facilities on the proposed project site would eliminate duplicate maintenance facilities and operations and would place all of UAL's maintenance activities in closer proximity to its gates in Terminals 7 and 8. The proposed project would reduce the total distance that UAL aircraft currently travel between the gates and the maintenance facilities and would eliminate vehicle trips between the two maintenance facilities.

The specific objectives of the proposed project are to:

- Consolidate/relocate UAL's existing aircraft and GSE maintenance facilities at LAX in a single location to provide for more efficient and effective maintenance of UAL aircraft and equipment at the airport that eliminates duplicate facilities;
- Locate UAL's aircraft and GSE maintenance facilities closer to UAL's gates to increase efficiency by reducing the distance between the gates and maintenance area, consistent with the mission of LAX Airfield Operations of providing a safe and efficient airport operating environment;

- Modernize UAL's maintenance facilities, which were constructed between the mid-1940s and early 1970s when aircraft and GSE equipment were much smaller than they are today, in a manner that is consistent with LAWA's Sustainable Design and Construction Policy and that fulfills LAWA's strategic goal of innovating to enhance efficiency and effectiveness;
- Provide sufficient enclosed aircraft maintenance space and remain over night/remain all day (RON/RAD) aircraft parking spaces on UAL's leasehold to support routine servicing and maintenance of aircraft and meet overnight parking requirements;
- Provide facilities to support the maintenance requirements of UAL's operations at LAX; and
- Fulfill LAWA's strategic goal of sustaining a strong business that recognizes the fiscal impact the airport makes on the regional economy.

1.2 Summary of Proposed Project

The proposed project would consolidate and modernize existing UAL aircraft maintenance and GSE facilities at LAX, which, in turn, would allow for more efficient and effective maintenance of existing aircraft and GSE at the airport. Currently UAL performs maintenance in two areas at LAX: West Maintenance Facility (also known as the United Airlines Maintenance Facility, and formerly known as the Continental Airlines Aircraft Maintenance Hangar) and East Maintenance Facility (also known as the United Airlines Maintenance Operations Center or MOC). The West Maintenance Facility is located in the western portion of LAX, south of World Way West approximately 0.7 mile east of Pershing Drive, and the East Maintenance Facility is located south of Century Boulevard, approximately 0.45 mile east of Sepulveda Boulevard. The distance between the two maintenance facilities is approximately 1.6 miles. Both facilities have aircraft service areas, which include enclosed hangars at the West Maintenance Facility, aircraft parking spots, GSE bays and shops, maintenance and inspection rooms and functions, and office and storage space.

UAL proposes to redevelop its existing eastern facility to consolidate all of UAL's aircraft and GSE maintenance activities. Following implementation of the proposed project, the West Maintenance Facility would remain vacant until such time as LAWA leases the facility to a tenant or proposes redevelopment of the site, which may be subject to its own environmental review and documentation, as appropriate. Reasonably foreseeable uses of the West Maintenance Facility are discussed in Chapter 3, *Overview of Project Setting*, and the cumulative impacts of the proposed project, reasonably foreseeable future use of the West Maintenance Facility, and other development projects at and adjacent to LAX are addressed in Chapter 4, *Environmental Impact Analysis.*

The proposed project would redevelop an approximately 35-acre site in the eastern portion of the airport operations area (AOA). With the exception of a Quonset Hut located near the northern boundary of the project site and Avion Drive (south of Century Boulevard), all the buildings associated with the existing East Maintenance Facility would be demolished. LAWA is planning to relocate the Quonset Hut. This relocation is planned as part of LAWA's ongoing management of historic resources at LAX. The relocation will occur independently of the proposed project.

Although the portion of UAL's current aircraft and GSE maintenance operations that occurs at the West Maintenance Facility would be consolidated with operations located on the east side of the airport, the volume and basic nature of UAL's existing maintenance operations at LAX would not change or increase. Implementation of the project would simply combine/consolidate existing maintenance operations from two areas into one. The consolidation would alter on- and off-airport vehicular movements, as well as aircraft movements on the airfield. Specifically, employees that currently use the surrounding roadway network to drive to the West Maintenance Facility, including Imperial Highway, Pershing Drive, and Westchester Parkway, would instead drive to the East Maintenance Facility, which would be accessed via Century Boulevard or a generally parallel network of side roads located south of Century Boulevard.

Similarly, on the airfield, GSE and aircraft that currently travel on taxiways and taxilanes to access the West Maintenance Facility would instead travel to the East Maintenance Facility. The proposed project would not increase flights and/or aircraft operations at LAX compared to existing airfield conditions and would not affect terminals, the number of gates at LAX, gate frontage, taxiways, or runways. Construction of the proposed project would be phased over approximately 22 months (one year and ten months), beginning with the demolition of existing facilities in the East Maintenance Facility lease area, projected to commence in the fourth quarter of 2018; new construction would extend to late 2020.

1.3 Purpose of this EIR

Because the Initial Study determined that the proposed project may have a significant effect on the environment, the State CEQA Guidelines require the preparation of this Draft EIR. LAWA has undertaken this Draft EIR for the following purposes, as required by CEQA:

- To evaluate the potentially significant environmental effects associated with the implementation of the proposed project;
- To indicate the manner in which those significant impacts can be avoided or substantially lessened;
- To identify any significant and unavoidable adverse impacts that cannot be mitigated;
- To identify a reasonable range of potentially feasible alternatives to the proposed project that would attain most of the project objectives and eliminate any significant adverse environmental impacts or substantially lessen any of the significant effects;
- To inform the general public, the local community, and responsible trustee, State, and federal agencies of the nature of the proposed project, its potentially significant environmental effects, feasible mitigation measures to mitigate those effects, and a reasonable range of potentially feasible alternatives;
- To enable LAWA decision-makers to consider the environmental consequences of the proposed project and make findings regarding each significant effect that is identified; and
- To facilitate any responsible agencies in issuing permits and approvals for the proposed project.

Prior to approving the proposed project, LAWA would be required to certify the EIR. Upon certification, the EIR would serve as the environmental document for LAWA and would be used as a basis for decisions on implementation of the proposed project. Other agencies may also use this EIR in their review and approval processes.

This Draft EIR was prepared in accordance with Section 15151 of the State CEQA Guidelines, which defines the standards for EIR adequacy as follows:

> An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection; but for adequacy, completeness, and good faith effort at full disclosure.

1.4 Organization of this EIR

This Draft EIR follows the preparation and content guidance provided by CEQA and the State CEQA Guidelines. Listed below is a summary of the contents of each chapter of this report.

Chapter 1 – Introduction and Executive Summary

This chapter provides a summary of the proposed project, CEQA compliance requirements, an overview of the report organization, and a discussion of areas of controversy known to LAWA and issues to be resolved. Also included is a summary of the environmental analysis, including impacts and mitigation measures, and identification of the environmentally superior alternative.

Chapter 2 – Project Description

Chapter 2 presents the location of the proposed project, the objectives of the proposed project, and a description of the components and construction schedule of the proposed project. In addition, Chapter 2 identifies the intended use of the EIR and the approvals required for implementation of the proposed project.

Chapter 3 – Overview of Project Setting

Chapter 3 provides an overview of the existing environmental setting related to the proposed project area and the environmental resources evaluated in Chapter 4, *Environmental Impact Analysis*, of this EIR. This chapter also describes other projects proposed at and adjacent to LAX that, in conjunction with the proposed project, need to be considered in order to assess cumulative impacts.

Chapter 4 – Environmental Impact Analysis

The introductory section of Chapter 4 describes the analytical framework for the environmental review of the proposed project. The remaining sections of the chapter provide detailed analysis of the potential environmental impacts of the proposed project on air quality (including human health risk), cultural resources (historical resources), GHG emissions, and transportation/traffic. For each environmental resource, the individual sections describe existing conditions; methodology used in the impact analysis; thresholds of significance; impacts that would result from the proposed project; applicable mitigation measures that would eliminate or reduce significant impacts, if warranted; the residual impacts after mitigation for each environmental issue; and cumulative impacts.

Chapter 5 – Alternatives

As required by CEQA, Chapter 5 identifies and evaluates a range of potentially feasible alternatives that would avoid or substantially reduce any significant effects of the proposed project.

Chapter 6 – Other Environmental Considerations

Chapter 6 includes a discussion of issues required by CEQA that are not covered in Chapter 4. This includes growth-inducing impacts, irreversible environmental changes, and unavoidable significant impacts, as well as the impacts of the proposed project determined to be less than significant. This chapter also includes information about the proposed project’s energy consumption and energy efficiency measures.

Chapter 7 – List of Preparers, Parties to Whom Sent, References, NOP Comments, and Acronyms

Chapter 7 provides the following: a list of the individuals from the City of Los Angeles, the applicant, and contractors that performed key roles in the preparation and development of this Draft EIR; a list of the parties to whom this Draft EIR was sent for review or to whom notice of the availability of this Draft EIR was sent; the bibliography of documents used in the preparation of this Draft EIR; a list of agencies, organizations, and individuals who provided comments on the Notice of Preparation/Initial Study; and acronyms used in this Draft EIR.

All documents listed in Section 7.3, *References*, of Chapter 7 are available for public inspection at the following location:

Los Angeles World Airports
One World Way, Room 218
Los Angeles, California 90045

Appendices

The appendices present data supporting the analysis contained in the Draft EIR. The appendices in this Draft EIR include:

Appendix A – Notice of Preparation/Scoping

Appendix B – Air Quality, Human Health Risk Assessment, Greenhouse Gas Emissions, and Energy

Appendix C – Historic Resources Technical Report

Appendix D – Transportation/Traffic

1.5 Summary of Environmental Impacts

Table 1-1 summarizes the environmental impacts from implementation of the proposed project to air quality (including human health risk), cultural resources (historical resources), GHG emissions, and transportation/traffic as identified in Chapter 4, *Environmental Impact Analysis*, of this EIR. It also summarizes the energy impacts discussed in Chapter 6, *Other Environmental Considerations*. In accordance with the requirements of the State CEQA Guidelines, and as further described in Chapter 6, impacts on all other environmental resources, including aesthetics, agriculture and forestry resources, biological resources, cultural resources (archaeological and paleontological resources), geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, tribal cultural resources, and utilities and service systems, were determined to be less than significant and were not evaluated in this Draft EIR.

Table 1-1
Summary of Environmental Impacts Related to the Proposed Project

Resource Category	Impact Before Mitigation	Proposed Mitigation Measures	Level of Significance After Mitigation
Air Quality and Human Health Risk			
Air Quality – Construction	Significant	MM-AQ (UAL)-1. Construction-Related Air Quality Mitigation Measures	Significant and Unavoidable (NO_X - regional construction emissions; PM_{10} and $PM_{2.5}$ localized construction emissions)
Air Quality – Cumulative Construction	Significant	MM-AQ (UAL)-1. Construction-Related Air Quality Mitigation Measures	Significant and Unavoidable (NO_X - regional construction emissions; PM_{10} and $PM_{2.5}$ localized construction emissions)
Air Quality – Operations	Less Than Significant	None Required	Less Than Significant
Air Quality – Cumulative Operations	Less Than Significant	None Required	Less Than Significant
Human Health Risk Assessment – Construction	Less Than Significant	None Required; however, further reduced with implementation of MM-AQ (UAL)-1	Less Than Significant
Human Health Risk Assessment – Cumulative Construction	Less Than Significant	None Required; however, further reduced with implementation of MM-AQ (UAL)-1	Less Than Significant
Human Health Risk Assessment – Operations	Less Than Significant	None Required	Less Than Significant
Human Health Risk Assessment – Cumulative Operations	Less Than Significant	None Required	Less Than Significant
Cultural Resources			
Historical Resources	Significant	No feasible mitigation is available	Significant and Unavoidable
Historical Resources – Cumulative	Less Than Significant	None Required	Less Than Significant
Greenhouse Gas Emissions			
Construction plus Operations	Less Than Significant (Beneficial)	None Required; however, further reduced with implementation of MM-AQ (UAL)-1	Less Than Significant
Transportation/Traffic			
Construction Transportation/Traffic	Less Than Significant	None Required	Less Than Significant
Construction Transportation/Traffic – Cumulative	Significant	MM-ST (UAL)-1. Designated Truck Delivery Hours	Less Than Significant

Table 1-1
Summary of Environmental Impacts Related to the Proposed Project

Resource Category	Impact Before Mitigation	Proposed Mitigation Measures	Level of Significance After Mitigation
Operational Transportation/Traffic	Less Than Significant	None Required	Less Than Significant
Operational Transportation/Traffic – Cumulative	Less Than Significant	None Required	Less Than Significant
Energy Impacts And Conservation (Construction and Operation)			
Wasteful, Inefficient or Unnecessary Consumption	Less Than Significant	None Required; however, further reduced during construction with implementation of MM-AQ (UAL)-1	Less Than Significant
Reliance on Fossil Fuels	Less Than Significant	None Required; however, further reduced during construction with implementation of MM-AQ (UAL)-1	Less Than Significant
Comply with State or Local Plan for Renewable Energy or Energy Efficiency	Less Than Significant	None Required	Less Than Significant

Source: CDM Smith, 2018.

Notes:

NO_X = nitrogen oxides

PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 micrometers

$PM_{2.5}$ = fine particulate matter, or particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers

1.6 Environmentally Superior Alternative

Section 15126.6(e)(2) of the State CEQA Guidelines requires an EIR to identify an environmentally superior alternative. If the environmentally superior alternative is the “no project” alternative, the EIR must identify an environmentally superior alternative among the other alternatives. As further described in Chapter 5, *Alternatives*, the alternatives to the proposed project evaluated in detail in the Draft EIR are:

- **Alternative 1: No Project.** Under Alternative 1, development of a consolidated aircraft and GSE maintenance facility for UAL would not occur. Both the West Maintenance Facility and the East Maintenance Facility would remain in their existing state; that is, both facilities would continue to be used for aircraft and GSE maintenance and the physical conditions associated with the two sites and their activities would remain essentially the same as under baseline conditions. This would require modification and extension of UAL’s current lease on the West Maintenance Facility. Current inefficiencies associated with operation of two separate maintenance facilities would continue, and UAL aircraft would continue to travel long distances to reach the West Maintenance Facility from the gates at Terminals 7 and 8. Moreover, the existing maintenance facilities, which were constructed between the mid-1940s and the 1970s, would not be modernized. Existing deficiencies in the buildings, such as aging infrastructure and inaptly sized and located facilities, would be unimproved. All UAL aircraft at the East Maintenance Facility would continue to be serviced out-of-doors (i.e., at RON spaces on the apron) due to the lack of a hangar of sufficient size to accommodate the aircraft. Under this alternative, a consolidated, modernized aircraft maintenance and GSE facility for UAL would not be constructed on the proposed project site.
- **Alternative 2: West Maintenance Facility Consolidation.** Under Alternative 2, UAL would consolidate all aircraft and GSE maintenance activities at the current West Maintenance Facility. This would require modification and extension of UAL’s current lease on the West Maintenance Facility. The leasehold would be extended north and east to encompass a portion of the current surface parking lots located south of the former CAL Training Center Building. In order to accommodate the consolidated activities, the existing buildings would be substantially refurbished or altered to provide additional GSE bays, paint booths, and office space, to the extent possible. The narrow-body aircraft hangars would be modified to include doors to accommodate maintenance functions that are required to be conducted in an enclosed space. This alternative would provide 15 or fewer aircraft parking positions. Operational changes would need to be implemented to continue to conduct maintenance activities and provide aircraft parking. These changes would be expected to require additional aircraft movement around the airfield.
- **Alternative 3: Reduced Development.** Under Alternative 3, UAL would consolidate all aircraft and GSE maintenance activities at the East Maintenance Facility. However, instead of demolishing both hangars, only Hangar 2 (the easternmost hangar) would be demolished. A new GSE facility and yard would be constructed north of the existing hangars and a new, single-bay aircraft maintenance hangar would be constructed to replace Hangar 2. Hangar 1 (the westernmost hangar) would be used for aircraft maintenance-related support uses, such as stores. The single bay would provide room for three narrow-body aircraft or one large-body aircraft. This is less hangar space than under existing conditions and would be less aircraft space than provided by the proposed project or by Alternative 2. In addition, the project site would accommodate 10 outdoor aircraft parking positions. Operational changes would need to be implemented to continue to conduct maintenance activities and provide aircraft parking. These changes would be expected to require additional aircraft movement around the airfield.

Based on the analysis in Chapter 4, *Environmental Impact Analysis*, and Chapter 5, *Alternatives*, Alternative 1, the No Project Alternative, is considered to be the environmentally superior alternative. Alternative 1 would avoid all construction impacts of the proposed project, including significant unavoidable temporary construction-related air quality impacts, and it would avoid the significant unavoidable impact to historical resources that would occur under the proposed project. It should be noted that Alternative 1 would have greater operational air pollutant and GHG emissions than the proposed project and would result in a less efficient consumption of energy resources as compared to the proposed project. Moreover, the No Project Alternative would not meet many of the objectives of the proposed project, which are identified in Section 1.1, *Project Objectives*, above, and in Chapter 2, *Project Description.*

In accordance with the State CEQA Guidelines requirement to identify an environmentally superior alternative other than the No Project Alternative, a comparative evaluation of the remaining alternatives indicates that Alternative 2, West Maintenance Facility Consolidation, would be the environmentally superior alternative relative to the other build alternative. Alternative 2 would avoid the significant unavoidable impact to historical resources associated with the proposed project. Alternative 2 would also avoid the significant unavoidable temporary construction-related air quality impacts associated with the proposed project and would have lower construction-related impacts associated with GHG and energy consumption than the proposed project. Construction-related impacts of Alternative 2 on transportation/traffic would be less than those of the proposed project, although these impacts would be less than significant under both Alternative 2 and the proposed project (with implementation of mitigation measures). With respect to operations, Alternative 2 would increase operations-related impacts to air quality, GHG, and energy and conservation as compared to the proposed project.

1.7 Areas of Known Controversy and Issues to be Resolved

LAWA is not aware of any areas of known controversy or issues to be resolved related to the proposed project or the EIR.

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2. PROJECT DESCRIPTION

The project description is intended, among other things, to serve as a general description of the project's technical, economic, and environmental characteristics, considering the principal engineering proposals and the supporting public service facilities (such as utilities). (State CEQA Guidelines Section 15124(c)). The proposed project's technical and engineering characteristics are detailed below in Section 2.4, Project Characteristics. The objectives, purpose, and economic characteristics of the proposed project are detailed in Section 2.3, Project Objectives, below.

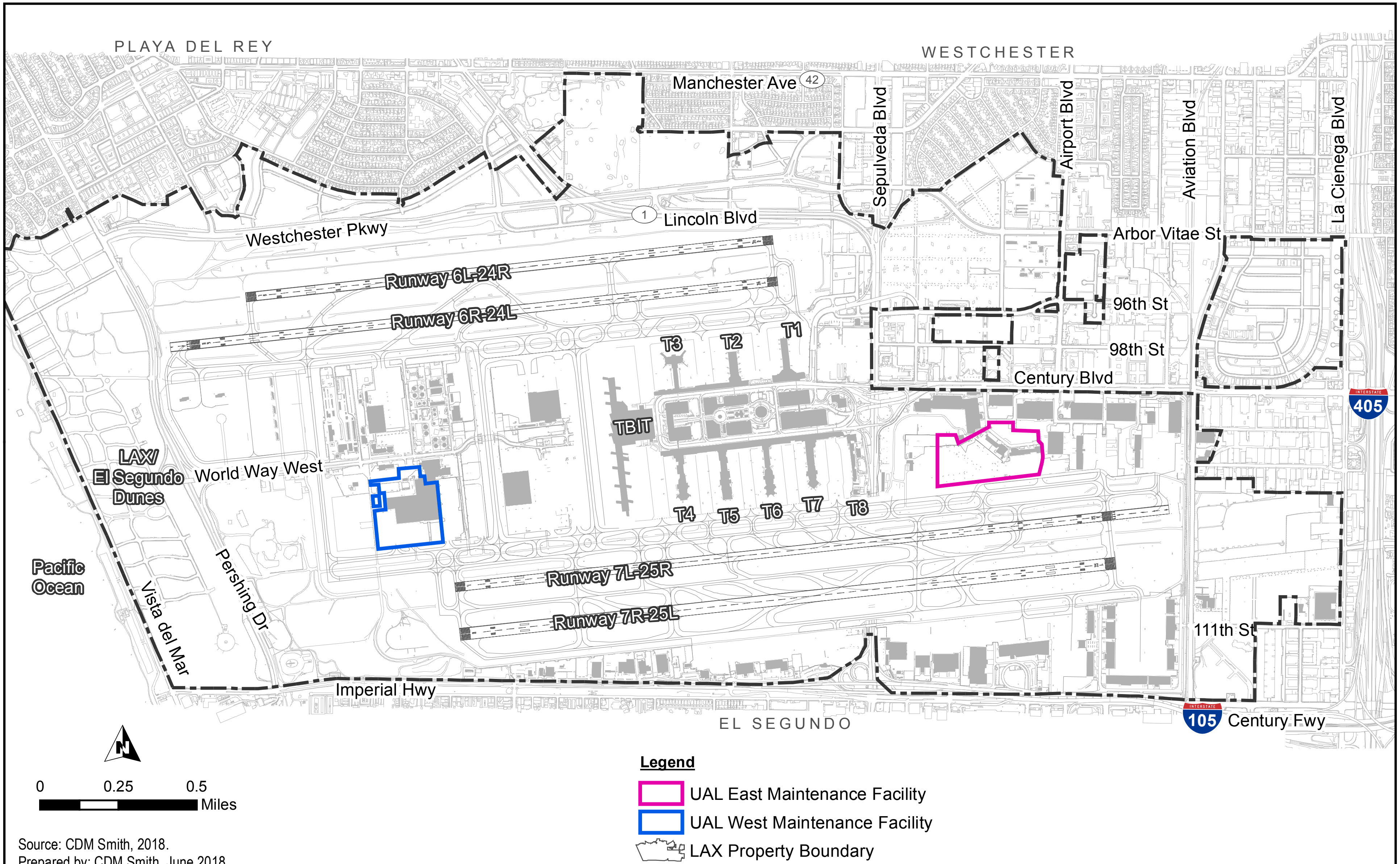
The environmental and engineering characteristics of the proposed project specific to each environmental resource analyzed within this Draft EIR are further detailed in the individual subsections (i.e., Sections 4.1, 4.2, 4.3, and 4.4) of Chapter 4, *Environmental Impact Analysis*. Supporting public services facilities associated with the proposed project are discussed in Appendix A, *Notice of Preparation/Scoping*.

2.1 Project Overview

The proposed project would consolidate and modernize existing United Airlines' (UAL) aircraft maintenance and ground support equipment (GSE) facilities at LAX, which, in turn, would allow for more efficient and effective maintenance of existing aircraft and GSE at the airport. Currently UAL performs maintenance in two areas at LAX: West Maintenance Facility (also known as the United Airlines Maintenance Facility, and formerly known as the Continental Airlines [CAL] Aircraft Maintenance Hangar) and East Maintenance Facility (also known as the United Airlines Maintenance Operations Center or MOC). The location of these facilities is shown in **Figure 2-1**. The West Maintenance Facility is located in the western portion of LAX, south of World Way West approximately 0.7 mile east of Pershing Drive, and the East Maintenance Facility is located south of Century Boulevard, approximately 0.45 mile east of Sepulveda Boulevard. The distance between the two maintenance facilities is approximately 1.6 miles. Both facilities have aircraft service areas, which include enclosed hangars at the West Maintenance Facility, aircraft parking spots, GSE bays and shops, maintenance and inspection rooms and functions, and office and storage space.

UAL proposes to redevelop its existing eastern facility to consolidate all of UAL's aircraft and GSE maintenance activities. Following implementation of the proposed project, the West Maintenance Facility would remain vacant until such time as LAWA leases the facility to a tenant or proposes redevelopment of the site, which may be subject to its own environmental review and documentation, as appropriate. Reasonably foreseeable uses of the West Maintenance Facility are discussed in Chapter 3, *Overview of Project Setting*, and the cumulative impacts of the proposed project, reasonably foreseeable future use of the West Maintenance Facility, and other development projects at and adjacent to LAX are addressed in Chapter 4, *Environmental Impact Analysis.*

The proposed project would redevelop an approximately 35-acre site in the eastern portion of the airport operations area (AOA). With the exception of a Quonset Hut located near the northern boundary of the project site and Avion Drive (south of Century Boulevard), all the buildings associated with the existing East Maintenance Facility would be demolished. LAWA is planning to relocate the Quonset Hut. This relocation is planned as part of LAWA's ongoing management of historic resources at LAX. The relocation will occur independently of the proposed project.



Source: CDM Smith, 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project

Existing UAL Maintenance Facilities at LAX

Figure
2-1

Although the portion of UAL's current aircraft and GSE maintenance operations that occurs at the West Maintenance Facility would be consolidated with operations located on the east side of the airport, the volume and basic nature of UAL's existing maintenance operations at LAX would not change or increase. Implementation of the project would simply combine/consolidate existing maintenance operations from two areas into one. The consolidation would alter on- and off-airport vehicular movements, as well as aircraft movements on the airfield. Specifically, employees that currently use the surrounding roadway network to drive to the West Maintenance Facility, including Imperial Highway, Pershing Drive, and Westchester Parkway, would instead drive to the East Maintenance Facility, which would be accessed via Century Boulevard or a generally parallel network of side roads located south of Century Boulevard. Similarly, on the airfield, GSE and aircraft that currently travel on taxiways and taxilanes to access the West Maintenance Facility would instead travel to the East Maintenance Facility. The proposed project would not increase flights and/or aircraft operations at LAX compared to existing airfield conditions and would not affect terminals, the number of gates at LAX, gate frontage, taxiways, or runways. Construction of the proposed project would be phased over approximately 22 months (one year and ten months), beginning with the demolition of existing facilities in the East Maintenance Facility lease area, projected to commence in the fourth quarter of 2018; new construction would extend to late 2020.

2.2 Project Location

As shown in **Figure 2-2,** the project site is located within the City of Los Angeles, at LAX on LAWA property. The project site is located within the LAX Plan area of the City of Los Angeles, which is in the County of Los Angeles. LAX is the primary airport for the greater Los Angeles area, encompassing approximately 3,800 acres, and is situated at the western edge of the City of Los Angeles.

In the LAX vicinity, the community of Westchester is located to the north, the City of El Segundo is to the south, the City of Inglewood and unincorporated portions of Los Angeles County are to the east, and the Pacific Ocean lies to the west. Regional access to LAX is provided by Interstate 105 (I-105), which runs east-west and is located adjacent to LAX on the south, and the San Diego Freeway (Interstate 405 or I-405), which runs north-south and is located east of LAX. Access to the west side of the airport is via Imperial Highway and Pershing Drive.

The 35-acre project site is located within the eastern portion of LAX, parallel to and south of Century Boulevard (see **Figure 2-3**). The project site includes UAL's existing 32-acre maintenance leasehold, which consists of paved areas currently used for UAL aircraft and GSE maintenance, with two large maintenance bays (referred to as Hangar 1 and Hangar 2 and located at 6020-6024 Avion Drive and 6000-6016 Avion Drive, respectively), apron areas, maintenance areas, storage, office space, and surface parking (Parking Lot H). UAL's cargo building is adjacent to the project site to the northeast. As described in Section 2.4.2, a small portion of the cargo leasehold would be used for electrical equipment for the proposed maintenance facility. The project site also includes a 3-acre parcel to the north of UAL's existing facility, which is currently used as a shared-ride vehicle holding lot by Super Shuttle. Super Shuttle plans to relocate its vehicles in the fourth quarter of 2018. This relocation is occurring independently of the proposed project.

The land use setting around the project site is characterized by airport operations, aircraft maintenance facilities, and cargo facilities. Existing adjacent uses include the LAWA Records Building and American Eagle commuter facility to the west; air cargo facilities and Delta Air Lines aircraft maintenance facility to the northwest; a shared-ride vehicle holding lot and an employee parking structure (referred to as Parking Garage F) to the north; the UAL Cargo building to the northeast; American Airlines Cargo and GSE facility to the east; and the LAX south airfield to the south, specifically Taxiway C, followed by Taxiway B, Runway 7L-25R, Taxiway H (centerline taxiway), Runway 7R-25L, and Taxiway A. Surrounding land uses are identified in **Figure 2-4**.

Source: CDM Smith, 2018.
Prepared by: CDM Smith, March 2018.

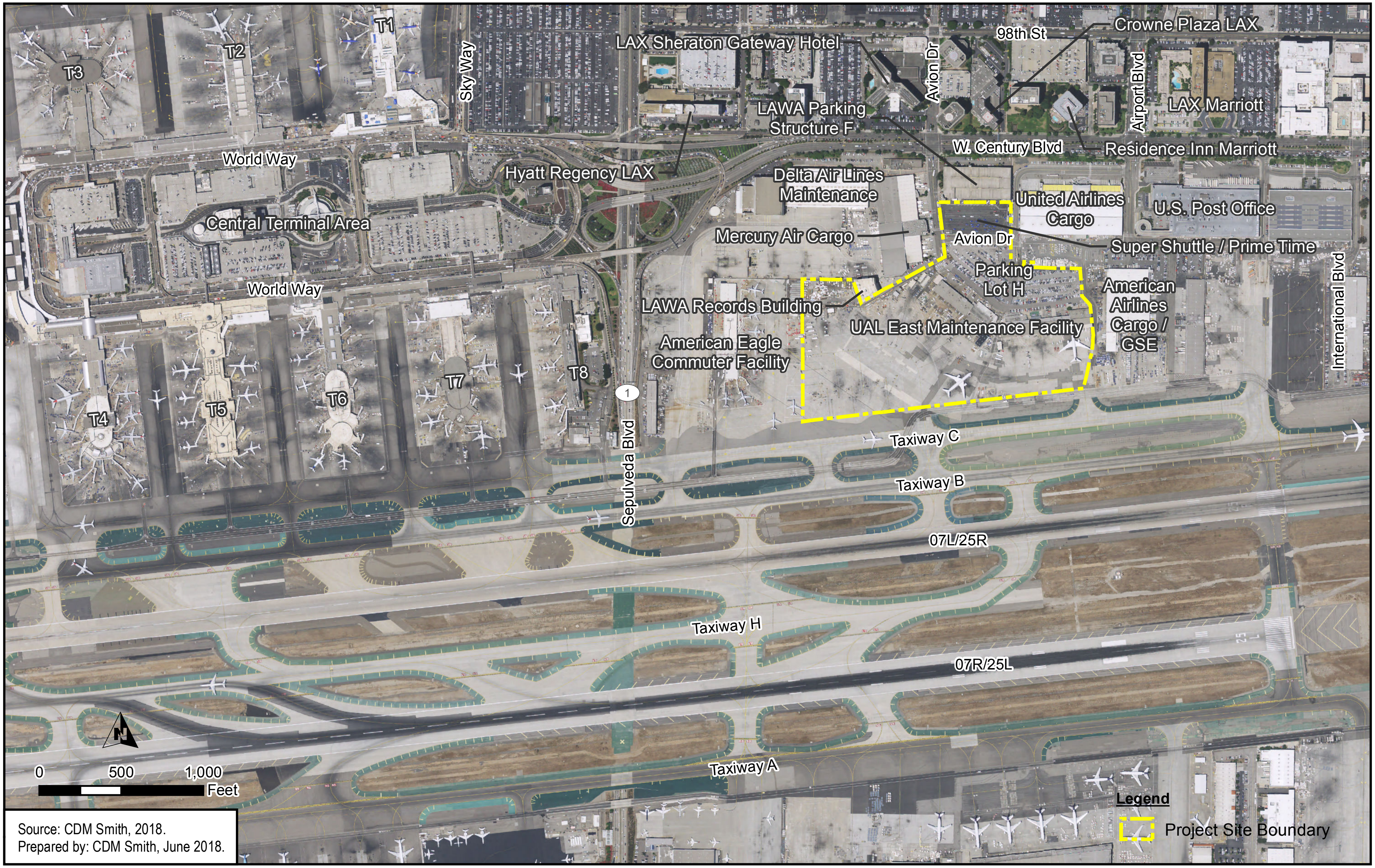
LAX UAL East Aircraft Maintenance and GSE Project	Regional Location Map	Figure 2-2

Source: United Airlines, 2018.
Prepared by: CDM Smith, May 2018.

LAX UAL East Aircraft Maintenance and GSE Project

Project Site

Figure
2-3



Source: CDM Smith, 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project	Project Vicinity and Surrounding Land Uses	Figure **2-4**

The Los Angeles International Airport Plan (LAX Plan), the City of Los Angeles General Plan Land Use Element that governs uses on LAX, designates the project site as Airport Airside.[1] The corresponding LAX Specific Plan designates this area as LAX Zone: Airport Airside Subarea.[2]

2.3 Project Objectives

2.3.1 Background

The proposed project would consolidate and modernize existing UAL aircraft maintenance and GSE facilities at LAX, which, in turn, would allow for more efficient and effective maintenance of existing aircraft and GSE at the airport. Consolidation of the maintenance facilities on the proposed project site would eliminate duplicate maintenance facilities and operations and would place all of UAL's maintenance activities in closer proximity to its gates in Terminals 7 and 8. The proposed project would reduce the total distance that UAL aircraft currently travel between the gates and the maintenance facilities and would eliminate vehicle trips between the two maintenance facilities.

As noted above, the proposed project would modernize UAL's maintenance facilities. The current West Maintenance Facility was constructed in the 1960s and 1970s as part of CAL's Corporate Headquarters facility and the East Maintenance Facility was constructed in the mid to late 1940s for use as interim airline offices and hangars. The buildings were constructed in accordance with building codes in place at the time of construction, which at the time did not include requirements contained in current building codes, including seismic standards or California Title 24 energy standards pertaining to energy efficiency. All air conditioning is provided by window units, which are less efficient than central heating, ventilation, and air conditioning (HVAC) systems. Building systems, particularly those at the East Maintenance Facility, were not constructed to accommodate modern equipment or building needs. Both the building systems and the buildings themselves have exceeded their useful life spans. The East Maintenance Facility does not have sufficient power to adequately meet current electrical demands, including demands for building systems such as air conditioners and air compressors as well as demands associated with modern airline fleets, such as electric Ground Power Units (GPUs) and other electric GSE (eGSE). In addition, the facilities, particularly the East Maintenance Facility, do not have modern fire and life safety systems and would require extensive modifications to meet modern accessible design standards. Moreover, the buildings were constructed when aircraft and GSE equipment were much smaller than they are today. The aircraft hangar at the East Maintenance Facility is not tall enough to accommodate modern aircraft; all aircraft maintenance at the East Maintenance Facility is conducted out-of-doors on the apron area. The equipment bays at the GSE hangar are similarly unable to accommodate large GSE equipment (the doors are not wide enough). Some of the equipment storage areas are located in building spaces that are too small, making it difficult to stack equipment or accommodate forklifts. The East Maintenance Facility lacks sufficient GSE yard space, and the West Maintenance Facility lacks adequate remain overnight/remain all day (RON/RAD) aircraft parking spaces.

2.3.2 Objectives

The specific objectives of the proposed project are to:

- Consolidate/relocate UAL's existing aircraft and GSE maintenance facilities at LAX in a single location to provide for more efficient and effective maintenance of UAL aircraft and equipment at the airport that eliminates duplicate facilities;

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1 City of Los Angeles, Department of City Planning, *LAX Plan*, adopted December 14, 2004, last amended June 7, 2017. Available: https://www.lawa.org/en/lawa-our-lax/plan-and-ordinances.

2 City of Los Angeles, Department of City Planning, *Los Angeles International Airport (LAX) Specific Plan*, adopted December 14, 2004, last amended September 8, 2017. Available: https://www.lawa.org/en/lawa-our-lax/plan-and-ordinances.

- Locate UAL's aircraft and GSE maintenance facilities closer to UAL's gates to increase efficiency by reducing the distance between the gates and maintenance area, consistent with the mission of LAX Airfield Operations of providing a safe and efficient airport operating environment;[3]
- Modernize UAL's maintenance facilities, which were constructed between the mid-1940s and early 1970s when aircraft and GSE equipment were much smaller than they are today, in a manner that is consistent with LAWA's Sustainable Design and Construction Policy[4] and that fulfills LAWA's strategic goal of innovating to enhance efficiency and effectiveness;[5]
- Provide sufficient enclosed aircraft maintenance space and RON/RAD aircraft parking spaces on UAL's leasehold to support routine servicing and maintenance of aircraft and meet overnight parking requirements;
- Provide facilities to support the maintenance requirements of UAL's operations at LAX; and
- Fulfill LAWA's strategic goal of sustaining a strong business that recognizes the fiscal impact the airport makes on the regional economy.[6]

2.4 Project Characteristics

2.4.1 Existing Facilities

The proposed project would consolidate and modernize UAL's existing aircraft and GSE maintenance, storage, and office functions from two existing locations into a single location. Following is a description of the existing facilities under lease to UAL at the two locations.

2.4.1.1 West Maintenance Facility

The West Maintenance Facility is situated on approximately 28 acres in the western airfield (see Figure 2-1). The facility consists of a four- to five-bay hangar; GSE storage and maintenance area, including 9 service bays, 1 paint bay and 1 wash bay; apron area (with a total of 15 aircraft parking positions under baseline conditions and 6 blast fences[7]); and maintenance support stores and equipment. The total building area associated with the West Maintenance Facility is approximately 593,050 square feet. The current building area contains more building space than currently needed by UAL. Aircraft maintenance activities conducted at the West Maintenance Facility include routine scheduled maintenance checks (referred to as A-checks), and other maintenance activities. Employee parking for the West Maintenance Facility is provided in lots in the vicinity of the hangar, with access provided via World Way West. The apron area located to the south and west of the hangar is bordered by blast fences. Other surrounding land uses include the LAX south airfield to the south; American Airlines operations facilities

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3 City of Los Angeles, Los Angeles World Airports, *Airfield Operations Mission Statement*, 2017. Available: http://www.losangelesinternationalairport.org/airops.aspx?id=850.

4 City of Los Angeles, Los Angeles World Airports, *LAWA Sustainable Design and Construction Policy,* September 7, 2017. Available: https://lawa.org/-/media/lawa-web/tenants411/file/lawa-sustainable-design-and-construction-policy.ashx?la=en&hash=943CF9EB68DA44DB4209F5832242C38BEA4E3289.

5 City of Los Angeles, Los Angeles World Airports, *Aerogramme: LAWA Unveils New Strategic Plan,* November 2016. Available: https://www.lawa.org/-/media/lawa-web/lawa-newsletter/aerogramme/aero_newsletter_2016_nov.ashx?la=en&hash=A7A17C484C82046DC6CC323D2CACBB211F48422.

6 City of Los Angeles, Los Angeles World Airports, *Aerogramme: LAWA Unveils New Strategic Plan,* November 2016. Available: https://www.lawa.org/-/media/lawa-web/lawa-newsletter/aerogramme/aero_newsletter_2016_nov.ashx?la=en&hash=A7A17C484C82046DC6CC323D2CACBB211F48422.

7 A jet blast deflector, or blast fence, is a safety barrier that is used to substantially reduce or eliminate the damaging effects of jet blast or propeller wash from run-up areas (U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular AC 150/5300-13A, *Airport Design*, September 28, 2012, updated February 26, 2014).

and Compass Airlines aircraft maintenance facilities to the north and east; a building formerly occupied by Chelsea Food Services kitchen to the northeast; and the former CAL General Office (GO) and Training Center buildings, which are vacant, farther north.

2.4.1.2 East Maintenance Facility

The East Maintenance Facility consists of two large structures designated “Hangar 1” and “Hangar 2” (although neither is an enclosed hangar capable of holding an aircraft, as further described below), an apron area providing 19 individual aircraft parking positions, maintenance areas, stores, and office space, on approximately 32 acres in the eastern airfield. Hangar 2 was constructed in 1944 and Hangar 1 was constructed in 1946. Hangar 1 is a two-story building that is used for GSE storage and maintenance, including support functions on the ground level, and offices on the second floor. Hangar 1 includes 10 GSE service bays and 2 paint bays. Hangar 2 is a tall, wide, open-faced structure that contains equipment and facilities used for various aircraft maintenance functions performed on aircraft parked outside on the adjacent apron. Such aircraft maintenance functions include routine repair, inspection, and modification of aircraft and aircraft components; cabin checks; and engine wash. Hangar 2 also contains offices and support rooms that serve employees (locker facilities and break room/shower facility), as well as a training facility. The total building area of the East Maintenance Facility is approximately 135,750 square feet. Also in the vicinity of Hangar 2 are RON/RAD hold areas for aircraft. Employee parking associated with the East Maintenance Facility is located north of the project site (immediately north of Hangars 1 and 2), in Lot H, which is accessed from Avion Drive via Century Boulevard.

As discussed further in Section 4.2, *Cultural Resources*, and Appendix C, *Historic Resources Technical Report*, of this Draft EIR, Hangars 1 and 2 comprise two of the three remaining buildings associated with the Intermediate Terminal Facility, which is located east of the existing LAX Central Terminal Area (CTA) on the western and southern sides of Avion Drive. (The third building, which is located adjacent to the project site to the northwest, is currently occupied by Mercury Air Cargo.) The buildings that comprise the Intermediate Terminal Facility are shown in **Figure 2-5**. The Intermediate Terminal Facility was constructed between 1945 and 1947 to temporarily house airport administration and airline offices, passenger terminals, hangars, and aircraft service facilities.[8]

Due to past demolition of the majority of the buildings, and alterations to the remaining buildings, the surviving three buildings do not retain sufficient integrity for listing in the National Register of Historic Places (National Register). However, the two intact buildings referred to as Hangars 1 and 2 retain sufficient integrity to be eligible (as a single resource) for listing in the California Register of Historical Resources (California Register) and for designation as a City of Los Angeles Historic-Cultural Monument.[9]

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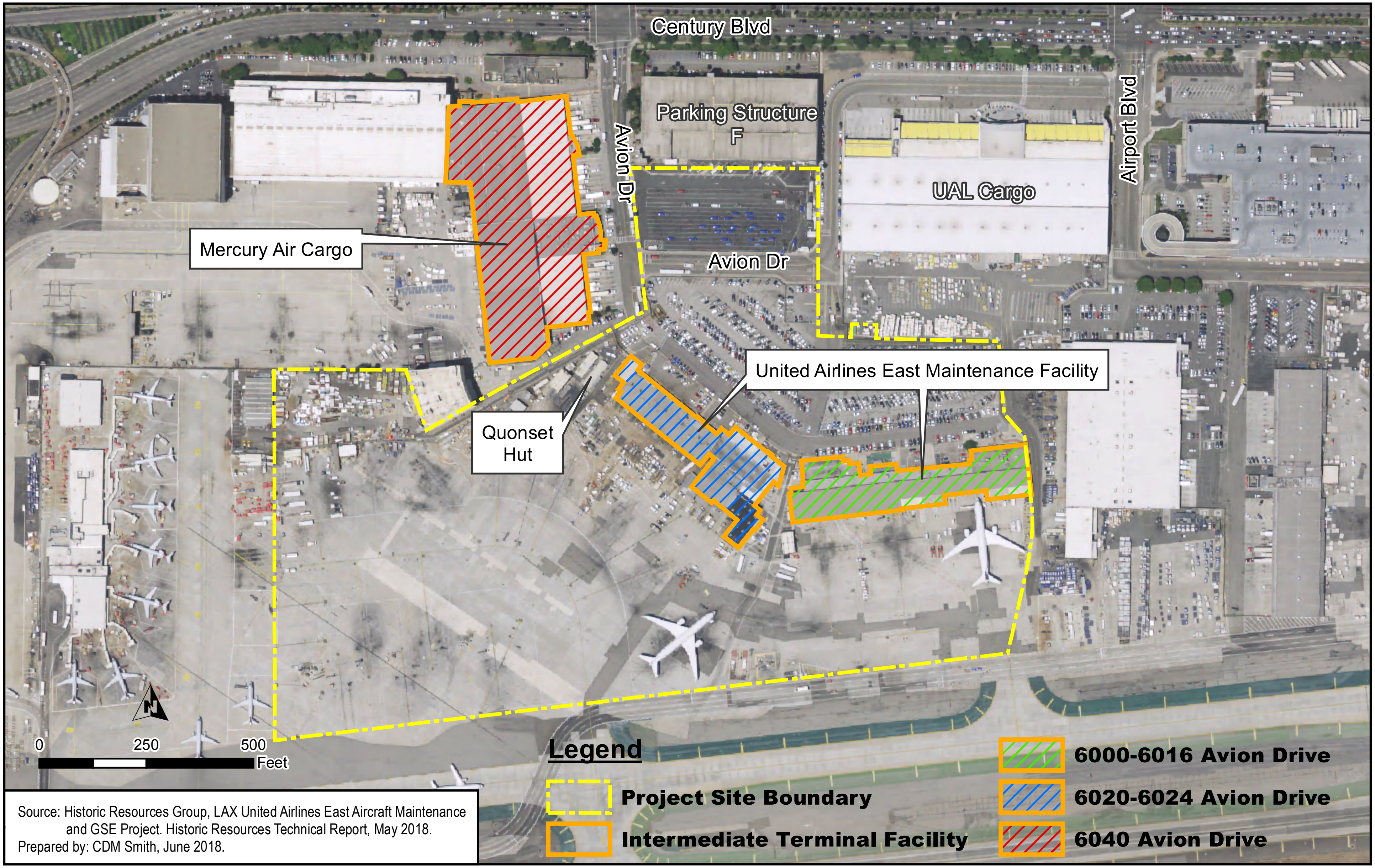
8 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, *(SCH 2015021014)*, Appendix J, LAX Preservation Plan, February 2017. Available: https://cloud1lawa.app.box.com/s/ia03fbbop9u07dek6u8jxdr2hua33sdh.

9 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, *(SCH 2015021014)*, Appendix H, Historic Resources Technical Report, Prepared by Historic Resources Group, February 2017. Available: https://cloud1lawa.app.box.com/s/7ggkdvn7nvbzvesasxnb6a6kr4ytew7d.



LAX UAL East Aircraft Maintenance and GSE Project	Historical Resources On and Adjacent to the Project Site	Figure 2-5

The East Maintenance Facility also includes several smaller buildings. One of these is a Quonset hut, which is located northwest of Hangar 1. The Quonset Hut is a semi-cylindrical structure constructed of corrugated steel sheeting placed atop arched metal rib framing. The Quonset Hut at the project site was constructed for UAL in 1947. It is eligible for listing in the National Register and California Register, and for designation as a City of Los Angeles Historic-Cultural Monument.[10] As noted previously, LAWA is planning to relocate the Quonset Hut. The relocation will occur independently of the proposed project.

2.4.2 Project Components

The intent of the proposed project is to consolidate and modernize existing UAL aircraft maintenance and GSE facilities at LAX. Most of the buildings that comprise the existing East Maintenance Facility were constructed in the mid to late 1940s to house airline offices and hangars. These buildings were part of the Intermediate Terminal Facility, which was built to temporarily house airport administration and airline offices, passenger terminals, hangars, and air service facilities, until the permanent airport facilities were opened in the early 1960s. Notwithstanding their original design intent, the building systems have not been significantly upgraded, are inefficient, and are at or beyond their useful lives. In addition, the size of the existing hangars and layout of the apron area do not match current aircraft or GSE fleet requirements.

The main elements of the proposed project are:

- Demolish the existing buildings associated with the East Maintenance Facility (including Hangars 1 and 2), with the exception of the Quonset Hut, which is planned for relocation by LAWA independent of the proposed project.
- Construct and operate a new aircraft and GSE maintenance facility, totaling approximately 411,000 square feet, and consisting of the following elements:
  - Two wide body aircraft hangar bays with approximately 160,000 square feet of floor area and a height of approximately 110 feet, able to serve both narrow-body and wide-body aircraft
  - Aircraft maintenance shops with approximately 74,000 square feet of floor area
  - Aircraft parts/supplies stores with approximately 60,000 to 75,000 square feet of floor area, and an associated storage yard
  - A GSE maintenance facility with approximately 45,000 to 50,500 square feet of floor area, 15 GSE bays, 2 paint bays, 1 wash bay, eGSE charging stations, and an associated storage yard
  - Facility maintenance area with approximately 2,000 square feet of floor area
  - Approximately 10,000 square feet of dock and skywalk support areas
  - Approximately 40,000 to 60,000 square feet of building circulation and support
- Replace/resurface a portion of the apron area and restripe aircraft parking positions.
- Reconfigure the apron and include aircraft parking positions in the hangar for a total of 22 aircraft parking positions on the leasehold, including 6 in the hangar, 6 on the south side of the project site, and 10 within the western portion of the leasehold.
- Provide an aircraft wash pad in a contained area for conducting dry washes of aircraft.[11]

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10 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, *(SCH 2015021014)*, Appendix H, Historic Resources Technical Report, Prepared by Historic Resources Group, February 2017. Available: https://cloud1lawa.app.box.com/s/7ggkdvn7nvbzvesasxnb6a6kr4ytew7d.

11 U.S. Department of Transportation, Federal Aviation Administration, *Aviation Maintenance Technician Handbook – General (FAA-H-8083-30A)*, Chapter 8, 2018. Available: https://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/media/amt_general_handbook.pdf. According to this Handbook, aircraft dry washing is a process that removes airport film, dust, and small accumulations of dirt and soil

- Construct a jet blast deflector, also referred to as a blast fence, on the eastern portion of the project site for the purpose of conducting aircraft engine run-ups.[12] With this blast fence, the proposed project would accommodate aircraft engine run-up activities that would be conducted at the East Aircraft Maintenance Facility approximately 90 percent of the time; the remaining run-ups would occur at other facilities within the airfield).[13]
- Relocate and/or remove utilities, including water and wastewater pipelines, storm drain facilities, clarifiers, fuel lines, and an onsite triturator.[14]
- Replace existing paint booths with a new spray booth that would be required to meet Best Available Control Technology (BACT).[15]
- Install a diesel-powered backup generator to provide emergency power and transformer equipment on a small portion of the adjacent UAL cargo yard.
- Vacate the east-west portion of Avion Drive that abuts Parking Lot H to the north, and relocate Avion Drive south of Parking Garage F, which is located north of the existing shared-ride van lot on the south side of Century Boulevard, as a one-way street with travel from east to west.
- Relocate employee parking from Parking Lot H to Parking Garage F.

Table 2-1 identifies existing and proposed building sizes and aircraft parking positions. **Figure 2-6** illustrates a conceptual site plan for the proposed project. Conceptual floor plans are provided in **Figure 2-7** and **Figure 2-8**.

Table 2-1
Baseline and Proposed Facilities

Facility	Baseline Facilities		Proposed Facilities	
	Approximate Building Area (square feet)	Aircraft Parking Positions	Approximate Building Area (square feet)	Aircraft Parking Positions
West Maintenance Facility	593,050	15	NA	NA
East Maintenance Facility	135,750	19	411,000	22
Total	**728,800**	**34**	**411,000**	**22**

Source: United Airlines, FSB, 2017, 2018.

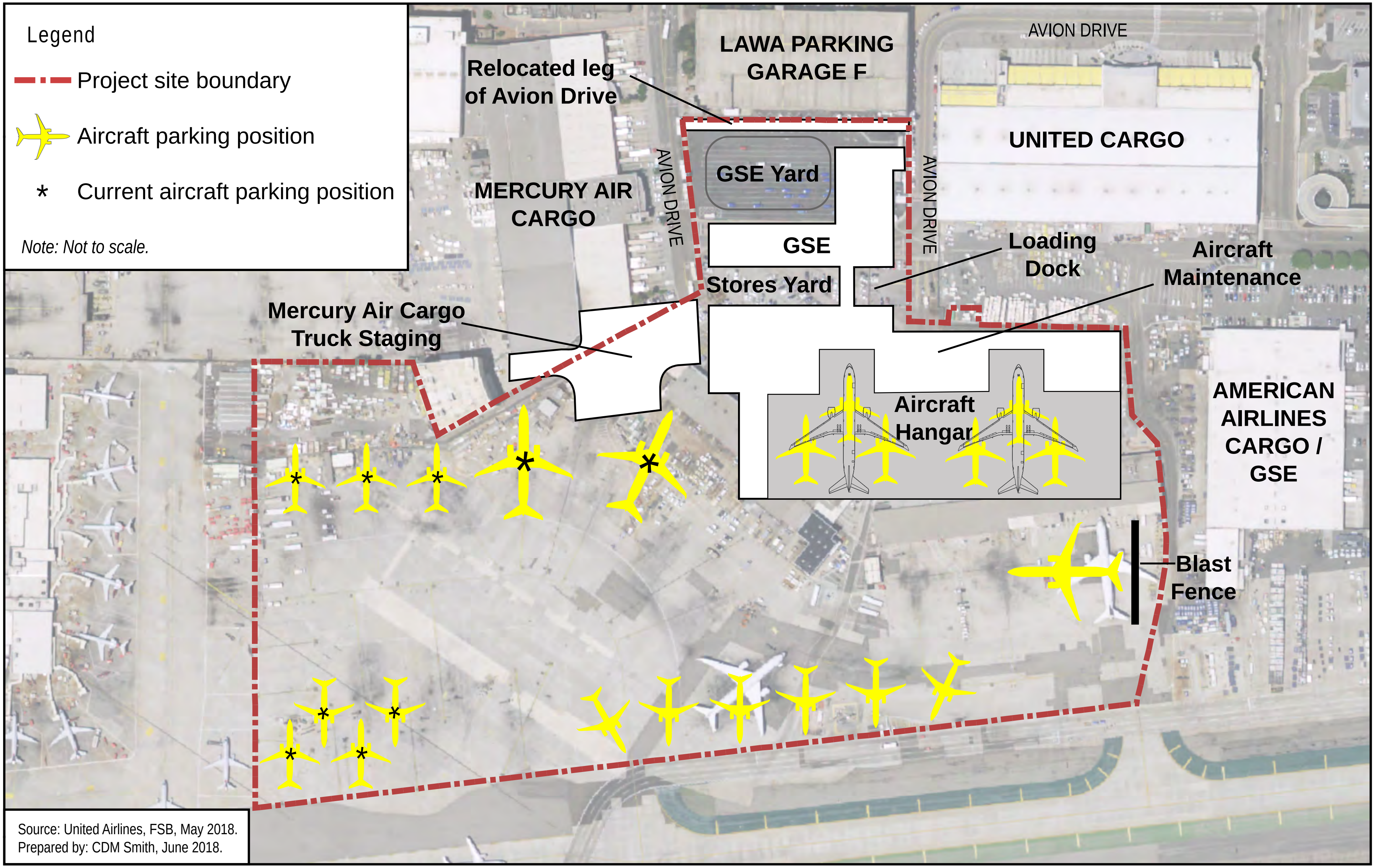
without the use of water. The dry washing process involves applying a cleaning compound that meets international aviation standards to the exterior of the aircraft with sprays, mops, or cloths. Once the compound has dried, the material is removed by dry mopping or wiping with clean, dry cloths.

12 Airlines routinely inspect and maintain their aircraft to ensure the safety of the traveling public, and each aircraft is on a stringent maintenance schedule based on its number of hours in operation. As part of this regularly scheduled maintenance, the Federal Aviation Administration (FAA) requires that aircraft engines be tested at various power levels to ensure their proper operation. These tests are called engine run-ups and occur when aircraft are stationary.

13 Aircraft engine ground run-ups normally require that the aircraft be positioned facing into the wind. At LAX, the predominant wind direction is from west to east, and the proposed blast fence would be positioned to accommodate aircraft engine run-ups in these wind conditions. When UAL aircraft engine ground run-ups are required during conditions where the wind direction is not from west to east, the run-ups would occur at another location at LAX where there is a blast fence available for the non-standard wind conditions.

14 A triturator is a below-grade automated facility that accepts aircraft lavatory sewage (transported from the aircraft via lavatory vehicles) and conveys the material to the sanitary sewer system.

15 The existing spray booths at the West Maintenance Facility would be taken out of operation. It is anticipated that the Permit to Operate for the new spray booth at the proposed project site would be structured to reduce allowable paint and solvent usage below current permitted levels.

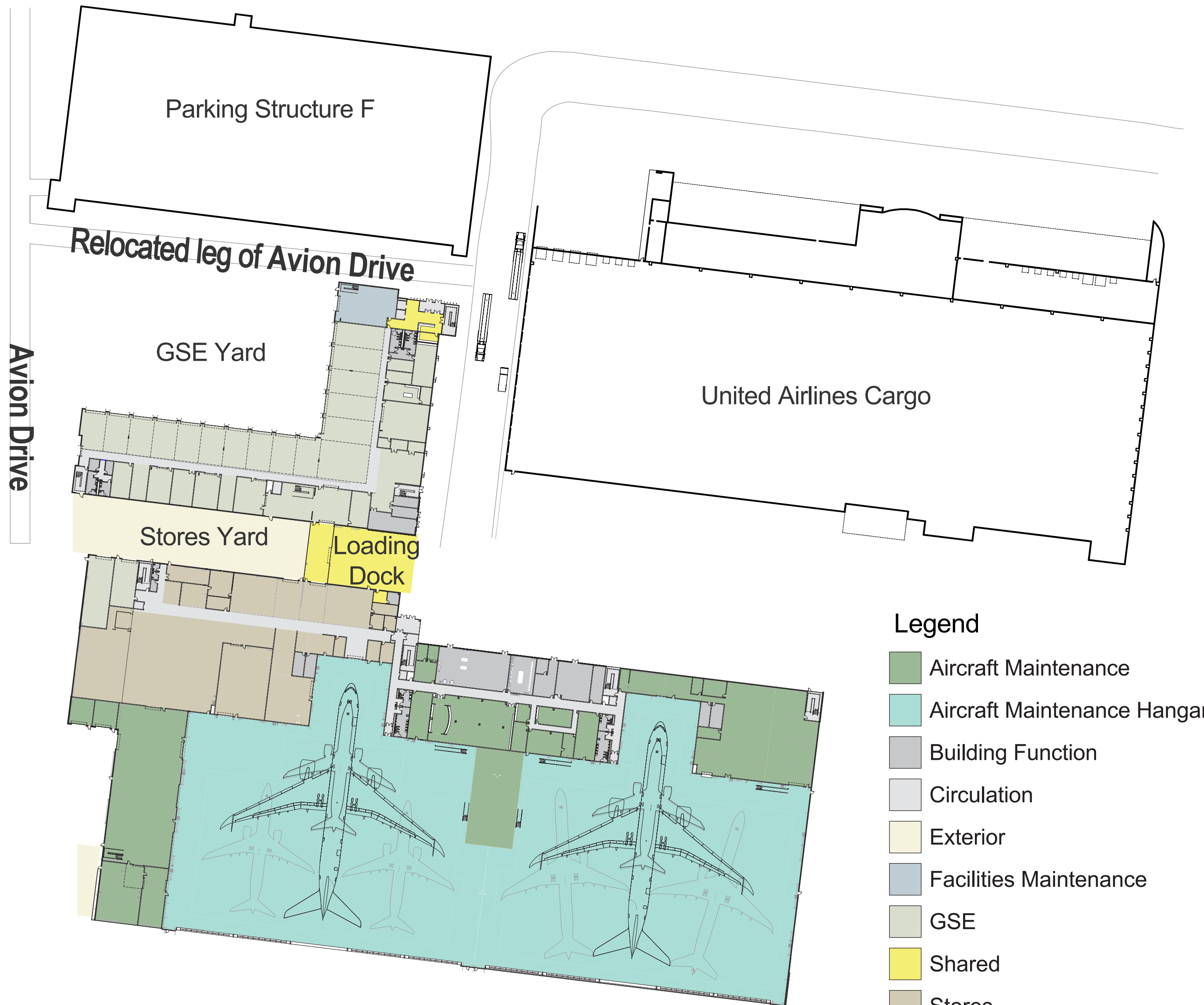


Source: United Airlines, FSB, May 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project

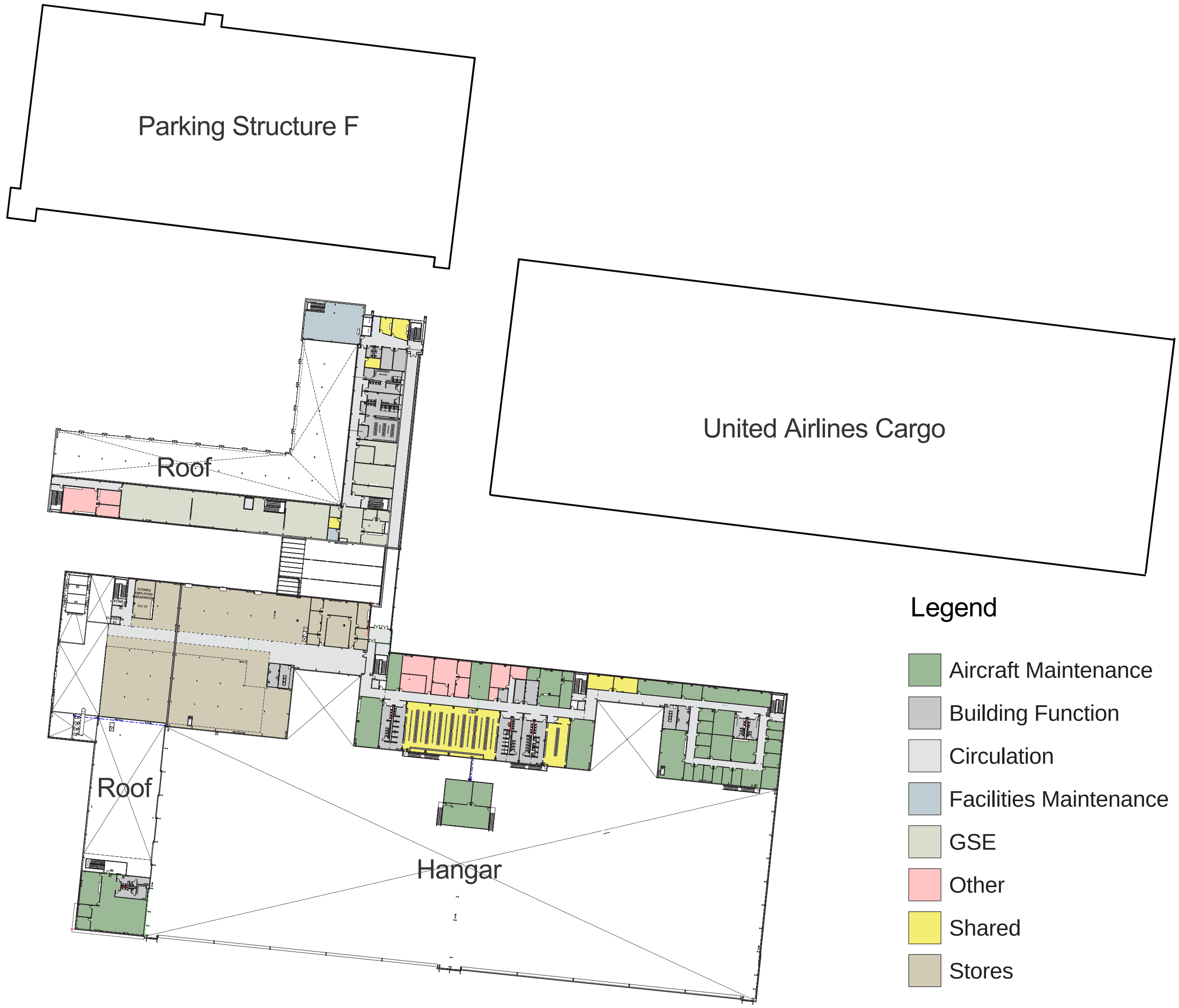
Project Site Plan

Figure
2-6



Source: United Airlines, FSB, May 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project	Proposed Floor Plan - Level 1	Figure **2-7**



Source: United Airlines, FSB, May 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project

Proposed Floor Plan - Level 2

Figure
2-8

With project implementation, the square footage of the maintenance buildings occupied by UAL would be substantially lower than the total square footage of the current east and west maintenance facilities. In addition, UAL would have fewer aircraft parking positions at LAX. Despite these changes, current maintenance activities would not be substantially reduced with project implementation. Rather, building space and ramp areas would be used more efficiently. (A discussion of potential future uses of the West Maintenance Facility is provided in Chapter 3, *Overview of Project Setting*.)

As with the existing facilities, the proposed project would include eGSE charging stations within the GSE maintenance facility. The number of eGSE charging stations would be the same as the current number of stations. In addition, the hangar and aircraft apron would be designed as a "Pad-of-the-Future," with dual 400 hertz (Hz) electric power for all aircraft parking positions, and using stationary or portable GPUs, stationary or portable pre-conditioned air (PCA) units, and/or electrification of GSE maintenance activities. The portable GPUs and PCA units to be used at the facility would include existing diesel, gasoline, and electric-powered units.[16]

As noted above, a small portion of the current UAL cargo yard would be used for project-related electrical equipment. The project site would also incorporate an approximately 3-acre site that is currently used by Super Shuttle as a commercial shared-ride vehicle holding lot. Super Shuttle plans to relocate its vehicles in the fourth quarter of 2018. This relocation is occurring independently of the proposed project.

2.4.3 Parking

As described in Section 2.4.2, as part of the proposed project, employee parking would be relocated from Parking Lot H to Parking Garage F both during and after construction (these parking facilities are identified on Figure 2-4). Parking Lot H is located on the current East Maintenance Facility leasehold, directly north of Hangars 1 and 2, and is used by UAL employees. The parking lot includes a small visitor parking area. There are a total of approximately 760 parking spaces in Parking Lot H. A recent parking survey found that the maximum number of occupied parking spaces over a 24-hour period was 664.[17]

The total number of parking spaces in Parking Garage F is approximately 1,850 spaces. The parking survey found that the maximum number of occupied parking spaces in Parking Garage F over a 24-hour period was 720. Parking Garage F is owned by LAWA. Parking passes to the garage are available for purchase. Approximately 2,250 parking passes have been purchased for the garage. Using an occupancy factor of 2.7 (which is the number regularly used by LAWA) yields an average occupancy of approximately 835 vehicles. Using the calculated occupancy of 835, Parking Garage F has an available capacity of approximately 1,015 spaces.

With implementation of the proposed project, all of the employees that currently park in Parking Lot H would be relocated to Parking Garage F. In addition, following completion of construction, a maximum of approximately 235 employees who currently park at the West Maintenance Facility at any one time would be relocated to the proposed new maintenance facility and would also park in Parking Garage F. In total, with implementation of the proposed project, a maximum of approximately 900 UAL employees would park in Parking Garage F at any one time.[18] If 100 percent occupancy of Parking Lot H were assumed (i.e., 760 vehicles), the total number of parking spaces required to accommodate the relocated UAL employees would be 995.

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16 Although the proposed project would provide infrastructure for electric equipment, the GSE fleet would not change as a result of the proposed project. Rather, any future changes to UAL's GSE fleet, including the addition of new eGSE equipment, would occur independently of the proposed project.

17 The parking survey was conducted by Wiltec, Inc. on February 22, 2018.

18 This is a very conservative estimate, as the employee parking peak at the West Maintenance Facility does not overlap with the employee parking peak at the East Maintenance Facility.

As noted above, Parking Garage F has an available capacity of approximately 1,015 spaces. There is availability and sufficient room in the parking garage to accommodate the UAL employees during project operations.

As stated in Section 2.5.1, the greatest number of construction employee vehicles at any one time during the peak month of construction would be 135.[19] Construction employees would park in Parking Garage F, along with relocated vehicles from Parking Lot H. If 100 percent occupancy of Parking Lot H were assumed (i.e., 760 vehicles), the total number of parking spaces required to accommodate the relocated UAL East Maintenance Facility employees and the construction employees during construction would be 895. There is available and sufficient room in the parking garage to accommodate UAL employees and project-related construction employees during project construction.

2.5 Project Construction

2.5.1 Construction Schedule and Activities

Construction of the proposed project would be phased over approximately 22 months (one year and ten months), beginning with the demolition of existing facilities in the East Maintenance Facility lease area. During construction, some of the existing activities that currently occur at the East Maintenance Facility, including administration and GSE maintenance, would be conducted at the West Maintenance Facility. This would require the relocation of up to 70 employees from the East Maintenance Facility to the West Maintenance Facility during construction. Aircraft maintenance would continue to be conducted at both the West Maintenance Facility and on the ramp area at the East Maintenance Facility during construction, with offices, equipment, and tools in temporary trailers.

Employees who would continue to work on the east side of the airport during construction and who currently park in Parking Lot H would park in Parking Garage F during construction. Employees whose work location would shift to the West Maintenance Facility during construction would park in existing UAL parking lots at the West Maintenance Facility during construction.

Prior to the initiation of demolition activities, abatement of hazardous building materials within the East Maintenance Facility would be conducted to remove any asbestos-containing materials (ACM), lead-containing surfaces (LCS), and other hazardous materials that may be present inside the buildings due to their age. Abatement and disposal of hazardous building materials would be done in accordance with local, state, and federal regulations which govern the removal and disposal of hazardous building materials.

19 A total of 155 construction employees are estimated to work in the morning shift during the peak month of construction. (August 2019). Using a vehicle occupancy of 1.15 employees per vehicle, 135 vehicles would be expected to require parking during the peak construction method. For additional discussion of vehicle occupancy, see Section 2.5.1.

Demolition is projected to commence in the fourth quarter of 2018 and new construction is anticipated to extend to late 2020. The peak construction month for the proposed project is anticipated to occur during August 2019. Construction staging would primarily occur onsite, although steel laydown would occur at an offsite location. Two optional on-airport sites are currently under consideration for steel laydown; only one of these sites would be used during construction. One site is located on the north side of Imperial Highway, east of the LAWA pistol range. The other site is located west of La Cienega Boulevard between W. 104th Street and W. 111th Street. The steel laydown areas are shown on **Figure 2-9**. Trucks leaving the project site would travel north on Avion Drive, east on Century Boulevard, and either north on Aviation Boulevard to Manchester Boulevard, or south on Aviation Boulevard, connecting to I-105, La Cienega Boulevard, or I-405. The haul route for the proposed project is shown on Figure 2-9. Once a secure perimeter is established for the construction site, all demolition and construction activities would occur on the landside and no entry to the AOA would be required. No lane or road closures of public roadways would be required for construction.

Construction worker parking is anticipated to be provided at Parking Garage F, which is located north of the current East Maintenance Facility on the south side of Century Boulevard. Construction shifts would be scheduled to avoid peak commuter periods (7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.). Specifically, the construction schedule is based on a double-shift work schedule with shift times anticipated to occur from 6:00 a.m. to 2:30 p.m. and 3:00 p.m. to 11:30 p.m.; the second shift would only be required periodically. It is estimated that 278 construction employees would access the proposed project construction site on a daily basis during the peak month of construction. A total of 155 construction employees are estimated to work in the morning shift, with 123 employees in the afternoon shift. Vehicle occupancy was assumed to be 1.15 employees per vehicle.[20] By applying the assumed vehicle occupancy factor, it was projected that 242 construction employee vehicles per day during the proposed project construction peak month would access and egress the construction traffic study area in support of proposed project construction, including 135 vehicles in the morning shift and 107 vehicles in the afternoon shift.

Construction activities and staging for the proposed project would be coordinated with LAWA's Coordination and Logistics Management (CALM) Team. The CALM Team helps monitor and coordinate the construction logistics of development projects at LAX in the interest of avoiding conflicts between ongoing airport operations and construction activities. In accordance with standard LAWA practice, construction would be coordinated with the LAWA CALM Team to ensure that occupancy and operation of adjacent and surrounding facilities would be maintained throughout demolition and construction activities.[21]

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20 According to a study published by the Southern California Association of Governments (Southern California Association of Governments, *Regional High-Occupancy Vehicle Lane System Performance Study*, November 4, 2004), the average vehicle occupancy on several regional roadways in the Los Angeles region ranged from approximately 1.15 to 1.30. Provided the temporary nature of construction employment and the lower likelihood of rideshare opportunities, a conservative estimate of vehicle occupancy of 1.15 employees per vehicle was assumed for the proposed project.

21 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Design and Construction Handbook: CALM Review Procedures*, July 2017. Available: https://www.lawa.org/-/media/lawa-web/tenants411/file/calm-review-procedures-tiap-process-july-2017.ashx?la=en&hash=8860839120E2785BBABB24D56C2463F073759290.

Source: CDM Smith, 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project

Proposed Construction Haul Routes and Steel Laydown Areas

Figure
2-9

As required by the Los Angeles Department of Building and Safety, LAWA would submit a Haul Route Form and Haul Route Map, as shown on Figure 2-9, identifying routes to be used by trucks to export soil or demolition debris offsite. In addition, in accordance with LAWA procedures, a Site Logistics Plan that identifies construction access and ingress/egress, staging/laydown, etc. would be submitted to the CALM Team.[22]

2.5.2 LAWA Design and Construction Practices

The proposed project would be designed and constructed in accordance with LAWA's Sustainable Design and Construction Policy, which requires that the new building be designed to achieve the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Silver certification.[23] LEED® Silver certification requires a project to be designed in a manner to save energy, water, and other resources, and to generate less waste and support human health. In addition, the proposed project would be required to be constructed in accordance with the Los Angeles Green Building Code (LAGBC), which is based on the California Green Building Code (CALGreen).[24,25]

In addition to the measures required to obtain LEED® Silver certification, LAWA has implemented a wide range of actions designed to reduce temporary, construction-related air pollutant and greenhouse gas emissions from its ongoing construction program and has established aggressive construction emissions reduction measures, including having contractors use newer model construction equipment and heavy duty trucks with low-emission engines or emissions control devices.[26] With respect to the proposed project, mitigation measures have been included in this EIR to address the project's air quality impacts (as described in Section 4.1, *Air Quality and Human Health Risk)*. In accordance with the proposed mitigation measure, on-road haul trucks with a gross vehicle weight rating of at least 14,001 pounds would comply with U.S. Environmental Protection Agency (USEPA) 2010 on-road emissions standards for particulate matter up to 10 micrometers in size (PM_{10}) and nitrogen oxides (NO_X). Contractors for the proposed project would be required to use compatible on-road haul trucks or the next cleanest burning vehicle available. Also in accordance with the proposed mitigation measure, off-road diesel-powered construction equipment greater than 50 horsepower would meet new USEPA Tier 4 (final) off-road emissions standards or the next cleanest equipment available.

The impacts of the proposed project on air quality and greenhouse gas emissions addressed by these measures are discussed in Sections 4.1 and 4.3 of this EIR, respectively. The impacts of the proposed project on water supply addressed by these measures are discussed in Chapter 6 of this EIR and in Attachment A of the Initial Study (included in Appendix A of this Draft EIR). The impacts of the proposed project on solid waste addressed by these measures are discussed in Attachment A of the Initial Study (included in Appendix A of this Draft EIR). The energy implications of the proposed project, including its design and construction practices, are addressed in Section 6.5 of this Draft EIR, with emphasis on avoiding

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22 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Design and Construction Handbook: CALM Review Procedures*, July 2017. Available: https://www.lawa.org/-/media/lawa-web/tenants411/file/calm-review-procedures-tiap-process-july-2017.ashx?la=en&hash=8860839120E2785BBABB24D56C2463F073759290.

23 City of Los Angeles, Los Angeles World Airports, *LAWA Sustainable Design and Construction Policy*, September 7, 2017. Available: https://lawa.org/-/media/lawa-web/tenants411/file/lawa-sustainable-design-and-construction-policy.ashx?la=en&hash=943CF9EB68DA44DB4209F5832242C38BEA4E3289.

24 City of Los Angeles, Los Angeles Municipal Code, Chapter IX, Article 9, *Green Building Code*, as amended.

25 24 California Code of Regulations, Part 11, California Building Standards Commission, *2016 California Green Building Standards Code (CALGreen)*.

26 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Design and Construction Handbook: Design Standards and Guide Specifications, Division I – General Requirements*, July 2017. Available: https://www.lawa.org/-/media/lawa-web/tenants411/file/division-01-july-2017.ashx?la=en&hash=573DEC6E2A9501A7831B7D636A1BAB2F1D639AD3.

or reducing inefficient, wasteful, and unnecessary consumption of energy pursuant to State CEQA Guidelines Appendix F.

2.6 Project Operations

UAL currently conducts line maintenance (as opposed to heavy maintenance) at both the East and West Maintenance facilities at LAX. Line maintenance consists of routine, scheduled maintenance checks (referred to as A-checks and B-checks) and other routine maintenance activities. These types of checks normally occur over the course of a few hours, usually overnight when the aircraft is not in service. During some line checks, situations may be discovered that require the aircraft to undergo additional maintenance over a longer period of time. The reduction in the total building square footage and leasehold acreage associated with the proposed project would not alter the nature and type of aircraft maintenance, or the number of aircraft undergoing maintenance, at LAX. Rather, the consolidation would increase operational efficiency and would "right-size" the space to match the business operations.

2.7 Intended Use of this EIR

Implementation of the proposed project would require approvals from and consultation with federal, state, and regional/local agencies. The EIR will be used by the agencies identified below in connection with permits and approvals necessary for the construction and operation of the proposed project. Federal, state, and regional/local agency actions required for the construction and operation of the proposed project may include, but are not limited to, those described below. This EIR may also be used in connection with other federal, state, or regional/local approvals, permits, or actions that may be deemed necessary for the proposed project, but which are not specifically identified below.

This Draft EIR will be used primarily to (1) inform decision-makers and the public about the potentially significant environmental effects of the proposed project and the ways to avoid or reduce the significant environmental effects to the extent feasible; (2) demonstrate to the public that the environment is being protected; and (3) ensure that the planning and decision-making processes reflect an understanding of the environmental effects of the proposed project.

In addition to use of this EIR by LAWA and the City of Los Angeles City Council and Planning Commission, the proposed project requires various federal, state, and local agency approvals. CEQA requires that all state and local agencies consider the environmental consequences of projects over which they have discretionary authority. These agencies may use this EIR in their respective decision-making and approval processes, and federal agencies may use information in this EIR when conducting NEPA reviews. CEQA further requires that the EIR project description include a list of agencies that are expected to use the EIR in their decision making, a list of permits and other approvals required to implement the project, and a list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies. (State CEQA Guidelines Section 15124(d)(1)) This list of federal, state, and local permits, approvals, and reviews that may be needed to implement the proposed project includes, but is not necessarily limited to, the following:

2.7.1 Federal Actions

- U.S. Department of Transportation, Federal Aviation Administration (FAA) – Approval of the Airport Layout Plan (ALP) for the airport depicting the proposed improvements.[27]
- FAA approval of Form 7460-1 (Notice of Proposed Construction or Alteration) in consideration of Part 77 requirements.[28]

2.7.2 Regional Actions

- South Coast Air Quality Management District (SCAQMD) – Approval of permits required under the Clean Air Act for stationary sources.

2.7.3 Local Actions

- LAWA Board of Airport Commissioners – Project approval and LAX Specific Plan Compliance determination pursuant to LAX Specific Plan Section 7;
- City of Los Angeles Department of Public Works, Bureau of Sanitation, Watershed Protection Division – Approval of a project-specific Storm Water Management Plan or Standard Urban Storm Water Mitigation Plan;
- City of Los Angeles Department of Cultural Affairs – Permit application clearance;
- City of Los Angeles Department of City Planning, Office of Historic Resources – Historical Resource documentation plan review;
- City of Los Angeles Department of Building and Safety – Grading, foundation, and building permits; and
- City of Los Angeles Department of Public Works – Permits for infrastructure improvements, as needed.

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27 Approval of the ALP would require separate environmental analysis pursuant to the National Environmental Policy Act.

28 Although FAA is not a state agency regarding CEQA review, the proposed project would require approval of Form 7460 (Notice of Proposed Construction or Alteration) in consideration of Part 77 requirements.

3. OVERVIEW OF PROJECT SETTING

3.1 Introduction

This chapter provides an overview of the existing land use, environmental, and development setting relevant to the proposed project. More detailed descriptions of the existing setting specific to each of the environmental topics evaluated in this EIR are provided within their respective sections in Chapter 4, *Environmental Impact Analysis*. This chapter also describes other development projects at and immediately adjacent to LAX that may, in conjunction with the proposed project, result in cumulative impacts to the environment.

3.2 Land Use Setting

As indicated in Chapter 1, *Introduction and Executive Summary*, and Chapter 2, *Project Description*, and depicted in Figure 2-2 and Figure 2-3, the proposed project is located at LAX, within a highly-developed, urbanized area consisting of airport, commercial, and transportation (i.e., interstate highways) uses. More specifically, the proposed project site is located within the eastern portion of LAX, east of Sepulveda Boulevard and south of Century Boulevard (see Figure 2-3). The 35-acre project site includes UAL's existing 32-acre maintenance leasehold, which consists of paved areas currently used for UAL aircraft and GSE maintenance, with two large maintenance bays (referred to as Hangar 1 and Hangar 2), apron areas, maintenance areas, storage, office space, and surface parking (Parking Lot H). UAL's cargo building is adjacent to the project site to the northeast. The project site also includes a 3-acre parcel to the north of UAL's existing facility, which is currently used as a shared-ride vehicle holding lot by Super Shuttle. The LAX Plan, the City of Los Angeles General Plan Land Use Element that governs uses on LAX, designates the project site as Airport Airside. The corresponding LAX Specific Plan designates this area as LAX Zone: Airport Airside Subarea. The proposed project is consistent with the LAX Plan land use designation and with the allowable uses under the LAX Specific Plan.[29,30]

The land use setting around the project site is characterized by airport operations, aircraft maintenance facilities, and cargo facilities. Existing adjacent uses include the LAWA Records Building and American Eagle commuter facility to the west; air cargo facilities and Delta Air Lines aircraft maintenance facility to the northwest; a shared-ride vehicle holding lot and an employee parking structure (referred to as Parking Garage F) to the north; the UAL Cargo building to the northeast; American Airlines Cargo and GSE facility to the east; and the LAX south airfield to the south, specifically Taxiway C, followed by Taxiway B, Runway 7L-25R, Taxiway H (centerline taxiway), Runway 7R-25L, and Taxiway A. Surrounding land uses are identified in Figure 2-4.

Land uses in the general project vicinity that are not airport-related include the following:

- Commercial, office, and institutional uses within the City of Los Angeles community of Westchester to the north;
- A mix of commercial, hotel, office, industrial, and residential uses east of LAX in the City of Los Angeles, City of Inglewood, and unincorporated community of Lennox;

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29 City of Los Angeles, Department of City Planning, *LAX Plan*, adopted December 14, 2004, last amended June 7, 2017. Available: https://www.lawa.org/en/lawa-our-lax/plan-and-ordinances.

30 City of Los Angeles, Department of City Planning, *Los Angeles International Airport (LAX) Specific Plan*, adopted December 14, 2004, last amended September 8, 2017. Available: https://www.lawa.org/en/lawa-our-lax/plan-and-ordinances.

- Residential, commercial, office, and institutional uses to the south of LAX in the City of El Segundo and the unincorporated community of Del Aire; and
- Dockweiler State Beach, the Pacific Ocean, and the Los Angeles/El Segundo Dunes to the west.

The Los Angeles/El Segundo Dunes Specific Plan area, a portion of which is a designated Los Angeles County Significant Ecological Area, is located approximately 2.5 miles to the west of the project site, opposite Pershing Drive. The proposed project site is not located within the Coastal Zone, which is approximately 2.5 miles to the west of the project site.

Unique resources located on or within the vicinity of the project site are Hangars 1 and 2 located on the project site, which comprise two of the three remaining buildings of an area formerly known as the Intermediate Terminal Facility, and a Quonset Hut located near the northern boundary of the project site and Avion Drive (south of Century Boulevard). These resources are further discussed in Section 3.3.2 below.

3.3 Environmental Setting

This section provides an overview of the existing environmental setting related to the proposed project and the topical issues evaluated in Chapter 4, *Environmental Impact Analysis*, of this EIR. Additional information regarding existing conditions for these topics is provided in Chapter 4 of this EIR.

3.3.1 Air Quality

The airport is located within the South Coast Air Basin (Basin), a 6,745-square-mile area encompassing all of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The Basin is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). At the federal level, the Basin is designated as a nonattainment area for ozone (O_3), fine particulate matter ($PM_{2.5}$), and lead (Pb).[31] At the State level, the Basin is designated as nonattainment for O_3, particulate matter (PM_{10}), and $PM_{2.5}$.[32] The existing air quality setting in the immediate vicinity of the project site is dominated by air quality pollutants from aircraft activities, including landings and take-offs, taxiing, and other aircraft movements; vehicles on airport roads and surrounding roads and highways; and industrial uses. Other sources of existing air pollutant emissions on the airport include the Central Utility Plant (CUP), power generators, ground support equipment, and operations and maintenance activities.

3.3.2 Cultural Resources (Historical Resources)

As discussed further in Appendix C of this Draft EIR, the project site includes an area formerly known as the Intermediate Terminal Facility, which is located east of the existing LAX Central Terminal Area (CTA) on the western and southern sides of Avion Drive. Specifically, 6000-6016 Avion Drive and 6020-6024 Avion Drive comprise two of the three remaining buildings of the Intermediate Terminal Facility. (The third building, which is located adjacent to the project site to the northwest at 6040 Avion Drive, is currently occupied by Mercury Air Group's cargo operation.) The buildings that comprise the Intermediate Terminal Facility are shown in Figure 2-5. The Intermediate Terminal Facility was constructed between 1945 and 1947 to temporarily house airport administration and airline offices, passenger terminals, hangars, and aircraft service facilities.

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31 U.S. Environmental Protection Agency. *Green Book Nonattainment Areas*. Available: https://www.epa.gov/green-book, accessed February 2017.

32 California Air Resources Board, *Area Designations Maps/State and National.* Available: https://www.arb.ca.gov/desig/adm/adm.htm, accessed November 2017.

As noted above, only three buildings remain of the Intermediate Terminal Facility. One of these, the former Western Airlines facility at 6040 Avion Drive (located west of the project site) has been substantially altered by two large additions and alteration of the primary façade. This building no longer conveys the period during which the Intermediate Terminal Facility was active and, therefore, is not eligible for listing in the National Register of Historic Places (National Register) or California Register of Historical Resources (California Register), or for local designation as a City of Los Angeles Historic-Cultural Monument (LAHCM). The two other buildings, 6000-6016 and 6020-6024 Avion Drive (located within the project site), have also both undergone some alteration and do not retain sufficient integrity for listing in the National Register. However, resources lacking sufficient integrity for listing in the National Register are not precluded from listing in the California Register. Although the two intact, surviving Intermediate Terminal Facility buildings at 6000-6016 and 6020-6024 Avion Drive do not retain sufficient integrity to be eligible for the National Register, both do retain most of their original massing, cladding, fenestration, and entrance openings. Therefore, they retain sufficient integrity to be eligible for listing in the California Register and for designation as an LAHCM.[33] Together, they are considered two component parts of a single historical resource, significant for its association with the Intermediate Terminal Facility period at LAX.

The East Maintenance Facility also includes several smaller buildings. One of these is a Quonset hut, a semi-cylindrical structure constructed of corrugated steel sheeting placed atop arched metal rib framing. The Quonset Hut at the project site is believed to have been placed in its current location by 1947. It is eligible for listing in the National Register and California Register, and as a City of Los Angeles Historic-Cultural Monument.[34] LAWA is planning to relocate the Quonset Hut. This relocation is planned as part of LAWA's ongoing management of historic resources at LAX and will occur independently of the proposed project.

3.3.3 Greenhouse Gas Emissions

The primary greenhouse gas (GHG) emission sources on and within the vicinity of the project site are emissions of carbon dioxide (CO_2) from combustion of fuels associated with aircraft operations (i.e., taxiing/towing), area traffic, and ongoing construction activities, as well as from building and lighting operations. Mobile and area sources and indirect emissions from energy and water use, wastewater, and waste management also contribute to GHG emissions at the project site.

3.3.4 Transportation/Traffic

Traffic in the project area is primarily a mix of private vehicles, buses, shuttles, taxis, limousines, and LAWA vehicles associated with airport passengers and visitors, airline and airport employees, airport tenants, deliveries, and employees and visitors of commercial, office, and other uses located along the Century Boulevard corridor. Area traffic operates on the local roadway network, including Century Boulevard, Sepulveda Boulevard, Airport Boulevard, Aviation Boulevard, Lincoln Boulevard, Westchester Parkway, Imperial Highway, I-405, and I-105. In addition, airport cargo and maintenance traffic operates along Avion Drive, Postal Road, International Road, and West 104th Street. Traffic levels and operating conditions on- and off-airport vary throughout the day, week and time of year, ranging from good to poor.

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33 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, *(SCH 2015021014)*, Appendix J, LAX Preservation Plan, February 2017. Available: https://cloud1lawa.app.box.com/s/ia03fbbop9u07dek6u8jxdr2hua33sdh.

34 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, *(SCH 2015021014)*, Appendix J, LAX Preservation Plan, February 2017. Available: https://cloud1lawa.app.box.com/s/ia03fbbop9u07dek6u8jxdr2hua33sdh.

3.4 Development Setting

This section identifies past, present, and reasonably foreseeable probable future projects at and immediately adjacent to LAX that could, in conjunction with the proposed project, result in cumulative impacts to the environmental resources addressed in this EIR. These projects are listed in **Table 3-1** and identified in **Figure 3-1**. A description of each project is also provided in Table 3-1. The projects listed in Table 3-1 were considered in the cumulative impacts analysis for each resource analyzed in Chapter 4, *Environmental Impact Analysis*.

In accordance with State CEQA Guidelines Section 15130(b), there are essentially two approaches to evaluating cumulative impacts:

a. List past, present, and reasonably foreseeable probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or

b. Summarize projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program.

For purposes of analyzing the proposed project's cumulative impacts to air quality (including human health risk), cultural resources (historical resources), and GHG emissions, the first approach, the list approach, was used. For purposes of analyzing the proposed project's cumulative transportation/traffic impacts, a hybrid of the two approaches was used, as described in Section 4.4, *Transportation/Traffic*.

Table 3-1
Development Projects At/Adjacent to LAX

	Project	Expected Dates	Description
1	LAX Bradley West Project	Nov 2013 – Nov 2019	Replacement of existing concourses and aprons at the Tom Bradley International Terminal (TBIT) with new concourses and gates at Bradley West. Enabling projects included demolition of the American Airlines Low Bay Hangar (which included aircraft and GSE maintenance facilities), the former TWA Aircraft Maintenance Hangar, and the Menzies GSE Maintenance facility. Also includes Taxilane T project and construction of secure/sterile passenger and baggage connections between the TBIT core and Terminal 4 and between TBIT core and Terminal 3 (anticipated to occur between January 2021 and December 2022, after the remaining components of the Bradley West improvements are completed.)
2	West Aircraft Maintenance Area Project	Aug 2014 – Mar 2019	Aircraft parking and maintenance facilities, employee parking areas, and related storage, equipment, and facilities. The first phase, which included construction of a Qantas Airlines aircraft maintenance hangar and aircraft parking, was completed in July 2016. The second phase, which includes construction of an additional maintenance hangar for Delta Air Lines, is underway.
3	Metro Crenshaw/LAX Transit Corridor Project	Jan 2015 – 2019	The Los Angeles County Metropolitan Transportation Authority (Metro) is constructing the Crenshaw/LAX Transit Corridor Project, which includes an 8.5-mile light-rail transit line that will connect the existing Metro Green Line and the Metro Expo Line at Crenshaw and Exposition Boulevards. As part of this project, a station is being constructed in proximity to LAX near the intersection of Century Boulevard and Aviation Boulevard.

Table 3-1
Development Projects At/Adjacent to LAX

	Project	Expected Dates	Description
4	LAX Midfield Satellite Concourse North Project	Apr 2015 – Apr 2020	Satellite concourse west of TBIT that will provide up to 12 aircraft gates that can accommodate Aircraft Design Group (ADG) V and ADG VI aircraft, as well as associated apron areas, a new crossfield taxiway, a taxilane, and an underground tunnel. Enabling projects included demolition of the US Airways Aircraft Maintenance Facility; the American Airlines Maintenance (Non-Power) Shop, which supported aircraft and GSE maintenance activities; and the U.S. Coast Guard Facility, which included aircraft maintenance.
5	Terminal 1.5	Oct 2017 – Mar 2020	A new terminal between existing Terminal 1 and Terminal 2 to provide additional passenger processing facilities for the north passenger terminals.
6	Quonset Hut Relocation	2018 – 2019	Relocation and rehabilitation of a World War II-era Quonset Hut, currently located near the southern terminus of Avion Drive, to an alternative site on airport property as part of the implementation of the LAX Preservation Plan.
7	LAX Fuel Tank Installation	June 2018 – Mar 2019	Addition of four new 60,000-barrel gross capacity above ground fuel storage tanks at the existing LAXFUEL leasehold on the west side of LAX, as well as associated site work, piping, and electrical modifications.
8	Airport Police Facility[1]	May 2018 – Dec 2020	Relocation of LAWA Police Department to consolidate facilities into one location in LAX Northside, which will include the police headquarters, shooting range, canine facility, and parking structure.
9	Argo Drain Sub-Basin Stormwater Infiltration and Treatment Facility[1]	Jun 2018 – Jan 2020	22-acre stormwater infiltration facility north of Westchester Parkway and east of Pershing Drive that will treat both City of Los Angeles and LAWA stormwater flows from the Argo watershed.
10	Terminals 2 and 3 Modernization Project	May 2018 – June 2023	Improvements to Terminals 2 and 3, consisting of upgrading the Terminal 2 concourse; demolition and reconstruction of the Terminal 3 concourse; demolition of the Terminal 3 satellite; demolition and reconstruction of the passenger and baggage processing facilities (ticketing buildings) at Terminals 2 and 3, including new facilities for passenger and baggage screening, ticketing, and baggage claim; and a secure connector between Terminals 2 and 3.
11	Runway 7R-25L Rehabilitation	2020 – 2021	Reconstruction of runway pavement.
12	Secured Area Access Post (SAAP) Project	2018 – 2020	Construction of a fully functional, secured access point onto the Airport Operations Area (AOA) on the west side of LAX, parallel to, and south of, World Way West, near where the road will terminate at Coast Guard Road once the MSC North Project is completed.
13	LAX Landside Access Modernization Program (LAMP)	2018 – Dec 2035	Improvements within and east of the CTA to improve access options and the travel experience for passengers; provide a direct connection to the Metro transit system; provide easier and more efficient access to rental cars; relieve congestion in the CTA and on the surrounding street system; and improve the efficiency and operation of the transportation system serving LAX. The program components include an automated people mover (APM) system, Intermodal Transportation Facilities (ITFs), a Consolidated Rental Car Facility (CONRAC), pedestrian walkway connections to the passenger terminals within the CTA, and roadway improvements. One of the LAMP enabling projects is the demolition of the Delta Air Lines aircraft maintenance facility, currently located south of Century Boulevard between Sepulveda Boulevard and Avion Drive.

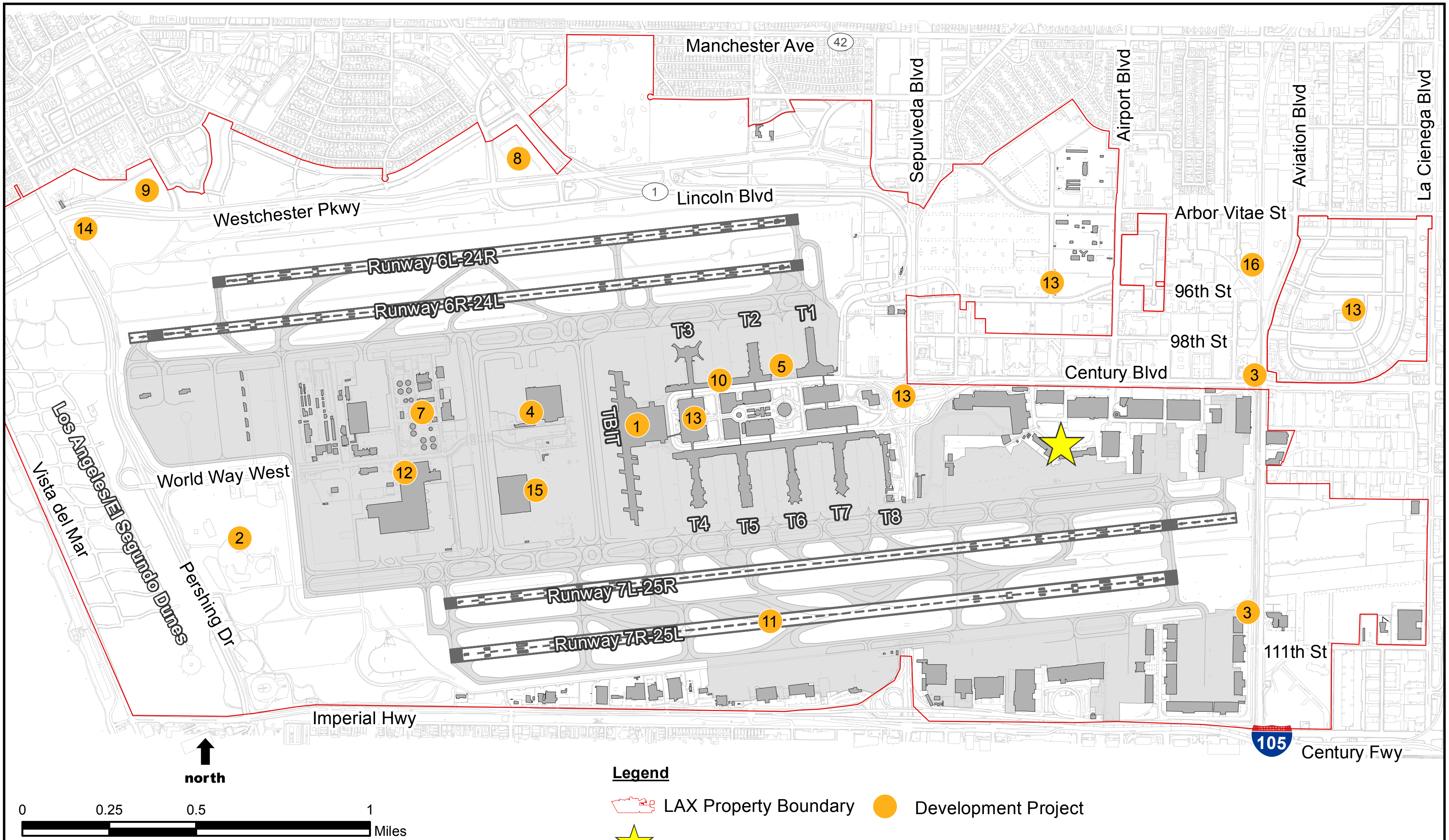
Table 3-1
Development Projects At/Adjacent to LAX

	Project	Expected Dates	Description
14	Receiving Station X[1]	Mar 2019 – Jan 2022	New receiving station to address power reliability issues, provide redundancy in the case of power outages, and accommodate the electrical demand of future infrastructure projects at LAX.
15	MSC South Project	2020 - 2025	New concourse to be constructed on the south end of the MSC North concourse.
16	Airport Metro Connector 96th Street Transit Station	2020 - 2023	Metro will construct a new multi-modal transportation center at 96th Street and Aviation Boulevard to connect LAX to the regional bus and transit system, including at-grade light rail transit (LRT) platforms, bus plaza, bicycle hub, pedestrian plaza, passenger vehicle pick-up and drop-off area and Metro transit center/terminal building ("Metro Hub") to connect passengers between the multiple transportation modes.
NA	Miscellaneous Projects and Improvements	Jan 2014 – July 2020	LAWA will undertake a wide variety of smaller miscellaneous projects and improvements mostly related to repair/ replacement of, and upgrades to, existing facilities at LAX, including, but not limited to, runway repair/rehabilitation; elevators/escalators replacement; CTA second level roadway repairs; terminal taxilanes and aprons rehabilitation; passenger boarding bridge replacements; terminal electrical, plumbing, and facilities upgrades; miscellaneous demolition; and other improvements.

Source: LAWA, 2018.

Notes:
1. This project is within the LAX Northside development.

Figure 3-1 illustrates the location of the projects in Table 3-1 in relationship to the project site. Miscellaneous Projects and Improvements are not on the figure because they occur at multiple locations throughout the airport. Similarly, the Quonset Hut Relocation is not included on the figure because its location has not been finalized.



Source: Los Angeles World Airports, 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project	Cumulative Development Projects At/Adjacent to LAX	Figure 3-1

The proposed project is one of many past and present changes to aircraft and GSE maintenance facilities at LAX that have occurred since initiation of the LAX modernization program, which followed approval of the LAX Master Plan in 2005. Changes to maintenance facilities have occurred in conjunction with individual LAX Master Plan projects, including the Crossfield Taxiway Project, Bradley West Project, West Aircraft Maintenance Area Project, Midfield Satellite Concourse Project, and the LAX Landside Access Modernization Program. Affected maintenance facilities have been replaced by new construction, consolidated into other maintenance facilities, or relocated to other buildings at LAX. In total, close to 840,000 square feet of building area used for aircraft and/or GSE maintenance has been removed or is planned for removal at LAX since initiation of the LAX modernization program, including the Qantas (former TWA) aircraft maintenance hangar, American Airlines Low Bay Hangar, and the Delta Air Lines hangar complex, among other facilities. Replacement aircraft and/or GSE maintenance facilities total approximately 650,000 square feet of building area, including the Qantas and Delta Air Lines hangars at the WAMA site and the proposed project. Aircraft and/or GSE maintenance facilities comprising an additional 815,000 square feet that were located at LAX at the inception of the LAX modernization program, including the current UAL West Maintenance Facility and the FedEx Maintenance Facility, are planned to remain onsite. In total, these changes will result in a net decrease in square footage of facilities dedicated to aircraft and GSE maintenance at LAX of approximately 190,000 square feet.

Following project implementation, it is reasonably foreseeable that UAL's West Maintenance Facility would continue to be used for aircraft and/or GSE maintenance by another airline currently conducting such activities at LAX in constrained or reduced facilities, and would not represent a new use or an increase in such activity. Any proposed reuse of the West Maintenance Facility may be subject to its own environmental review and documentation, as appropriate. Continued use of the West Maintenance Facility is considered as part of the cumulative impacts analysis in this Draft EIR.

4. ENVIRONMENTAL IMPACT ANALYSIS

This chapter presents an assessment of the potentially significant environmental impacts of the proposed project, as described in Chapter 2, *Project Description*. This chapter describes the physical environment at and within the vicinity of LAX that may be affected by the proposed project; the impacts to that physical environment; and the measures proposed to mitigate those impacts, as required.

The Notice of Preparation (NOP)/Initial Study for this EIR, which was published on December 7, 2017, identified the following environmental resource areas for further evaluation in the EIR, which are addressed in this chapter:

- Air Quality (including Human Health Risk)
- Cultural Resources (Historical Resources)
- Greenhouse Gas Emissions
- Transportation/Traffic

In addition, Appendix F of the State CEQA Guidelines requires an EIR to consider the potentially significant energy impacts of the proposed project. Therefore, Section 6.5 in Chapter 6, *Other Environmental Considerations,* addresses the infrastructure capacity and demand associated with the energy consumption associated with the construction and operation of the proposed project.

Organization

Each of the environmental resource areas addressed in this chapter is discussed in a separate section using a common organization. Sections are numbered 4.1, 4.2, 4.3, and 4.4. The sections are divided into subsections to simplify and clarify the discussion. Within each environmental resource area section, discussion of the following is provided:

- The **Introduction** briefly describes the resource topics addressed in the analysis. The Introduction also identifies any specific resource topic for that environmental resource area that is not being addressed as part of this EIR and provides a discussion explaining the reasons why. For air quality, cultural resources, and transportation/traffic, a number of individual resource topics were evaluated and it was determined that the proposed project would have no impact or impacts were determined to be less than significant, as documented in the Initial Study that was published with the NOP for the proposed project on December 7, 2017 (included as Appendix A of this EIR).[35]
- The **Methodology** describes how the resource topics were approached, including explanations of any assumptions; identification of information sources used for the analysis; and delineation of the study area considered for each environmental resource area. This section also identifies the environmental baseline where that baseline differs from 2017. A discussion of the environmental baseline is provided below under Analytical Framework.
- The **Existing Conditions** discusses the baseline conditions for the environmental resource topic in the study area, including relevant activities, facilities, and regulations. The environmental baseline is described below under Analytical Framework.

[35] As an example of an individual resource topic that was determined to be less than significant, the Initial Study determined that the proposed project would not result in a change in air traffic patterns. Therefore, this individual resource topic is not addressed in the EIR, although other individual topics related to Transportation/Traffic are evaluated in the EIR.

- The **Thresholds of Significance** are quantitative or qualitative criteria used to determine whether a significant environmental impact would occur as a result of the project. This section identifies the origins of the thresholds of significance used in the analysis. In general, and unless otherwise noted, the thresholds of significance used in the analysis of the proposed project impacts reflect guidance provided in Appendix G of the State CEQA Guidelines and/or criteria or guidance included in the L.A. CEQA Thresholds Guide.[36,37]
- The **Impacts Analysis** section presents the analysis of impacts for the construction (build-out horizon year 2020) of the proposed project. Impacts were compared to the thresholds of significance to determine whether they would be, under CEQA, significant or less than significant. For purposes of determining significance, impacts were compared to the environmental baseline conditions, as further described in the Analytical Framework below. The impact analysis includes a determination of the level of significance of impacts under each threshold before mitigation.
- **Cumulative Impacts** are the impacts of the proposed project in conjunction with other development projects at and immediately adjacent to LAX. The environmental impacts of the proposed project may be individually minor, but cumulatively considerable when considered in conjunction with other projects.
- **Mitigation Measures** are specified procedures, plans, policies, or activities proposed for adoption by the lead agency to reduce or avoid the significant impacts identified in the analysis of environmental impacts. This section identifies project-specific mitigation measures that have been proposed to address significant impacts that would occur with implementation of the proposed project. In accordance with the requirements of CEQA, a mitigation monitoring and reporting program (MMRP) would be adopted as part of the proposed project approvals, to ensure that implementation of mitigation measures is properly monitored and documented.
- **Level of Significance After Mitigation** is a CEQA determination of the significance of a particular impact after implementation of the proposed mitigation measures. This section identifies any significant impacts that cannot be mitigated to a level that is less than significant. These "significant unavoidable impacts" are also listed in Chapter 6, *Other Environmental Considerations*, of this EIR.

Effects Found Not to be Significant in Initial Study

In accordance with Sections 15063(c)(3)(A) and 15128 of the State CEQA Guidelines, further detailed analysis of specific environmental resource areas is not required in an EIR where it was determined in the Initial Study that the proposed project would have no impact or impacts were determined to be less than significant. Instead, the EIR need only contain a brief statement indicating the reasons that the various possible significant effects of a project were determined not to be significant, which, in this instance, is contained in the Initial Study (included as Appendix A of this EIR). The Initial Study determined there would be “no impact” or impacts would be “less than significant” for Aesthetics, Agriculture and Forestry Resources, Biological Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Noise, Population and Housing, Public Services, Recreation, and Utilities and Service Systems.

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36 State of California, *Guidelines for California Environmental Quality Act (State CEQA Guidelines)*, California Code of Regulations, Title 14, Chapter 3, Sections 15000-15387.

37 City of Los Angeles, *L.A. CEQA Thresholds Guide, Your Resource for Preparing CEQA Analyses in Los Angeles*, 2006.

For the reasons explained in the Initial Study, the Initial Study identified impacts to archaeological, paleontological, and tribal cultural resources as impacts that would be potentially significant unless mitigation was incorporated. The Initial Study further identified measures that would address these impacts. These measures reflect plans, policies, and procedures that have been adopted by LAWA and that apply to all construction projects at LAX. Therefore, these measures are not mitigation measures as defined by CEQA. Nevertheless, the plans, policies, and procedures would be implemented during construction as required. In consideration of the fact that these plans, policies, and procedures would be required to be implemented as part of the proposed project, this Draft EIR concludes that impacts to archaeological, paleontological, and tribal cultural resources would be less than significant and no mitigation is required.

Analytical Framework

Environmental Baseline

Section 15125 of the State CEQA Guidelines requires that an EIR describe the physical environmental conditions in the vicinity of a proposed project "as they exist at the time the notice of preparation is published…." and further states that "[t]his environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant."

The Notice of Preparation (NOP) for this EIR was published on December 7, 2017. In accordance with the provisions of CEQA Guidelines Section 15125, 2017 is the baseline year for characterizing existing conditions in the environmental analysis. Where existing conditions data specific to 2017 were not available, this EIR identifies this fact, explains what data were used to determine existing conditions, and provides evidence of why this information is representative of baseline conditions.

Description of Cumulative Impacts

As defined in the State CEQA Guidelines Section 15355, cumulative impacts are the impacts of the proposed project in conjunction with past, present, and reasonably foreseeable probable future projects. The environmental impacts of the project may be individually minor, but cumulatively considerable when considered in conjunction with other projects.

In accordance with the State CEQA Guidelines Section 15130, the proposed project must be evaluated for cumulative impacts to determine if they would be significant. This EIR provides an analysis of cumulative impacts to environmental resources addressed in this EIR that would be associated with construction and operation of the proposed project in conjunction with other development projects at and immediately adjacent to LAX.

In accordance with State CEQA Guidelines Section 15130(b), there are essentially two approaches to evaluating cumulative impacts:

a. List past, present, and reasonably foreseeable probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or

b. Summarize projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program.

For purposes of analyzing the proposed project's cumulative impacts to air quality (including human health risk), cultural resources (historical resources), greenhouse gas emissions, and transportation/ traffic, the first approach – the list approach – is used in this EIR.

Other development projects at and immediately adjacent to LAX that could, in conjunction with the proposed project, result in cumulative impacts to the environmental resources addressed in this EIR are described in Chapter 3, *Overview of Project Setting*, and are listed in Table 3-1 and identified in Figure 3-1; an analysis of cumulative impacts is included within the analysis of each of the four environmental resource areas evaluated in this chapter.

4.1 Air Quality and Human Health Risk

4.1.1 Air Quality

4.1.1.1 Introduction

This air quality analysis addresses criteria pollutant emissions from operational activities (on-site stationary sources, on-site mobile sources, and off-site regional traffic) that would occur at buildout of the proposed project in the horizon year of 2020. The analysis also addresses emissions from construction activities (e.g., on-site and off-site construction equipment, fugitive dust, and worker vehicle trips) that would occur during the temporary construction period, which is anticipated to occur between late 2018 and late 2020. Impacts related to human health risks from inhalation of toxic air contaminant (TAC) emissions are addressed in Section 4.1.2, *Human Health Risk Assessment*. Greenhouse gas emissions are discussed separately in Section 4.3, *Greenhouse Gas Emissions*. Appendix B provides details on methods, assumptions and backup data for both air quality and the human health risk assessment (HHRA).

Prior to the preparation of this EIR, an Initial Study (included in Appendix A of this EIR) was prepared using the CEQA Environmental Checklist Form to assess potential environmental impacts on air quality. Based on the analysis in the Initial Study, the potential for the proposed project to create objectionable odors affecting a substantial number of people was determined to be less than significant and this topic does not require any additional analysis in this EIR.

As discussed in Chapter 2, *Project Description,* of this EIR, the proposed project would not increase aircraft operations or passenger volumes beyond what would occur without the project. However, consolidation of aircraft maintenance and GSE facilities on the east side of the airport would increase the level of activity at a location that is in close proximity to the LAX fence-line.[38] Because impacts to air quality are measured at the fence-line, emissions associated with the increased aircraft and GSE movements, and with increased maintenance activities at the East Maintenance Facility resulting from the consolidation, were analyzed in this EIR for potential impacts.

The air quality impact analysis presented below includes development of emission inventories for the proposed project (i.e., the quantities of specific pollutants, typically expressed in pounds per day or tons per year) based on regional emissions modeling. The analysis also includes an assessment of localized effects of air pollutants associated with the proposed project based on the South Coast Air Quality Management District's (SCAQMD) localized significance thresholds (LSTs). The criteria pollutant emissions inventories and localized effects were developed using standard, generally accepted industry software/models and federal, state, and locally approved methodologies. Results of the emission inventories were compared to daily emissions significance thresholds established by SCAQMD for the South Coast Air Basin.[39] This section is based in part on the detailed information contained in Appendix B of this EIR.

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[38] As discussed in Chapter 2, Project Description, as with the existing facilities, the proposed project would include electric GSE (eGSE) charging stations within the GSE maintenance facility. The number of eGSE charging stations would be the same as the current number of stations. In addition, the hangar and aircraft apron would be designed as a "Pad-of-the-Future," with dual 400 hertz (Hz) electric power for all aircraft parking positions, which would support stationary or portable ground power units (GPUs), stationary or portable pre-conditioned air (PCA) units, and/or electrification of GSE maintenance activities. The portable GPUs and PCA units to be used at the facility would include existing diesel, gasoline, and electric-powered units. Any future changes to UAL's GSE fleet, including the addition of new eGSE equipment, would occur independently of the proposed project.

[39] South Coast Air Quality Management District, *SCAQMD Air Quality Significance Thresholds*, March 2015. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

4.1.1.1.1 Pollutants of Interest

Six criteria pollutants were evaluated for the proposed project's construction and operational activities: ozone (O_3), using as surrogates volatile organic compounds (VOCs) and oxides of nitrogen (NO_X); nitrogen dioxide (NO_2); carbon monoxide (CO); sulfur dioxide (SO_2); respirable particulate matter or particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}); and fine particulate matter, or particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers, ($PM_{2.5}$).[40]

Although lead (Pb) is a criteria pollutant, it was not evaluated in this section because the proposed project would not use any fuels or coatings with lead additives; therefore, the project would have no impacts on Pb levels in the South Coast Air Basin. The only source of Pb emissions from LAX is from aviation gasoline (AvGas) associated with piston-engine general aviation aircraft; however, UAL does not operate any piston-engine aircraft, so Pb emissions would not change with implementation of the proposed project.[41]

Sulfate compounds (e.g., ammonium sulfate) are generally not emitted directly into the air but are formed through various chemical reactions in the atmosphere; thus, sulfate is considered a secondary pollutant. All sulfur emitted by airport-related sources included in this analysis was assumed to be released and to remain in the atmosphere as SO_2. No sulfate inventories or concentrations were estimated because the relative abundance of sulfates from fuel combustion is much lower than that of SO_2, and because very little sulfur is emitted from project sources.[42]

Following standard professional practice, the evaluation of O_3 was conducted by evaluating emissions of VOCs and NO_X, which are precursors in the formation of O_3. O_3 is a regional pollutant and ambient concentrations can only be predicted using regional photochemical models that account for all sources of precursors; regional photochemical O_3 modeling is beyond the scope of this analysis, and under standard professional practice is not used for project-level reviews. Therefore, no photochemical O_3 modeling was conducted.

Additional information regarding the six criteria pollutants that were evaluated in the air quality analysis is presented below.

Ozone (O_3)[43]

O_3, the main component of smog, is formed from precursor pollutants rather than being directly emitted from pollutant sources. O_3 forms as a result of VOCs and NO_X reacting in the presence of sunlight. O_3 levels are typically highest in warm-weather months and in urban areas. VOCs and NO_X are termed "O_3 precursors" and their emissions are regulated in order to control the creation of O_3. O_3 damages lung tissue and reduces lung function. Scientific evidence indicates that ambient levels of O_3 not only affect

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40 The emissions of volatile organic compounds (VOC) and reactive organic gases (ROG) are essentially the same for the combustion emission sources that are considered in this EIR. This EIR will typically refer to organic emissions as VOC.

41 Section VIII.b of the Initial Study (included in Appendix A of this EIR) discusses procedures to minimize generation of lead emissions from lead-based paint during demolition activities associated with the proposed project. As discussed therein, prior to issuance of any permit for the demolition or alteration of any existing structure(s), a lead-based paint survey would be performed following protocols of the Los Angeles Department of Building and Safety designed to detect all lead-based paint. Should lead-based paint materials be identified, standard handling and disposal practices would be implemented pursuant to federal Occupational Safety and Health Administration (OSHA) and California OSHA regulations to limit worker and environmental risks. Compliance with existing federal, state and local regulations and routine precautions would reduce the potential for hazards to the public or the environment through the routine disposal or accidental release of hazardous building materials. Therefore, lead emissions from lead-based paint during demolition activities associated with the proposed project would be less than significant.

42 Seinfeld and Pandis, *Atmospheric Chemistry and Physics – From Air Pollution to Climate Change*, 1998, p. 59.

43 U.S. Environmental Protection Agency, *Ozone Pollution – Ozone Basics*. Available: https://www.epa.gov/ozone-pollution/ozone-basics, accessed November 6, 2017.

people with impaired respiratory systems (e.g., asthmatics), but also healthy children and adults. O_3 can cause health effects such as chest discomfort, coughing, nausea, respiratory tract and eye irritation, and decreased pulmonary functions.

Nitrogen Dioxide (NO_2)[44]

NO_2 is a reddish-brown to dark brown gas with an irritating odor. NO_2 forms when nitric oxide reacts with atmospheric oxygen. The primary source of NO_2 is the combustion of fuel. Significant sources of NO_2 at airports are boilers, aircraft operations, and vehicle movements. NO_2 emissions from these sources are highest during high-temperature combustion, such as aircraft takeoff mode. NO_2 may produce adverse health effects such as nose and throat irritation, coughing, choking, headaches, nausea, stomach or chest pains, and lung inflammation (e.g., bronchitis, pneumonia).

Carbon Monoxide (CO)[45]

CO is an odorless, colorless gas that is toxic. It is formed by the incomplete combustion of fuels. The primary sources of this pollutant in Los Angeles County are automobiles and other sources which burn fossil fuels. Breathing air with high concentrations of CO reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

Particulate Matter (PM_{10}) and Fine Particulate Matter ($PM_{2.5}$)[46]

Particulate matter consists of solid and liquid particles of dust, soot, aerosols, and other matter small enough to remain suspended in the air for a long period of time. PM_{10} refers to particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (microns, um, or µm) and $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers. Particles smaller than 10 micrometers (i.e., PM_{10} and $PM_{2.5}$) represent that portion of particulate matter thought to represent the greatest hazard to public health.[47] PM_{10} and $PM_{2.5}$ can accumulate in the respiratory system and are associated with a variety of negative health effects. Exposure to particulate matter can aggravate existing respiratory conditions, increase respiratory symptoms and disease, decrease long-term lung function, and possibly cause premature death. The segments of the population that are most sensitive to the negative effects of particulate matter in the air are the elderly, individuals with cardiopulmonary disease, and children.

A portion of the particulate matter in the air comes from natural sources such as windblown dust and pollen. Man-made sources of particulate matter include fuel combustion, automobile exhaust, field burning, cooking, tobacco smoking, factories, and vehicle movement, or other man-made disturbances, on unpaved areas. Secondary formation of particulate matter may occur in some cases where gases like sulfur oxides (SO_X) and NO_X interact with other compounds in the air to form particulate matter.[48] In the

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44 U.S. Environmental Protection Agency, *Nitrogen Dioxide (NO_2) Pollution – Basic Information about NO_2*. Available: https://www.epa.gov/no2-pollution/basic-information-about-no2, accessed November 6, 2017.

45 U.S. Environmental Protection Agency, *Carbon Monoxide (CO) Pollution in Outdoor Air – Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution.* Available: https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution, accessed November 6, 2017.

46 U.S. Environmental Protection Agency, *Particulate Matter (PM) Pollution – Particulate Matter (PM) Basics.* Available: https://www.epa.gov/pm-pollution/particulate-matter-pm-basics, accessed November 6, 2017.

47 U.S. Environmental Protection Agency, *Particle Pollution and Your Health*, September 2003. Available: https://www3.epa.gov/airnow/particle/pm-color.pdf.

48 The term SO_X accounts for distinct but related compounds, primarily SO_2 and, to a far lesser degree, sulfur trioxide. As a conservative assumption for this analysis, it was assumed that all SO_X is emitted as SO_2; therefore SO_X and SO_2 are considered equivalent in this document and only the latter term is used henceforth.

South Coast Air Basin, both VOCs and ammonia are also considered precursors to $PM_{2.5}$. Fugitive dust generated by construction activities is a major source of suspended particulate matter.

The secondary creators of particulate matter, SO_X and NO_X, are also major precursors to acidic deposition (acid rain). SO_X is a major precursor to particulate matter formation. NO_X reacts with ammonia, moisture, and other compounds to form nitric acid and related particles. Human health concerns include effects on breathing and the respiratory system, damage to lung tissue, and premature death. Small particles penetrate into sensitive parts of the lungs and can cause or worsen respiratory disease. NO_X has the potential to change the composition of some species of vegetation in wetland and terrestrial systems, to create the acidification of freshwater bodies, impair aquatic visibility, create eutrophication of estuarine and coastal waters, and increase the levels of toxins harmful to aquatic life.

Sulfur Dioxide (SO_2)[49]

Sulfur oxides are formed when fuel containing sulfur (typically, coal and oil) is burned, and during other industrial processes. The term "sulfur oxides" accounts for distinct but related compounds, primarily SO_2 and sulfur trioxide. As a conservative assumption for this analysis, it was assumed that all SO_X are emitted as SO_2; therefore, SO_X and SO_2 are considered equivalent in this document. Higher SO_2 concentrations are usually found in the vicinity of large industrial facilities.

The physical effects of SO_2 include temporary breathing impairment, respiratory illness, and aggravation of existing cardiovascular disease. Children and the elderly are most susceptible to the negative effects of exposure to SO_2.

4.1.1.1.2 Scope of Analysis

The air quality analysis conducted for the proposed project addresses construction-related impacts for the peak day of proposed construction activities and operations-related impacts following completion of construction. The basic steps involved in the scope of analysis are listed below.

Construction

Construction emissions were quantified for each year of construction, which is anticipated to occur between 2018 and 2020. The proposed project would take approximately 22 months (1 year, 10 months) to construct.

The scope of the evaluation of construction emissions was conducted to:

- Identify construction-related emissions sources;
- Develop peak daily and annual construction emissions inventories for the identified sources;
- Compare project regional construction emissions inventories for each year of construction with appropriate CEQA significance thresholds for construction;
- Compare peak daily on-site construction emissions with appropriate SCAQMD LSTs for construction;
- Determine level of significance of project impacts; and
- Identify construction-related mitigation measures, if required.

49 U.S. Environmental Protection Agency, *Sulfur Dioxide (SO_2) Pollution – Sulfur Dioxide Basics.* Available: https://www.epa.gov/so2-pollution/sulfur-dioxide-basics, accessed November 6, 2017.

Operations

Operational emissions were quantified for existing conditions and for the first year of operation of the project, expected to occur in 2021. The scope of the evaluation of operational emissions included the following components:

- Identify operational-related emissions sources;
- Develop peak daily and annual operational emissions inventories for the identified sources;
- Compare emissions inventories for existing conditions and for the first year of operations with appropriate CEQA significance thresholds for operations;
- Conduct dispersion modeling of operational impacts;
- Determine level of significance of project impacts; and
- Identify operations-related mitigation measures, if required.

4.1.1.2 Methodology

4.1.1.2.1 Emissions Source Types - Construction

Construction-related criteria pollutant emissions were quantified for CO, VOC, NO_X, SO_2, $PM_{10,}$ and $PM_{2.5}$ for the proposed project's constituent construction activities (project components). Sources of construction emissions evaluated in the analysis include off-road and on-road construction equipment, on-road delivery vehicles, on-road hauling and worker vehicles, as well as fugitive dust (PM_{10} and $PM_{2.5}$) from demolition, material handling, and vehicle travel on silted roadways, and fugitive VOCs from coating, painting, and paving.

The basis for the construction emissions analysis is the construction schedule, provided in Appendix B.1, that includes approximate durations and activities for each project component that together constitute the proposed project. Construction activity estimates were developed for each project component, from which monthly emissions were quantified. Daily emissions were calculated by dividing monthly emissions by the number of work days in the given month, based on a 5-day-per-week workweek. Construction activity is estimated at a monthly level of refinement; thus, the peak day of construction was identified as a day occurring during the month with the highest daily emissions. Annual and quarterly emissions, as applicable, were based on the monthly emissions estimates.

Emissions estimates for the proposed project's construction activities included the application of emission reduction measures required by SCAQMD, including compliance with Rule 403 for fugitive dust control and use of ultra-low sulfur fuel.

As further described in Chapter 2, *Project Description*, construction of the proposed project would occur over approximately 22 months, projected to begin in approximately the fourth quarter 2018 and to end in late 2020. Maintenance operations would continue at United Airlines' (UAL) existing West Maintenance Facility and East Maintenance Facility during construction, although some activities that currently occur at the East Maintenance Facility, including administration and GSE maintenance, would be conducted at the West Maintenance Facility. Maintenance activities would be managed to minimize operational disruption such that baseline operational activity is expected to remain unchanged during the construction period.

Off-Road Equipment

For purposes of this EIR, off-road construction equipment includes bulldozers, loaders, compactors, and other heavy-duty construction equipment that are not licensed to travel on public roadways. Off-road construction equipment types, models, horsepower, load factor, and estimated maximum daily hours of operation anticipated to be used during construction of the proposed project were derived from similar activities associated with the LAX Landside Access Modernization Program for each individual project component.[50] Equipment types with corresponding operating hours were matched with specific construction activities for each project component. The proposed project is expected to be constructed in two-shift workdays during the peak month of construction, with shift durations of eight hours.

In addition to off-road construction equipment use, off-road operational equipment, specifically use of portable diesel aircraft ground power units (GPUs), would increase during construction. Some of the existing electrified aircraft parking spaces at the East Maintenance Facility would be unavailable during construction. Aircraft that previously would have used these electrified aircraft parking spaces would use diesel GPUs instead. As a result, off-road GPU activity is expected to temporarily increase by approximately 15 percent during construction. To quantify the increase in diesel GPU use, the number of GPU units reported by UAL for the 2017 LAX GSE Emissions Reduction Program was used as a baseline. Annual and peak daily GPU operational activity was based on the default GSE activities in the California Air Resources Board's (CARB's) 2011 Inventory Model database for In-Use Off-Road Construction, Industrial, Ground Support and Oil Drilling equipment (OFFROAD 2011).[51]

Off-road diesel exhaust emission factors for VOC, NO_X, and PM_{10} were based on CARB's OFFROAD2011. Off-road exhaust emission factors for CO and SO_2 were derived from CARB's OFFROAD2007 model.[52] $PM_{2.5}$ emission factors were developed using the PM_{10} emission factors and $PM_{2.5}$ size profiles derived from the CARB-approved California Emission Inventory and Reporting System (CEIDARS).[53,54]

Emissions for off-road equipment were calculated by multiplying an emission factor by the horsepower, load factor, usage factor, and operational hours for each type of equipment.

On-Road On-Site Equipment

For purposes of this EIR, on-road on-site equipment emissions are generated from on-site pickup trucks, water trucks, haul trucks, dump trucks, cement trucks, and other on-road vehicles that are licensed to travel on public roadways. Exhaust emissions for each construction year from on-road, on-site vehicles were calculated using CARB's EMFAC2014 emission factor model.[55]

On-road on-site equipment types were categorized into vehicle types corresponding to CARB vehicle classes. Emission factors from the EMFAC2014 model are expressed in grams per mile and account for startup, running, and idling operations. In addition, the VOC emission factors include diurnal, hot soak, running, and resting emissions, while the PM_{10} and $PM_{2.5}$ factors include tire and brake wear.

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50 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, (SCH 2015021014), Section 4.2, Air Quality and Human Health Risk, and Appendix F, Air Quality, Greenhouse Gas Emissions, and Human Health Risk Assessment, as revised in the Final EIR, February 2017.

51 California Air Resources Board, *2011 Inventory Model for In-Use Off-Road Equipment.* Available: https://www.arb.ca.gov/msei/ordiesel.htm.

52 California Air Resources Board, *2007 Inventory Model for In-Use Off-Road Equipment*. Available: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

53 South Coast Air Quality Management District, *Final – Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds*, October 2006. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/particulate-matter-(pm)-2.5-significance-thresholds-and-calculation-methodology/final_pm2_5methodology.pdf?sfvrsn=2.

54 California Air Resources Board, *California Emission Inventory and Reporting System (CEIDARS) - Particulate Matter (PM) Speciation Profiles - Summary of Overall Size Fractions and Reference Documentation*, June 2, 2016. Available: http://www.arb.ca.gov/ei/speciate/pmsizeprofile2jun16.zip.

55 California Air Resources Board, Research Division, *EMFAC2014 On-Road Emissions Inventory Estimation Model*. Available: http://www.arb.ca.gov/msei/modeling.htm.

The emission factors were converted to pounds per hour and applied to the hourly activity schedule described in Appendix B.1.

On-Road Off-Site Equipment

On-road off-site vehicle trips include personal vehicles used by construction workers to access the construction site, personal vehicles used by operational workers whose work location would change during construction, and hauling trips for the transport of various materials and concrete to and from the site. On-road off-site hauling activity for the proposed project, including number of trips, was based on similar activity associated with the LAX Landside Access Modernization Program; the proposed project schedule for each project component and miles per trip were based on California Emissions Estimator Model (CalEEMod) default haul and delivery distances.[56] On-road off-site vehicle emissions were calculated by determining total vehicle miles traveled (VMT) by each type of vehicle. The emission factors obtained from EMFAC2014 as described previously (in grams per mile) were applied to the VMT estimates to calculate total emissions.

During construction, some of the activities that currently occur at the East Maintenance Facility, including administration and GSE maintenance, would be conducted at the West Maintenance Facility. Employees whose work would be conducted at the West Maintenance Facility during construction would park in existing UAL parking lots at the West Maintenance Facility. The majority of employees at LAX live in areas that are located east of the airport.[57] Therefore, the relocation of maintenance activities to the west side of the airport would increase VMT by maintenance employees from their places of residence to the worksite during construction. Emissions associated with the additional VMT from these employee trips were included in the analysis and were estimated using CARB's EMFAC2014 emission factor model.

Fugitive Dust

Fugitive dust is an additional source of PM_{10} and $PM_{2.5}$ emissions associated with construction activities. Fugitive dust includes re-suspended road dust from off-and on-road vehicles, as well as dust from grading, loading, unloading activities, and construction demolition. Fugitive dust emissions were calculated using methodologies, formulas, and values from the U.S. Environmental Protection Agency (USEPA)'s Compilation of Air Pollutant Factors (AP-42), the SCAQMD's *CEQA Air Quality Handbook*, and documentation associated with CARB's CalEEMod emissions estimator computer program.[58,59,60]

The proposed project is considered to be a large operation per SCAQMD Rule 403 (a large operation is any active operation on property which contains 50 or more acres of disturbed surface area or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic meters [5,000 cubic yards] or more three times during the most recent 365-day period.) Watering three times a

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56 California Air Resources Board, *California Emissions Estimator Model, Version 2013.2.2 User Guide, Appendix D.* Available: http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf.

57 Los Angeles World Airports Security Badge Office, 2015.

58 U.S. Environmental Protection Agency, *AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I, Section 13.2.1, Paved Roads, January 2011, Section 13.2.2 Unpaved Roads,* November 2006*, Section 13.2.3 Heavy Construction Operations*, January 1995. Available: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors.

59 South Coast Air Quality Management District, *CEQA Air Quality Handbook, April 1993;* South Coast Air Quality Management District, *SCAQMD Air Quality Significance Thresholds*, March 2015. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

60 California Air Resources Board, *California Emissions Estimator Model, Version 2013.3.2.* Available: http://www.caleemod.com/.

day, as required by SCAQMD Rule 403 for large projects, was estimated to reduce on-site fugitive dust emissions by 61 percent.[61]

Fugitive VOCs

A primary source of construction-related fugitive VOC emissions is concrete or asphalt paving. VOC emissions from asphalt paving operations result from evaporation of the petroleum distillate solvent, or diluent, used to liquefy asphalt cement. Based on the CARB default data contained within CalEEMod, an emission factor of 2.62 pounds of VOC (from asphalt curing) per acre of asphalt material was used to determine VOC emissions from asphalt paving. Another source of construction-related fugitive VOC emissions is architectural coatings. VOC emissions from architectural coatings result from evaporation of volatile compounds present in a coating applied to a structure's surface. Based on the CARB data contained within CalEEMod, an emission factor of 0.012 pounds of VOC (from evaporation) per square foot of coated surface was used to determine VOC emissions from architectural coatings.

4.1.1.2.2 Emissions Source Types - Operations

Operations-related criteria pollutant emissions were quantified for CO, VOC, NO_X, SO_2, PM_{10}, and $PM_{2.5}$ for both the existing conditions and proposed project's first year of operation. The first year of operations was selected because SCAQMD- and USEPA-approved emission models are designed to account for the gradual reduction in emissions over time. Because no increase in maintenance is expected to occur over time as a result of the proposed project after the first year of operations and emission factors are expected to decrease over time, the first year of operations would be the highest year of operational emissions associated with the implementation of the proposed project.

Sources of operational emissions evaluated in the analysis include aircraft tugs, aircraft taxiing, and aircraft engine run-ups.[62] With implementation of the proposed project, the number of aircraft movements between the passenger gates and the East Maintenance Facility was assumed to be the same as under baseline conditions. However, all aircraft that currently travel to the West Maintenance Facility would instead travel to the East Maintenance Facility. Because the East Maintenance Facility is closer to UAL's passenger gates, which are located in Terminals 7 and 8, the average daily travel distance for both taxiing and towing of aircraft would be reduced with implementation of the proposed project. In addition to the decreased travel distance, because of the proximity to the gates, more aircraft would be towed between the gates and the maintenance facility than under baseline conditions. Those aircraft not being towed would taxi using the main aircraft engines to move to and from the maintenance facility. As compared to taxiing, towing results in fewer emissions. Based on information from UAL regarding baseline operations and the proposed project location and design, it was estimated that, under the proposed project, the number of aircraft being towed would increase from 11 or 12 daily to 16 daily, with a corresponding decrease in taxiing aircraft.

As part of the proposed project, UAL would consolidate its stationary source equipment at the East Maintenance Facility, and would upgrade its current equipment with new, cleaner technologies. The existing equipment to be replaced (at both the east and west facilities) would be dismantled and/or decommissioned. Stationary equipment to be installed would include natural gas boilers and water heaters, a diesel-operated emergency generator, and a maintenance-related spray booth (which would replace the existing spray booths at both the east and west facilities). These sources would replace existing

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61 South Coast Air Quality Management District, *Rule 403 Fugitive Dust*, amended June 3, 2005. Available: http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf?sfvrsn=4.

62 Airlines routinely inspect and maintain their aircraft to ensure the safety of the traveling public, and each aircraft is on a stringent maintenance schedule based on its number of hours in operation. As part of this regularly scheduled maintenance, the FAA requires that aircraft engines be tested at various power levels to ensure their proper operation. These tests are called engine run-ups and occur when aircraft are stationary.

equipment and would service similar capacities to existing sources. UAL operates a Title V facility at LAX; therefore, the replaced equipment would be subject to review and approval by SCAQMD under new source review and other regulations. Where required, the project equipment would meet Best Available Control Technology (BACT). In particular, it is expected that the Permit to Operate for the new spray booth at the proposed project site would be structured to reduce allowable paint and solvent usage below current permitted levels. Therefore, emissions from new stationary operational sources would be the same as, or lower than, emissions under baseline conditions.[63]

The basis for the operational emissions analysis includes aircraft movement, engine testing, and maintenance data, which were provided by UAL and are available in Appendix B.2. Average daily activity estimates were developed for each operational source. As described in Chapter 2, *Project Description*, with implementation of the proposed project, the volume and basic nature of UAL's existing maintenance operations at LAX would not change or increase. Therefore, the number of aircraft movements between the gates and maintenance facilities, as well as the number of engine run-ups, was assumed to be the same under baseline conditions and future-with-project conditions. However, all of the aircraft movements would be to the East Maintenance Facility under the project conditions, which is closer to the airport property boundary (i.e., fence-line) than the West Maintenance Facility. Therefore, dispersion modeling of the operational emissions was conducted to determine if project-related air pollutant concentrations at the property line and beyond would exceed any ambient air quality standards.

During project operations, all employees would be located at the East Maintenance Facility. This would involve relocation of employees who currently work at the West Maintenance Facility. As mentioned previously, the majority of employees at LAX live in areas that are located east of the airport. Therefore, the consolidation of maintenance activities on the east side of the airport would reduce operational VMT by maintenance employees from their places of residence to the worksite. In addition, consolidation of UAL's maintenance activities into a single facility would eliminate vehicle trips between the two maintenance facilities that occur under baseline conditions. These reductions in VMT would be a beneficial impact of the proposed project.[64]

Aircraft

Air pollutant emissions from aircraft movements between the terminal gates utilized by UAL and either the West Maintenance Facility or East Maintenance Facility locations, as well as emissions from engine run-ups, were modeled. Engine models and associated engine emission indices for representative aircraft engines were obtained from the FAA's Aviation Environmental Design Tool (AEDT), Version 2d.[65,66] The distances between the terminal gates and UAL maintenance facilities were determined using Google Earth

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63 The expected reduction in emissions associated with operational stationary sources was not quantified in the analysis; no credit is taken for this reduction.

64 The reduction in emissions associated with the reduced VMT associated with operational worker trips and trips between the two existing maintenance facilities was not quantified in the analysis; no credit is taken for this reduction.

65 U.S. Department of Transportation, Federal Aviation Administration, *Aviation Environmental Design Tool (AEDT) Version 2d*. Available: https://aedt.faa.gov/.

66 AEDT Version 2d does not calculate emissions or dispersion for operations that do not include a landing or a takeoff. The activity associated with the proposed project only affects ground operations, (i.e., moving aircraft between the passenger gates and the maintenance hangars.) Therefore, emission factor and fuel flow data from the AEDT 2d databases were incorporated into a spreadsheet used to estimate taxiing and run-up test emissions from aircraft engines typically operated by UAL at LAX (included in Appendix B). The information obtained from the AEDT 2d databases included engine fuel flow, engine reference emission indices, and modal-specific adjustment factors on fuel flow for idle mode (applied to taxiing aircraft) and climb-out mode (applied to engine run-up testing). The procedures outlined in the U.S. Department of Transportation, Federal Aviation Administration, *Aviation Environmental Design Tool (AEDT) Technical Manual Version 2d, Service Pack 3*, June 2016, Section 5.1, were followed to estimate these emissions. Available: https://aedt.faa.gov/Documents/AEDT2b_TechManual.pdf.

Pro©, and travel time in the taxi operating mode assumed a travel speed of 25 miles per hour (mph).[67] A portion of the aircraft were assumed to taxi under main engine power to and from the maintenance facilities, and the remaining aircraft were assumed to be moved by aircraft tugs, discussed below.

Engine run-ups were assumed to occur at the West Maintenance Facility area under existing conditions, and at the East Maintenance Facility under the proposed project. Emissions associated with engine run-ups were included in the analysis.

Ground Support Equipment (Aircraft Tugs)

Air pollutant emissions from aircraft tugs used to move aircraft between the terminal gates and the maintenance facilities were developed from emission factors based on the CARB OFFROAD2011 and OFFROAD2007 models; these models are discussed in the Off-Road Equipment section above. Two aircraft tug sizes were included in the analysis: wide-body aircraft tugs (size assumed to be greater than 200 horsepower [HP]), and narrow-body aircraft tugs (size assumed to be less than 200 HP). The same distances used for aircraft taxiing were used for the tugging distance, but tug speed was limited to 5 mph.

4.1.1.2.3 Dispersion Modeling

Air dispersion modeling was used to estimate the localized effects from the on-site portion of daily emissions from the operational sources described above. The localized effects were evaluated at nearby receptor points (shown on **Figure 4.1.1-1**) that could be affected by the proposed project. The USEPA- and SCAQMD-approved dispersion model, American Meteorological Society/USEPA Regulatory Model (AERMOD), was used to model the air quality impacts of CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ emissions.[68] AERMOD can estimate the air quality impacts of single point, multiple point, area, or volume sources using historical meteorological conditions. A series of area sources strung together can be used to model releases from a variety of emission sources, including the taxiing and towing of aircraft on taxiways.

Volume sources were used to represent the emissions from the aircraft engine run-ups. Model inputs were developed following the SCAQMD's Modeling Guidance for AERMOD.[69] To be conservative, this analysis did not calculate PM_{10} deposition, which would potentially reduce the ambient modeled concentration of PM_{10}.

Dispersion modeling was not performed for construction, as SCAQMD's emission lookup tables in the Final Localized Significance Threshold Methodology[70] were used to conservatively estimate localized construction impacts.

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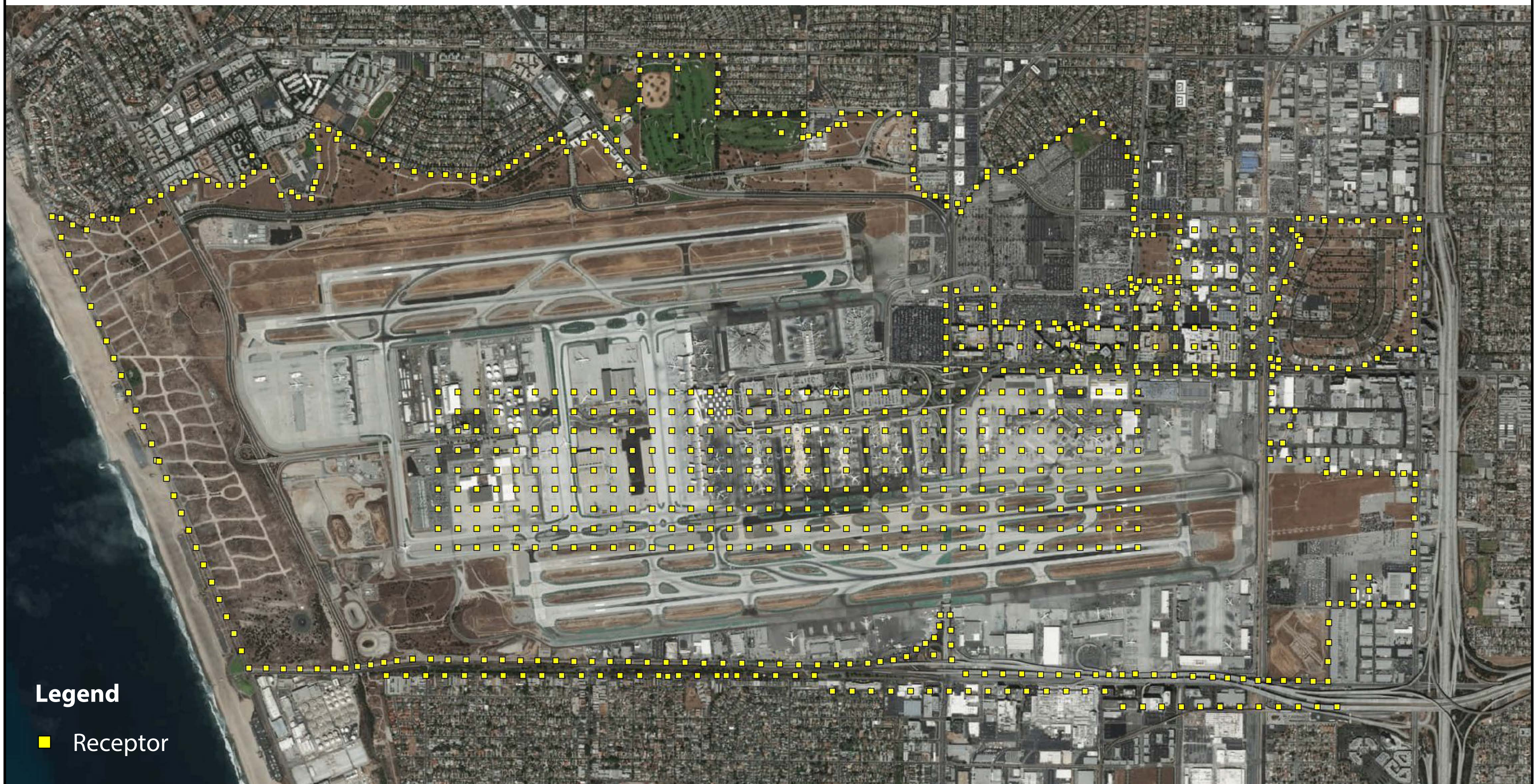
67 It is likely that aircraft that travel from the gates at Terminals 7 and 8 to the existing West Maintenance Facility travel at speeds lower than 25 mph due to congestion on terminal-area taxiways west of these gates, resulting in longer taxi times. As a result, it is likely that emissions from aircraft taxiing under baseline conditions are higher than assumed in this analysis and that, consequently, incremental emissions resulting from the proposed project would be lower than assumed in this analysis. The assumptions in this Draft EIR result in a conservative analysis of project-related operational impacts from aircraft taxiing.

68 The AERMOD modeling system is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. Additional information, documentation, and guidance regarding the AERMOD modeling system, including the model code and documentation for AERMOD Version 15181, is available on the USEPA's website at https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models.

69 South Coast Air Quality Management District, SCAQMD Modeling Guidance for AERMOD. Available: http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/modeling-guidance, accessed March 13, 2018.

70 South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology, revised July 2008*. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2.



Source: CDM Smith.
Prepared by: CDM Smith, March 2018.

LAX UAL East Aircraft Maintenance and GSE Project

Receptor Locations

Figure
4.1.1-1

Sources

Operational activities were assumed to be located at specified locations at the project site and along the taxiways. On-site sources were modeled as area sources using the polygon-area option in AERMOD. Aircraft taxi and towing routes were modeled as line-area sources. These sources were modeled with a 12-meter release height and 2.8-meter initial vertical dimension.

Receptor Locations

Receptor points are the geographic locations where the air dispersion model calculates ambient air pollutant concentrations. These discrete receptors were used to determine the concentrations of criteria pollutants in the vicinity of the project site.[71] Receptors were placed at the nearest off-site receptor locations, as shown on Figure 4.1.1-1.

Meteorology

The meteorological data used in the analysis were obtained from the National Climatic Data Center website, and was preprocessed using AERMET.[72,73] AERMET is a meteorological preprocessor for organizing available meteorological data into a format suitable for use in the AERMOD air quality dispersion model. These files were also developed by the SCAQMD using site-specific surface characteristics (i.e., surface albedo, surface roughness, and Bowen ratio) obtained using AERSURFACE.[74,75] AERSURFACE is a tool that provides realistic reproducible surface characteristic values, including albedo, Bowen ratio, and surface roughness length, for input into AERMET. The data set used consisted of hourly surface data collected at the LAX National Weather Service station (Station 23174) for calendar years 2012 through 2016; the data included ambient temperature, wind speed, wind direction, and atmospheric stability parameters, as well as mixing height parameters from the appropriate upper air station (Miramar, California).

Terrain

The terrain data used in the analysis were U.S. Geological Survey National Elevation Data (NED) geographic tiff files (GEO TIFF) with 10-meter elevation resolution. Two files covered the modeling domain: NED_n34w119_13.tif and NED_n35w119_13.tif.[76] These data were processed with the AERMAP pre-processor for AERMOD to generate base elevations for each source and receptor location.

Ozone Limiting Method for NO_2 Modeling

AERMOD contains various methods for modeling the conversion of NO_X to NO_2, including the Ozone Limiting Method (OLM) and the Plume Volume Molar Ratio Method (PVMRM). The OLM option was used in this modeling analysis because it is the most applicable to the non-stack, mobile sources included in

71 Discrete Cartesian receptors are identified by their x (east-west) and y (north-south) coordinates and represent a specific location of interest.

72 National Climatic Data Center Portal. Available: ftp://ftp.ncdc.noaa.gov/pub/data/noaa/; and ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/, accessed November, 2017.

73 U.S. Environmental Protection Agency, *Support Center for Regulatory Atmospheric Modeling (SCRAM), Meteorological Processors and Accessory Programs.* Available: https://www3.epa.gov/scram001/metobsdata_procaccprogs.htm, accessed November 4, 2017.

74 The surface albedo is the portion of sunlight that is reflected; the Bowen ratio is the measure of moisture available for evaporation.

75 U.S. Environmental Protection Agency, *Support Center for Regulatory Atmospheric Modeling (SCRAM), Air Quality Dispersion Modeling – Related Model Support Programs.* Available: https://www.epa.gov/scram/air-quality-dispersion-modeling-related-model-support-programs, accessed November 4, 2017.

76 United States Geological Survey, *National Map Viewer*. Available: https://viewer.nationalmap.gov/basic/, accessed November 28, 2016.

this project.[77] The SCAQMD provides hourly O_3 data for modeling conversion of NO_X to NO_2 using the OLM option. In addition, the following values were used in the analysis:

- Ambient Equilibrium NO_2/NO_X Ratio: 0.90;
- In-stack NO_2/NO_X Ratio: 0.11 for heavy-duty trucks and construction equipment; and
- Default Ozone Value: Hourly O_3 data file provided by the SCAQMD.

4.1.1.3 Existing Conditions

4.1.1.3.1 Climatological Conditions[78]

LAX is located within the South Coast Air Basin of California, a 6,745 square-mile area encompassing all of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The meteorological conditions at the airport are heavily influenced by the proximity of the airport to the Pacific Ocean to the west and the mountains to the north and east. This location tends to produce a regular daily reversal of wind direction; onshore (from the west) during the day and offshore (from the east) at night. Comparatively warm, moist Pacific air masses drifting over cooler air resulting from coastal upwelling of cooler water often form a bank of fog that is generally swept inland by the prevailing westerly (i.e., from the west) winds. The "marine layer" is generally 1,500 to 2,000 feet deep, extending only a short distance inland and rising during the morning hours producing a deck of low clouds. The air above is usually relatively warm, dry, and cloudless. The prevalent temperature inversion in the South Coast Air Basin tends to prevent vertical mixing of air through more than a shallow layer.

A dominating factor in California weather is the semi-permanent high-pressure area of the North Pacific Ocean. This pressure center moves northward in summer, holding storm tracks well to the north, and minimizing precipitation. Changes in the circulation pattern allow storm centers to approach California from the southwest during the winter months and large amounts of moisture are carried ashore. The Los Angeles region receives on average 10 to 15 inches of precipitation per year, of which 83 percent occurs during the months of November through March. Thunderstorms are light and infrequent and, on very rare occasions, trace amounts of snowfall have been reported at the airport.

The annual minimum mean, maximum mean, and overall mean temperatures at the airport are 56 degrees Fahrenheit (°F), 70°F, and 63°F, respectively.[79] The prevailing wind direction at the airport is from the west-southwest with an average wind speed of roughly 6.4 knots (7.4 mph or 3.3 meters per second [m/s]).[80,81] Maximum recorded gusts range from 27 knots (31 mph or 13.9 m/s) in July to 56 knots (64 mph or 28.6 m/s) in March. The monthly average wind speeds range from 5.3 knots (6.1 mph or 2.7 m/s) in November to 7.6 knots (8.7 mph or 3.9 m/s) in April.[82]

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77 OLM is a USEPA-approved methodology for determining NO_X to NO_2 conversion. OLM provides a more accurate determination of NO_X to NO_2 conversion than other approved methods by using actual monitored ozone data.

78 Ruffner, J.A., Gale Research Company, *Climates of the States: National Oceanic and Atmospheric Administration Narrative Summaries, Table, and Maps for Each State with Overview of State Climatologist Programs*, Third Edition, Volume 1: Alabama – New Mexico, 1985, pp. 83-93.

79 Western Regional Climate Center, *Los Angeles Intl AP, California (045114)*. Available: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5114, accessed November 7, 2017.

80 Western Regional Climate Center, *Prevailing Wind Direction.* Available: https://wrcc.dri.edu/Climate/comp_table_show.php?stype=wind_dir_avg, accessed November 7, 2017.

81 Western Regional Climate Center, *Average Wind Speeds - MPH.* Available: https://wrcc.dri.edu/Climate/comp_table_show.php?stype=wind_speed_avg, accessed November 7, 2017.

82 Western Regional Climate Center, *2008 LCD for Los Angeles International, California.* Available: https://wrcc.dri.edu/Climate/west_lcd_show.php?iyear=2008&sstate=CA&stag=losangelesintl&sloc=Los+Angeles+International, accessed November 7, 2017.

4.1.1.3.2 Regulatory Setting

Air quality is regulated by federal, state, and local laws. In addition to rules and standards contained in the Federal Clean Air Act (CAA) and the California Clean Air Act (CCAA), air quality in the Los Angeles region is subject to the rules and regulations established by CARB and SCAQMD with oversight provided by the USEPA, Region IX.

Federal

The USEPA is responsible for implementation of the CAA. The CAA was first enacted in 1970 and has been amended numerous times in subsequent years (1977, 1990, and 1997). Under the authority granted by the CAA, USEPA has established National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: O_3, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. **Table 4.1.1-1** presents the NAAQS that are currently in effect for criteria air pollutants. As discussed previously, O_3 is a secondary pollutant, meaning that it is formed from reactions of "precursor" compounds under certain conditions. The primary precursor compounds that can lead to the formation of O_3 are VOCs and NO_X.

Table 4.1.1-1
National and California Ambient Air Quality Standards (NAAQS and CAAQS)

			NAAQS	
Pollutant	Averaging Time	CAAQS	Primary	Secondary
Ozone (O_3)	8-hour	0.070 ppm (137 µg/m³)	0.070 ppm (137 µg/m³)	Same as Primary
	1-Hour	0.09 ppm (180 µg/m³)	N/A	N/A
Carbon Monoxide (CO)	8-hour	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	N/A
	1-Hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	N/A
Nitrogen Dioxide (NO_2)	Annual	0.030 ppm (57 µg/m³)	0.053 ppm (100 µg/m³)	Same as Primary[1]
	1-Hour	0.18 ppm (339 µg/m³)	0.100 ppm (188 µg/m³)	N/A
Sulfur Dioxide (SO_2)[2]	Annual	N/A	0.030 ppm (80 µg/m³)	N/A
	24-Hour	0.04 ppm (105 µg/m³)	0.14 ppm (365 µg/m³)	N/A
	3-Hour	N/A	N/A	0.5 ppm (1300 µg/m³)
	1-Hour	0.25 ppm (655 µg/m³)	0.075 ppm (196 µg/m³)	N/A
Respirable Particulate Matter (PM_{10})	AAM	20 µg/m³	N/A	N/A
	24-Hour	50 µg/m³	150 µg/m³	Same as Primary
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m³	12.0 µg/m³	15 µg/m³
	24-Hour	N/A	35 µg/m³ [10/]	Same as Primary
Lead (Pb)	Rolling 3-Month Average	N/A	0.15 µg/m³	Same as Primary
	Monthly	1.5 µg/m³	N/A	N/A
Visibility Reducing Particles	8-Hour	Extinction of 0.23 per kilometer	N/A	N/A
Sulfates	24-Hour	25 µg/m³	N/A	N/A

Source: California Air Resources Board, Ambient Air Quality Standards Chart, May 4, 2016. Available: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

Table 4.1.1-1 National and California Ambient Air Quality Standards (NAAQS and CAAQS)
Notes: NAAQS = National Ambient Air Quality Standards; N/A = Not applicable CAAQS = California Ambient Air Quality Standards; mg/m^3 = milligrams per cubic meter ppm = parts per million (by volume); AAM = Annual arithmetic mean $\mu g/m^3$ = micrograms per cubic meter
1. On March 20, 2012, the USEPA took final action to retain the current secondary NAAQS for NO_2 (0.053 ppm averaged over a year) and SO_2 (0.5 ppm averaged over three hours, not to be exceeded more than once per year) (77 Federal Register [FR] 20264). 2. On June 22, 2010, the 1-hour SO_2 NAAQS was updated and the previous 24-hour and annual primary NAAQS were revoked. The previous 1971 SO_2 NAAQS (24-hour: 0.14 ppm; annual: 0.030 ppm) remains in effect until 1 year after an area is designated for the 2010 NAAQS (75 FR 35520).
Prepared by: CDM Smith, January 2018.

The CAA also specifies future dates for achieving compliance with the NAAQS and mandates that states submit and implement a State Implementation Plan (SIP) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met. The 1990 amendments to the CAA identify specific emission reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones.

LAX is located in the South Coast Air Basin, which is designated as a federal nonattainment area for O_3, $PM_{2.5}$, and Pb. Nonattainment designations under the CAA for O_3 are classified into levels of severity based on the level of concentration above the standard, which is also used to set the required attainment date. The South Coast Basin is classified as an extreme nonattainment area for O_3. The South Coast Air Basin was redesignated in 1998 to attainment/maintenance for NO_2 and in 2007 to attainment/maintenance for CO. A designation of attainment/maintenance means that the pollutant is currently in attainment (i.e., meets standards) and that measures are included in the SIP to ensure that the NAAQS for that pollutant are not exceeded again (maintained). More recently, the South Coast Air Basin was redesignated to attainment/maintenance for PM_{10} on July 26, 2013.[83] Most recently, the South Coast Air Basin was also found to attain the 1997 $PM_{2.5}$ NAAQS;[84] however, the South Coast Air Basin remains a nonattainment area for the 2006 daily and 2012 annual $PM_{2.5}$ NAAQS shown in **Table 4.1.1-2**. The attainment status with regard to the NAAQS is presented in Table 4.1.1-2 for each criteria pollutant.

83 U.S. Environmental Protection Agency, *Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Air Basin; Approval of PM_{10} Maintenance Plan and Redesignation to Attainment for the PM_{10} Standard*, Federal Register, Vol. 78, No. 123, June 26, 2013, pp. 38223-38226.

84 U.S. Environmental Protection Agency, *Clean Data Determination for 1997 $PM_{2.5}$ Standards; California-South Coast; Applicability of Clean Air Act Requirements*, Federal Register, Vol. 81, No. 142, July 25, 2016, pp. 48350-48356.

Table 4.1.1-2
South Coast Air Basin Attainment Status

Pollutant	Federal Standards (NAAQS)[1]	California Standards (CAAQS)[2]
Ozone (O_3)	Nonattainment – Extreme	Nonattainment
Carbon Monoxide (CO)	Attainment – Maintenance	Attainment
Nitrogen Dioxide (NO_2)	Attainment – Maintenance	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Respirable Particulate Matter (PM_{10})	Attainment - Maintenance	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment[3]	Nonattainment
Lead (Pb)	Nonattainment	Attainment

Sources: U.S. Environmental Protection Agency, *Green Book Nonattainment Areas*. Available: https://www.epa.gov/green-book, accessed March 2018; California Air Resources Board, *Area Designations Maps/State and National.* Available: https://www.arb.ca.gov/desig/adm/adm.htm, accessed November 2017; U.S. Environmental Protection Agency. *Clean Data Determination for 1997 $PM_{2.5}$ Standards; California-South Coast; Applicability of Clean Air Act Requirements*, Federal Register, Vol. 81, No. 142, p. 48350. Available: https://www.federalregister.gov/documents/2016/07/25/2016-17410/clean-data-determination-for-1997-pm25, effective August 24, 2016.

Notes:

1. Status as of November 3, 2017.
2. Status as of November 3, 2017.
3. Classified as attainment for 1997 NAAQS, moderate nonattainment for 2012 NAAQS, and serious nonattainment for 2006 NAAQS.

Prepared By: CDM Smith, January 2018.

State

The CCAA, signed into law in 1988, requires all areas of the State to achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practicable date. The CAAQS are generally as stringent as, and in several cases more stringent than, the NAAQS.[85] The currently applicable CAAQS are presented with the NAAQS in Table 4.1.1-1. The attainment status with regard to the CAAQS is presented in Table 4.1.1-2 for each criteria pollutant. CARB has jurisdiction over a number of air pollutant emission sources that operate in the State. Specifically, CARB has the authority to develop emission standards for on-road motor vehicles (with USEPA approval), as well as for stationary sources and some off-road mobile sources. In turn, CARB has granted authority to the regional air pollution control and air quality management districts to develop stationary source emission standards, issue air quality permits, and enforce permit conditions.

South Coast Air Quality Management District

SCAQMD has jurisdiction over an area of 10,743 square miles consisting of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino counties, and the Riverside County portions of the Salton Sea Air Basin and Mojave Desert Air Basin. The South Coast Air Basin is a sub-region of SCAQMD's jurisdiction and covers an area of 6,745 square miles. Although air quality in this area has improved, the South Coast Air Basin requires continued diligence to meet air quality standards.

85 The numerical value of the NO_2 and SO_2 1-hour CAAQS is less stringent than the NAAQS value; however, the form of the CAAQS is different than the form of the NAAQS. The CAAQS is attained for both pollutants when measured concentrations never exceed the CAAQS value. The 1-hour NO_2 NAAQS is attained when the 98th percentile of measured concentrations is less than the NAAQS. The 1-hour SO_2 NAAQS is attained when the 99th percentile of measured concentrations is less than the NAAQS. Therefore, the CAAQS and NAAQS are not directly comparable.

The SCAQMD adopted a series of Air Quality Management Plans (AQMPs) to meet the CAAQS and NAAQS. The most recent AQMP adopted by SCAQMD and CARB is the 2016 AQMP. However, the most recent plan that has been approved by USEPA as an update to the State Implementation Plan (SIP) is the 2012 AQMP. Both the 2016 AQMP and 2012 AQMP are briefly discussed below.

SCAQMD adopted the 2016 AQMP on March 3, 2017.[86] It incorporates the latest scientific and technology information and planning assumptions, including those consistent with the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)[87] measures adopted by the Southern California Association of Governments (SCAG) on April 7, 2016, and updated emission inventory methodologies for various source categories. The 2016 AQMP incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, and on-road and off-road mobile sources. The 2016 AQMP builds upon improvements in previous plans, and includes new and changing federal requirements, implementation of new technology measures, and the continued development of economically sound, flexible compliance approaches. In addition, it highlights the significant amount of emission reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under the federal CAA.

The 2016 AQMP's key undertaking is to bring the South Coast Air Basin into attainment with the following standards:

- 8-hour 80 parts per billion (ppb) Ozone NAAQS by 2023 (adopted in 1997);
- 8-hour 75 ppb Ozone NAAQS by 2031 (adopted in 2008);
- 1-hour 120 ppb Ozone NAAQS by 2022 (adopted in 1979);
- 24-hour 35 micrograms per cubic meter (µg/m3) PM2.5 NAAQS by 2019 (adopted in 2006); and
- Annual 12 µg/m3 PM2.5 NAAQS by 2025 (adopted in 2012).

The overall control strategy is an integrated approach relying on fair-share emission reductions from federal, state, and locally regulated sources. The 2016 AQMP is composed of stationary and mobile source emission reductions from (1) traditional regulatory control measures, (2) incentive-based programs, (3) co-benefits from climate programs, (4) mobile source strategies and (5) reductions from federally-controlled sources, which include aircraft, locomotives and ocean-going vessels. These strategies are to be implemented in partnership with CARB and USEPA. In addition, the SCAG-approved 2016 RTP/SCS transportation programs, measures, and strategies, which are generally designed to reduce VMT, are included within baseline emissions.

LAWA provided baseline and forecasted airport emission inventories to SCAQMD for LAX, Van Nuys Airport, and Ontario International Airport (which was then under LAWA's jurisdiction), and the aircraft emissions from these inputs were included in the 2016 AQMP. The 2016 AQMP includes several future air pollution control measures to be developed and implemented by CARB. These measures include state regulations potentially requiring zero-emission GSE and zero-emission airport shuttle buses in the future.

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86 South Coast Air Quality Management District, *Final 2016 Air Quality Management Plan (AQMP)*, March 3, 2017. Available: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp.

87 Southern California Association of Governments, *2016-2040 Regional Transportation Plan/Sustainable Communities Strategy*: A Plan for Mobility, Accessibility, Sustainability, and a High Quality of Life, adopted April 7, 2016. Available: http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf.

Previously, SCAQMD and CARB adopted the 2012 AQMP,[88] which included the 2012-2035 RTP/SCS[89] measures. The Final 2012 AQMP was adopted by the AQMD Governing Board on December 7, 2012. The 2012 AQMP's key undertaking was to bring the South Coast Air Basin into attainment with NAAQS for 24-hour $PM_{2.5}$ by 2014. It also intensified the scope and pace of continued air quality improvement efforts toward meeting the 2023 8-hour O_3 standard deadline with new measures designed to reduce reliance on the CAA Section 182(e)(5) long-term measures for NO_X and VOC reductions. SCAQMD expects exposure reductions to be achieved through implementation of new and advanced control technologies, as well as improvement of existing technologies.

The control measures in the 2012 AQMP consisted of four components: (1) South Coast Air Basin-wide and Episodic Short-term $PM_{2.5}$ Measures; (2) Contingency Measures; (3) 8-hour O_3 Implementation Measures; and (4) Transportation and Control Measures provided by SCAG. The Plan included eight short-term $PM_{2.5}$ control measures, sixteen stationary source 8-hour O_3 measures, ten early action measures for mobile sources, seven early action measures proposed to accelerate near-zero and zero emission technologies for goods movement-related sources, and five on-road and five off-road mobile source control measures. In general, the District's control strategy for stationary and mobile sources is based on the following approaches: (1) available cleaner technologies; (2) best management practices; (3) incentive programs; (4) development and implementation of zero-near-zero technologies and vehicles and control methods; and (5) emission reductions from mobile sources.

The SCAQMD also adopts rules to implement portions of the AQMP. Several previously adopted rules are applicable to the construction of the proposed project as well as to stationary sources being relocated or replaced as part of the proposed project. SCAQMD Rule 403[90] requires the implementation of best available fugitive dust control measures during active construction activities capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and construction equipment travel on paved and unpaved roads. SCAQMD Rule 113[91] limits the amount of VOCs from architectural coatings in solvents, which lowers the emissions of odorous compounds. As explained previously, UAL operates a Title V facility at LAX. Therefore, Regulation II – Permits[92] would apply to relocated or replaced stationary equipment associated with the maintenance operations and facilities (such as spray booths, comfort heating/cooling, and emergency generators); replacement stationary equipment could also be subject to requirements and/or exemptions under Regulation XIII – New Source Review.[93]

Southern California Association of Governments

SCAG is the metropolitan planning organization (MPO) for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial counties and serves as a forum for the discussion of regional issues related to transportation, the economy, community development, and the environment. As the federally-designated MPO for the Southern California region, SCAG is mandated by the federal

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88 South Coast Air Quality Management District, *Final 2012 Air Quality Management Plan*, December 7, 2012. Available: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2012-aqmp-carb-epa-sip-submittal.

89 Southern California Association of Governments, *2012-2035 Regional Transportation Plan/Sustainable Communities Strategy*: Towards a Sustainable Future, April 2012. Available: http://rtpscs.scag.ca.gov/Documents/2012/final/f2012RTPSCS.pdf.

90 South Coast Air Quality Management District, *Rule 403 – Fugitive Dust*, amended June 3, 2005. Available: http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf?sfvrsn=4.

91 South Coast Air Quality Management District, *Rule 1113 – Architectural Coatings*, amended February 5, 2016. Available: http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf?sfvrsn=17.

92 South Coast Air Quality Management District, *Regulation II - Permits*. Available: http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/regulation-ii.

93 South Coast Air Quality Management District, *Regulation XIII – New Source Review.* Available: http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/regulation-xiii.

government to research and develop plans for transportation, hazardous waste management, and air quality. Pursuant to California Health and Safety Code Section 40460(b), SCAG has the responsibility for preparing and approving the portions of the AQMP relating to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. SCAG is also responsible under the CAA for determining conformity of surface transportation projects, plans, and programs with applicable air quality plans. With regard to air quality planning, SCAG prepared and adopted the 2016-2040 RTP/SCS, which includes a Sustainable Communities Strategy that addresses regional development and growth forecasts.[94]

Other Related Rules and Policies

In the South Coast Air Basin, the City of Los Angeles, CARB, and the SCAQMD have adopted or proposed additional rules and policies governing the use of cleaner fuels in public vehicle fleets. The City of Los Angeles Policy CF#00-0157 requires that City-owned or operated diesel-fueled vehicles be equipped with particulate traps and that they use ultra-low-sulfur diesel fuel. CARB adopted a Risk Reduction Plan for diesel-fueled engines and vehicles.[95] The SCAQMD adopted a series of rules that would require the use of clean fuel technologies in on-road transit buses, on-road public fleet vehicles, airport taxicabs and shuttles, trash trucks, and street sweepers.[96]

LAWA's Sustainable Design and Construction Policy, adopted in September 2017, requires that new buildings and major building renovation projects at LAX be designed to achieve the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Silver certification, at a minimum, unless an exemption is provided.[97] Silver certification mandates that energy efficiency features be incorporated into new construction, which would reduce criteria pollutant and greenhouse gas emissions.

In 2015, LAWA adopted the LAX GSE Emissions Reduction Policy.[98] It is the first GSE emissions reduction policy of its kind in the nation. The Policy requires annual reporting of GSE operating at LAX and associated emissions, and requires that GSE operators reduce emissions from their GSE fleets operating at LAX to specific emission factor goals (in grams per brake horsepower-hour) by 2019 and 2021.

4.1.1.3.3 Existing Ambient Air Quality

In an effort to monitor the various concentrations of air pollutants throughout the South Coast Air Basin, the SCAQMD divided the region into 38 Source Receptor Areas in which monitoring stations operate. The monitoring station that is most representative of existing air quality conditions in the project area is the Southwest Coastal Los Angeles Monitoring Station located at 7201 W. Westchester Parkway

94 Southern California Association of Governments, *Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life*, adopted April 7, 2016. Available: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.

95 California Air Resources Board, Stationary Source Division, Mobile Source Control Division, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October 2000. Available: http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf.

96 South Coast Air Quality Management District, *Rule 1186.1 – Less-Polluting Sweepers, amended January 9, 2009; Rule 1191 – Clean On-Road Light- and Medium-Duty Public Fleet Vehicles, adopted June 16, 2000; Rule 1192 – Clean On-Road Transit Buses, adopted June 16, 2000; Rule 1193 – Clean On-Road Residential and Commercial Refuse Collection Vehicles, amended July 9, 2010; Rule 1194 – Commercial Airport Ground Access, amended October 20, 2000; and Rule 1196 – Clean On-Road Heavy-Duty Public Fleet Vehicles, amended June 6, 2008*. Available: http://www.aqmd.gov/home/regulations/fleet-rules.

97 City of Los Angeles, Los Angeles World Airports, *LAWA Sustainable Design and Construction Policy*, September 7, 2017.

98 Los Angeles World Airports, *Ground Support Equipment Emissions Policy*, April 16, 205. Available: https://www.lawa.org/-/media/lawa-web/environment/files/lax_gse_emission_reduction_policy_boac.ashx?la=en&hash=A46EAB51C1192B3B8DF6FCD0BF55E478EA76DAE5.

(referred to as the LAX Hastings site), less than 0.5-mile from Runway 6L-24R (northernmost LAX runway). Criteria pollutants monitored at this station include O_3, CO, SO_2, NO_2, and PM_{10}. The nearest representative monitoring station that monitors $PM_{2.5}$ is the South Coastal Los Angeles County 1 Station, which is located 1305 E. Pacific Coast Highway (Long Beach). The most recent data available from the SCAQMD for these monitoring stations at the time of the Draft EIR preparation encompassed the years 2012 to 2016, as shown in **Table 4.1.1-3**.

Table 4.1.1-3
Ambient Air Quality Data

Pollutant[1,2]	2012	2013	2014	2015	2016
Ozone (O_3)					
Maximum Concentration 1-hr period, ppm	0.106	0.105	0.114	0.096	0.087
Days over State Standard (0.09 ppm)	1	1	1	1	0
Federal Design Value 8-hr period, ppm	---[4]	---[4]	0.064	0.068	0.070
Maximum California Concentration 8-hr period, ppm	0.075	0.082	0.080	0.078	0.080
Days over State Standard (0.07 ppm)	1	1	6	3	3
Carbon Monoxide (CO)					
Maximum Concentration 1-hr period, ppm	4.8	5.6	5.4	4.3	4.3
Days over State Standard (20.0 ppm)	0	0	0	0	0
Maximum Concentration 8-hr period, ppm	3.9	3.4	3.8	3.0	3.6
Days over State Standard (9.0 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)					
Maximum Concentration 1-hr period, ppm	0.077	0.078	0.087	0.087	0.082
98th Percentile Concentration 1-hr period, ppm	0.055	0.059	0.066	0.060	0.055
Days over State Standard (0.18 ppm)	0	0	0	0	0
Annual Arithmetic Mean (AAM), ppm	---[4]	---[4]	0.012	0.011	0.010
Exceed State Standard? (0.030 ppm)	---[4]	---[4]	No	No	No
Sulfur Dioxide (SO_2)					
Maximum Concentration 1-hr period, ppm	---[5]	---[5]	---[5]	---[5]	---[5]
Days over State Standard (75 ppb)	0	0	0	0	0
99th Percentile Concentration 1-hr period, ppm	0.021	0.012	0.010	0.012	0.012
Maximum Concentration 24-hr period, ppm	0.003	0.004	0.003	0.003	0.004
Days over State Standard (140 ppb)	0	0	0	0	0
Annual Arithmetic Mean (AAM), ppm	0.001	0.001	0.001	0.001	0.001
Respirable Particulate Matter (PM_{10})[3]					
Maximum Federal Concentration 24-hr period, $\mu g/m^3$	31	38	46	42	43
Days over Federal Standard (150 $\mu g/m^3$)	0	0	0	0	0
Maximum California Concentration 24-hr period, $\mu g/m^3$	30	37	45	42	---[4]
Days over State Standard (50 $\mu g/m^3$)	0	---[4]	0	---[4]	---[4]
Annual California Concentration, $\mu g/m^3$	19.6	---[4]	21.9	---[4]	---[4]
Exceed State Standard? (20 $\mu g/m^3$)	No	---[4]	Yes	Yes	Yes
Fine Particulate Matter ($PM_{2.5}$)[3]					
Federal Design Value 24-hr period, $\mu g/m^3$	26	26	---[4]	---[4]	---[4]
Federal Design Value Annual period, $\mu g/m^3$	10.6	10.8	---[4]	---[4]	---[4]
Maximum California Concentration 24-hr period, $\mu g/m^3$	59.1	42.9	61.9	62.2	35.2
Annual Federal Concentration, $\mu g/m^3$	10.5	10.9	---[4]	10.2	9.5

Table 4.1.1-3
Ambient Air Quality Data

Pollutant[1,2]	2012	2013	2014	2015	2016
Exceed State Standard? (12 $\mu g/m^3$)	No	No	No	No	No

Sources: California Air Resources Board, *iADAM: Air Quality Data Statistics*. Available: http://www.arb.ca.gov/adam/, accessed November 6, 2017. U.S. Environmental Protection Agency, *Air Quality Statistics Report*. Available: https://www.epa.gov/outdoor-air-quality-data/air-quality-statistics-report, accessed November 7, 2017.

Notes:

AAM = Annual arithmetic mean
ppb = parts per billion (by volume)
ppm = parts per million (by volume)
$\mu g/m^3$ = micrograms per cubic meter
--- = insufficient data to determine the value
N/A = not applicable

1. Monitoring data from the Southwest Coastal Los Angeles Station (Station No. 820) was used for O_3, NO_2, and PM_{10} concentrations. Monitoring data from the South Coastal Los Angeles County 1 Monitoring Station (Station No. 072) was used for $PM_{2.5}$ concentrations. USEPA regional summaries were used for CO and SO_2 concentrations.
2. An exceedance is not necessarily a violation. Violations are defined in 40 CFR 50 for NAAQS and 17 CCR 70200 for CAAQS
3. Statistics may include data that are related to an exceptional event.
4. Insufficient data available to determine the value.
5. CARB does not provide summarized CO and SO_2 concentration data for the South Coast Air Basin.

Prepared by: CDM Smith, January 2018.

The data show the following pollutant trends (refer to Table 4.1.1-1 for NAAQS and CAAQS):

- **Ozone** – The maximum 1-hour O_3 concentration recorded during the 2012 to 2016 period was 0.114 parts per million (ppm), recorded in 2014. During the reporting period, the California 1-hour standard was exceeded four times. The maximum 8-hour O_3 concentration was 0.082 ppm recorded in 2013. The California standard was exceeded between 1 and 6 days annually from 2012 to 2016. The 8-hour NAAQS was not exceeded in 2014, 2015 or 2016, however there was not enough data was available in 2012 or 2013 to determine the Federal 8-hour design value.
- **Carbon Monoxide** – The highest 1-hour CO concentration recorded was 5.6 ppm, recorded in 2013. The maximum 8-hour CO concentration recorded was 3.9 ppm recorded in 2012. As demonstrated by the data, the standards were not exceeded during the five-year period.
- **Nitrogen Dioxide** – The highest 1-hour NO_2 concentration recorded was 0.087 ppm in both 2014 and 2015. The maximum 98th percentile 1-hour concentration was 0.066 ppm, recorded in 2014. The highest recorded NO_2 annual arithmetic mean was 0.012 ppm recorded in 2014. As shown, the standards were not exceeded during the five-year period.
- **Sulfur Dioxide** – The highest 99th percentile 1-hour concentration recorded was 0.021 ppm in 2012. The maximum 24-hour concentration was 0.004 ppm, recorded in both 2013 and 2016. The highest annual arithmetic mean concentration was 0.001, recorded in each year between 2012 and 2016. As shown, the standards were not exceeded during the five-year period.
- **Respirable Particulate Matter (PM_{10})** – The highest recorded 24-hour PM_{10} concentration recorded was 46 $\mu g/m^3$ in 2014. During the period 2012 to 2016, the CAAQS for 24-hour PM_{10} was not exceeded and the NAAQS was not violated. The maximum annual California concentration recorded was 21.9 $\mu g/m^3$ in 2014.
- **Fine Particulates ($PM_{2.5}$)** – The maximum 24-hour $PM_{2.5}$ concentration recorded was 62.2 $\mu g/m^3$ in 2015. The highest annual federal design value of 10.8 was recorded in 2013. Between 2012 and 2013 the 24-hour and annual NAAQS were not violated. Not enough data was recorded or available in 2014, 2015 or 2016 to determine the NAAQS design values.

4.1.1.4 Thresholds of Significance

4.1.1.4.1 Emissions Thresholds

The SCAQMD has established CEQA operational and construction-related thresholds of significance for air pollutant emissions from projects proposed in the South Coast Air Basin.[99] These thresholds serve to address a project's consistency with applicable SCAQMD plans, impacts to ambient air quality standards, and contributions to cumulative impacts, including cumulatively considerable net increases to any criteria pollutant for which the air basin is in nonattainment, as specified in Appendix G of the State CEQA Guidelines. Construction and operational emission thresholds are summarized in **Table 4.1.1-4**. In accordance with the SCAQMD *CEQA Air Quality Handbook*, a significant air quality impact would occur if the estimated incremental increase in construction or operations-related emissions attributable to the proposed project would be greater than the daily emission thresholds presented in Table 4.1.1-4.

Table 4.1.1-4
SCAQMD CEQA Thresholds of Significance for Air Pollutant Emissions in the South Coast Air Basin

Mass Emission Thresholds lbs/day		
Pollutant	Construction	Operations
Carbon monoxide, CO	550	550
Volatile organic compounds, VOC[1]	75	55
Nitrogen oxides, NO_X	100	55
Sulfur dioxide, SO_2	150	150
Respirable particulate matter, PM_{10}	150	150
Fine particulate matter, $PM_{2.5}$	55	55
Lead, Pb[2]	3	3

Source: South Coast Air Quality Management District, *SCAQMD Air Quality Significance Thresholds*, March 2015. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

Notes:

1. The emissions of VOCs and ROGs are essentially the same for the combustion emission sources that are considered in this EIR. This EIR will typically refer to organic emissions as VOCs.
2. The only source of lead emissions from LAX is from aviation gasoline (AvGas) associated with piston-engine general aviation aircraft; however, due to the low number of piston-engines general aviation aircraft operations at LAX, AvGas quantities are low and emissions from these sources would not be materially affected by the project.

Prepared by: CDM Smith, January 2018.

Baseline Used to Determine Significance for the Proposed Project Emissions

For construction-related incremental emissions associated with the proposed project, a baseline of zero emissions is used. Therefore, all construction-related emissions attributable to the proposed project are compared to the significance thresholds for construction.

For operations-related incremental emissions associated with the proposed project, a baseline of 2017 emissions is used, accounting for operations at both the East and West Maintenance Facilities. Incremental operational emissions attributable to the proposed project are compared to the significance thresholds for operations.

99 South Coast Air Quality Management District, *SCAQMD Air Quality Significance Thresholds*, March 2015. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

4.1.1.4.2 Localized Significance Thresholds

The SCAQMD has developed emission thresholds for local air quality impacts from construction activities, referred to as localized significance thresholds (LSTs).[100] LSTs are only applicable to the following criteria pollutants: NO_X, CO, PM_{10}, and $PM_{2.5}$. As per SCAQMD's *CEQA Air Quality Handbook*, "LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area."[101] LSTs are analogous to NAAQS and CAAQS; pollutant levels below LSTs would not be expected to violate the NAAQS or CAAQS. The LST methodology was developed as a tool to assist in the evaluation of projects for which project-specific air quality modeling may not be warranted. The methodology provides mass rate look-up tables that allow a user to readily determine if the daily emissions for proposed construction or operational activities could result in significant localized air quality impacts. LSTs are applicable at the project-specific level and are generally not applicable to regional projects. The proposed project's emissions from on-site construction activity, as determined following the methodology discussed in Section 4.1.1.2, were compared to the LST values. If the proposed project's on-site construction emissions would exceed the LSTs, then the impacts to local air quality were considered significant.

SCAQMD's LST methodology determines localized emission thresholds based on a combination of the project area that would be disturbed during any given day of construction, the ambient air quality in the source receptor area, and the distance to the nearest receptor point. To determine the area that would be disturbed, the methodology offers a selection of 1 acre, 2 acres, or 5 or more acres disturbed, each relating to a different matrix of emission thresholds. For the proposed project, it is anticipated that 5 or more acres would be disturbed at any given time during project construction. The closest receptor from the project site boundary (i.e., LAX Crowne Plaza Hotel on Century Boulevard) is located at a distance of approximately 135 meters (approximately 450 feet); therefore, the LSTs for 100 meters were used. **Table 4.1.1-5** summarizes allowable on-site emissions for a project located in the Southwest Coastal Los Angeles County Source-Receptor Area with a 100 meter receptor distance and a 5 or more acre area of disturbance. LSTs consider ambient concentrations of pollutants for each source receptor area and distances to the nearest receptor. In accordance with the SCAQMD *CEQA Air Quality Handbook*, a significant air quality impact would occur if the estimated incremental emissions would be greater than the emissions thresholds presented in Table 4.1.1-5.

The thresholds for NO_2, CO, PM_{10}, and $PM_{2.5}$ represent the allowable peak day emissions that would not cause or contribute to a significant impact to local air quality.

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[100] South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology, revised July 2008*. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2.

[101] South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology, revised July 2008*. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2.

Table 4.1.1-5 SCAQMD Localized Significance Thresholds for Localized Air Pollutant Impacts in the South Coast Air Basin		
Project-Related Construction and Operational Thresholds[1]		
Pollutant	Construction Threshold (lbs/day)	Operations Threshold (lbs/day)
ROG	---	---
NO_X	202	202
CO	2,608	2,608
PM_{10}	60	15
$PM_{2.5}$	19	5
SO_2	---	---

Sources: South Coast Air Quality Management District, *Localized Significance Thresholds – Appendix C – Mass Rate Look Up.* Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/appendix-c-mass-rate-lst-look-up-tables.pdf, accessed November 7, 2017.

Notes:

1. The LSTs that apply to the proposed project are based on a minimum 5-acre site disturbance area and a distance to the nearest receptor distance of 100 meters.

Prepared By: CDM Smith, January 2018.

4.1.1.5 Impacts Analysis

4.1.1.5.1 Construction Impacts

Regional Construction Impacts

Peak daily construction-related emissions were calculated from a peak-month average day for each month of each year of construction associated with the proposed project. The peak daily construction emissions are presented in **Table 4.1.1-6** for all criteria and precursor pollutants studied (CO, VOC, NO_X, SO_2, PM_{10}, and $PM_{2.5}$). These calculations include appropriate reductions achieved with implementation of mandated dust control, as required by SCAQMD Rule 403 (Fugitive Dust).

Significant regional emissions of NO_X would result from heavy-duty on-site construction equipment and trucks. Daily NO_X emissions would potentially exceed the SCAQMD threshold of significance for approximately 7 months of the 22-month construction period. The peak daily NO_X emissions would potentially occur for only one month.

Table 4.1.1-6
Project Maximum Construction Emissions (lbs/day)

Pollutant	Peak Daily Emissions	Construction Threshold	Significant?
CO	178	550	No
VOC	41	75	No
NO_X	259	100	**Yes**
SO_2	1	150	No
PM_{10}	85	150	No
$PM_{2.5}$	30	55	No

Source: Appendix B.1 of this EIR.

Prepared By: CDM Smith, January 2018.

As seen in Table 4.1.1-6, the unmitigated regional construction emissions would be less than the SCAQMD CEQA construction emission thresholds for CO, VOC, SO_2, PM_{10}, and $PM_{2.5}$ but would exceed the threshold for NO_X. Therefore, the proposed project's construction emissions of NO_X would be a significant impact.

Localized Construction Impacts

As discussed in Section 4.1.1.2, *Methodology*, the local effects from the on-site portion of construction emissions were evaluated at the nearest receptor location that could be affected by the proposed project consistent with the methodologies in the SCAQMD's Final Localized Significance Threshold Methodology. The comparison of the peak daily on-site construction emissions compared with the SCAQMD's LSTs are presented in **Table 4.1.1-7**.

As shown in Table 4.1.1-7, the unmitigated on-site construction emissions would exceed the SCAQMD LSTs for NO_X, PM_{10}, and $PM_{2.5}$. Therefore, the localized construction impacts of the proposed project relative to NO_X, PM_{10}, and $PM_{2.5}$ emissions would be significant.

Table 4.1.1-7
Project Maximum On-Site Construction Emissions (lbs/day)

Pollutant	Peak Daily On-Site Emissions	Construction Threshold (LST)	Significant?
NO_X	249	202	**Yes**
CO	139	2,608	No
PM_{10}	82	60	**Yes**
$PM_{2.5}$	29	19	**Yes**
SO_2	N/A	N/A[1]	N/A

Source: Appendix B.1 of this EIR.

Notes:

1. SCAQMD has not developed LSTs for SO_2.

Prepared By: CDM Smith, January 2018.

As with significant regional emissions, significant local emissions of NO_X would primarily result from heavy-duty on-site construction equipment and trucks; these emissions would exceed the SCAQMD threshold of significance for approximately one month of the 22-month construction period. Significant local emissions of PM_{10} and $PM_{2.5}$ would primarily result from apron demolition and installation activities; these emissions would exceed the SCAQMD thresholds of significance for approximately 4 months of the 22-month construction period.

4.1.1.5.2 Operational Impacts

Regional Operational Impacts

Peak daily operational emissions were calculated based on peak daily operational data provided by UAL, included in Appendix B.2. The peak daily operational emissions are presented in **Table 4.1.1-8** for all criteria and precursor pollutants studied (CO, VOC, NO_X, SO_2, PM_{10} and $PM_{2.5}$).

As shown in Table 4.1.1-8, operational emissions with implementation of the proposed project would be lower than baseline emissions (i.e., operation of the proposed project would have a beneficial result with respect to criteria pollutant emissions). This reduction is due to the relocation of maintenance activities from the West Maintenance Facility to the East Maintenance Facility, which is located in closer proximity to UAL's passenger gates in Terminals 7 and 8. By placing all maintenance activity in closer proximity to the passenger gates, the average daily travel distance for both taxiing and towing of aircraft would be reduced. In addition to the decreased travel distance, with implementation of the proposed project, more aircraft would be towed between the gates and the maintenance facility than under baseline conditions, although the total number of daily aircraft movements would be the same. This would result in a reduction in taxi-related emissions compared to baseline conditions. As shown in Table 4.1.1-8, the unmitigated regional operational emissions would be less than the SCAQMD CEQA operational emission thresholds for all criteria pollutants. Therefore, the proposed project's regional operational emissions would be less than significant.

Table 4.1.1-8
Maximum Peak Daily Operational Emissions (lbs/day)

Pollutant	Baseline Peak Daily Emissions	Proposed Project Peak Daily Emissions	Increment in Peak Daily Emissions	Threshold	Significant?
CO	75.37	44.59	-30.79	550	No
VOC	6.72	3.98	-2.74	55	No
NO_X	23.38	15.83	-7.55	55	No
SO_2	4.70	2.71	-1.99	150	No
PM_{10}	0.45	0.34	-0.11	150	No
$PM_{2.5}$	0.45	0.34	-0.11	55	No

Source: Appendix B.2 of this EIR.

Prepared By: CDM Smith, February 2018.

Localized Operational Impacts

As discussed in Section 4.1.1.2, *Methodology*, the local effects from the on-site operational emissions were evaluated at all receptor locations that could be affected by the proposed project, consistent with the methodologies in the SCAQMD's Final Localized Significance Threshold Methodology and its Modeling Guidance for AERMOD.[102] The results of air dispersion modeling of the project operational sources are presented in **Table 4.1.1-9**

As shown in Table 4.1.1-9, the unmitigated on-site operational emissions would not exceed the thresholds. Therefore, the localized operational impacts of the proposed project would be less than significant.

4.1.1.6 Cumulative Impacts

4.1.1.6.1 Cumulative Construction Impacts

A list of other development projects at and immediately adjacent to LAX whose construction could overlap with construction of the proposed project is provided in **Table 4.1.1-10** along with estimated mass emissions. Emissions for several of these cumulative development projects were estimated or obtained from publicly available and readily accessible environmental documents. Construction emissions for other projects were obtained from the Final EIR for the Terminals 2 and 3 (T2/T3) Modernization Project.[103] Calculation details for the proposed project are provided in Appendix B.1. Due to the uncertainty of the

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102 South Coast Air Quality Management District, SCAQMD Modeling Guidance for AERMOD. Available: http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/modeling-guidance, accessed March 13, 2018.

103 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Terminals 2 and 3 Modernization Project*, June 2017.

multiple project schedules, the SCAQMD construction thresholds in tons per quarter were used per SCAQMD's 1993 CEQA Air Quality Handbook.[104]

Table 4.1.1-9
Operational Concentrations at Peak Increment Receptors (μg/m³)

Pollutant	Averaging Period[1]	Baseline Concentrations (μg/m³)	1st Year of Operations Concentrations (μg/m³)	Increment (μg/m³)[4]	Background (μg/m³)	Total (μg/m³)	Threshold (μg/m³)[1]	Significant?
CO	1-hr CAAQS	63	69	6	6,400	6,406	23,000	No
	8-hr CAAQS	19	17	-2	4,457	4,557	10,000	No
NO_2	1-hr CAAQS	34	206[2]	172[2]	---[2]	172	339	No
	1-hr NAAQS	33	188[2]	155[2]	---[2]	155	188	No
	Annual CAAQS	1	6	5	23	28	57	No
SO_2	1-hr CAAQS	4	41	37	55	92	655	No
	1-hr NAAQS	4	35	31	55	86	196	No
	3-hr NAAQS	4	23	19	55	74	1,300	No
	24-hr CAAQS	<1	1	1	10	11	105	No
	Annual NAAQS	<1	<1	<1	3	3	80	No
PM_{10}	24-hr	<0.1	0.1	0.1	---[3]	0.1	10.4	No
	Annual	<0.1	<0.1	<0.1	---[3]	<0.1	1.0	No
$PM_{2.5}$	24-hr	<0.1	0.1	0.1	---[3]	0.1	10.4	No

Source: Appendix B.3 of this EIR.

Notes:
CAAQS = California Ambient Air Quality Standard.
NAAQS = National Ambient Air Quality Standard.

1. NAAQS and CAAQS often have the same averaging period, but usually have different standard values and may have different methods of determining compliance with each standard.
2. For the CAAQS and NAAQS analysis, the 1-hour NO_2 background concentrations were calculated as the 98th percentile concentrations for each hour-of-day, by season (Winter, Spring, Summer, and Fall). Due to the hourly nature of these background concentrations, which vary substantially by hour-of-day, these background concentrations were included in the AERMOD dispersion model for the first year of operations. Therefore, the project increment includes the background concentrations.
3. PM_{10} and $PM_{2.5}$ thresholds are project only values, therefore, are not added to background concentrations.
4. Numbers may not add exactly due to rounding.

Prepared By: CDM Smith, January 2018.

104 South Coast Air Quality Management District, *CEQA Air Quality Handbook*, 1993.

Table 4.1.1-10
Cumulative Construction Projects Peak Quarter Emissions Estimates (tons/quarter)[1]

Concurrent Construction Project	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
UAL East Aircraft Maintenance and GSE Project (proposed project)[2]	5.3	1.2	7.0	<0.1	3.1	1.1
LAX Bradley West Project	0.6	2.1	0.7	<0.1	0.1	<0.1
Metro Crenshaw/LAX Transit Corridor Project	4.9	1.0	8.8	<0.1	1.0	0.6
Argo Drain Sub-Basin Stormwater Infiltration and Treatment Facility[3]	2.4	0.4	3.4	<0.1	0.4	0.4
Secured Area Access Post (SAAP) Project	1.3	0.2	1.8	<0.1	0.2	0.2
Terminals 2 and 3 Modernization Project	4.3	1.8	3.9	<0.1	1.9	1.0
Midfield Satellite Concourse North	22.0	2.5	9.1	<0.1	4.7	1.0
Terminal 1.5	1.0	1.5	1.2	<0.1	0.3	0.2
Miscellaneous Projects/Improvements	23.9	6.4	32.3	<0.1	2.0	1.7
Landside Access Modernization Program	7.5	2.1	18.4	<0.1	1.8	0.9
Receiving Station X[3]	0.8	<0.1	0.7	<0.1	0.3	0.1
Airport Police Facility[3]	0.3	0.4	0.3	<0.1	0.5	0.4
Total from Other Construction Projects Emissions	69.0	18.4	80.6	<0.1	13.2	6.5
Total Cumulative Construction Project Emissions	**74.3**	**19.6**	**87.6**	**<0.1**	**16.3**	**7.6**
SCAQMD Construction Emission Significance Thresholds	24.75	2.5	2.5	6.75	6.75	2.5
Emissions Exceed SCAQMD Project-Level Threshold?	Yes	Yes	Yes	No	Yes	Yes

Source: Appendix B.1 of this EIR.

Notes:

1. This table includes cumulative projects whose construction would occur during the estimated combined (i.e., cumulative) peak day.
2. Proposed project construction is estimated to occur between 2018 and 2020.
3. This project is part of the LAX Northside Development.

Prepared By: CDM Smith, May 2018.

The emissions estimates presented in Table 4.1.1-10 are based upon project construction information known or reasonably assumed for the development projects listed in Table 3-1, as presented in Chapter 3, *Overview of Project Setting*, Section 3.4.

The SCAQMD guidance on an acceptable approach to addressing cumulative impacts for air quality states as follows: "As Lead Agency, the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in the Environmental Assessment or EIR … Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively considerable." [105]

As shown in Table 4.1.1-10, cumulative construction emissions of CO, VOC, NO_X, $PM_{10,}$ and $PM_{2.5}$ would exceed the significance thresholds. Therefore, cumulative construction emissions of these five pollutants would be cumulatively significant.

Construction emissions associated with the proposed project would exceed the project-specific significance construction emission thresholds for NO_X, as shown in Table 4.1.1-6. As a result, the contribution of the proposed project to cumulative regional construction-related impacts would be cumulatively considerable for NO_X. The project's contribution to cumulative regional CO, VOC, $PM_{10,}$ and $PM_{2.5}$ impacts would not be cumulatively considerable.

As stated in Section 4.1.1.4.2, LSTs were developed by SCAQMD to evaluate impacts to local air quality at the project-specific level using on-site emission thresholds. As noted above, per SCAQMD guidance, projects that exceed SCAQMD's significance thresholds are generally considered to result in a cumulatively considerable contribution to cumulative air quality impacts. As shown in Table 4.1.1-7, project-related on-site construction emissions would exceed the SCAQMD LSTs for NO_X, PM_{10}, and $PM_{2.5}$. Thus, the project's contribution to cumulative localized construction impacts relative to NO_X, PM_{10} and $PM_{2.5}$ would be cumulatively considerable.

As with the impacts associated with the proposed project, cumulatively significant regional and localized construction emissions of NO_X would occur from equipment and trucks used for installation of cumulative projects. The primary activities associated with the cumulatively significant regional and localized construction emissions of PM_{10} and $PM_{2.5}$ would be demolition and installation of cumulative projects. Cumulatively significant regional construction emissions of VOC and CO would occur from painting/coating of buildings and structures and from roadway paving and striping (the proposed project's contribution to cumulatively significant VOC and CO impacts would not be cumulatively considerable).

4.1.1.6.2 Cumulative Operational Impacts

As noted above, per SCAQMD guidance, projects that do not exceed SCAQMD's significance thresholds are generally not considered to result in a cumulatively considerable contribution to cumulative air quality impacts. As shown in Tables 4.1.1-8 and 4.1.1-9, operation of the proposed project would not exceed the SCAQMD significance thresholds. Therefore, the contribution of the proposed project operations to cumulative air quality impacts would not be cumulatively considerable.

4.1.1.7 Mitigation Measures

As described in Section 4.1.1.5.1, construction of the proposed project would have a significant impact relative to NO_X, PM_{10}, and $PM_{2.5}$. The following mitigation measure is proposed to reduce these impacts to air quality.

- **MM-AQ (UAL)-1. Construction-Related Air Quality Mitigation Measures.**

  This measure includes specific actions to reduce exhaust emissions from on-road and off-road mobile and stationary sources used in construction. Measures a and b listed in **Table 4.1.1-11** were incorporated into the post-mitigation modeling (see Section 4.1.1.8 for modeling assumptions associated with these measures).

[105] South Coast Air Quality Management District, *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution*, Appendix A: Background, August 2003, p. D-3.

<table>
<tr><th colspan="3">Table 4.1.1-11
Construction-Related Air Quality Mitigation Measures</th></tr>
<tr><th>Measure</th><th>Measure</th><th>Type of Measure</th></tr>
<tr><td>a</td><td>On-road medium-duty and larger diesel-powered trucks used on LAX construction projects with a gross vehicle weight rating of at least 14,001 pounds shall, at a minimum, comply with USEPA 2010 on-road emissions standards for PM_{10} and NO_X. Contractor requirements to utilize such on-road haul trucks or the next cleanest vehicle available will be subject to the provisions of LAWA Air Quality Mitigation Measure c below.</td><td>On-Road Mobile</td></tr>
<tr><td>b</td><td>All off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, USEPA Tier 4 (final) off-road emissions standards. Contractor requirements to utilize Tier 4 (final) equipment or next cleanest equipment available will be subject to the provisions of LAWA Air Quality Mitigation Measure c below.</td><td>Off-Road Mobile</td></tr>
<tr><td>c</td><td>The requirements in a and b shall apply unless the Contractor provides a written finding that:

The Contractor does not have the required types of trucks or equipment detailed in Measures a and b within its current available inventory and has made a good faith effort to lease or rent such trucks or equipment but they are not available.
The Contractor has been awarded funding that would provide some or all of the cost to retrofit, repower, or purchase trucks or equipment that comply with Measures a and b but the funding has not yet been provided and the Contractor has attempted in good faith to lease or rent such trucks or equipment but they are not available.
Contractor has ordered equipment or trucks in compliance with Measures a and b at least 60 days before that equipment or vehicle is needed at the project site, but that equipment or vehicle has not yet arrived, and the Contractor has attempted in good faith to lease or rent such trucks or equipment but they are not available.
Construction-related diesel equipment or trucks will be used on the project site for fewer than 20 calendar days per calendar year.

In any of the situations described above, the Contractor/Subcontractor shall provide the next cleanest piece of equipment or truck as provided by the step down schedules in Table A for Off-Road Equipment and Table B for On-Road Equipment.
Nothing in the above shall require an emissions control device (i.e., VDECS) that does not meet Occupational Safety and Health Administration (OSHA) standards.
<table>
<tr><th colspan="3">Table A
Off-Road Equipment Compliance Step Down Schedule</th></tr>
<tr><td>Compliance Alternative</td><td>Engine Standard</td><td>CARB-verified DECS (VDECS)</td></tr>
<tr><td>1</td><td>Tier 4 interim</td><td>N/A*</td></tr>
<tr><td>2</td><td>Tier 3</td><td>Level 3</td></tr>
<tr><td>3</td><td>Tier 2</td><td>Level 3</td></tr>
<tr><td>4</td><td>Tier 1</td><td>Level 3</td></tr>
<tr><td>5</td><td>Tier 2</td><td>Level 2</td></tr>
<tr><td>6</td><td>Tier 2</td><td>Level 1</td></tr>
<tr><td>7</td><td>Tier 3</td><td>Uncontrolled</td></tr>
<tr><td>8</td><td>Tier 2</td><td>Uncontrolled</td></tr>
<tr><td>9</td><td>Tier 1</td><td>Level 2</td></tr>
<tr><td colspan="3">* Tier 4 (interim or final) or 2007 model year equipment not already supplied with a factory-equipped diesel particulate filter shall be outfitted with Level 3 VDECS.</td></tr>
<tr><td colspan="3">Equipment less than Tier 1, Level 2 shall not be permitted.</td></tr>
</table>
</td><td>On-Road and Off-Road Mobile</td></tr>
</table>

Table 4.1.1-11
Construction-Related Air Quality Mitigation Measures

	Table B **On-Road Equipment Compliance Step Down Schedule** Compliance Alternative / Engine Model Year / CARB-verified DECS (VDECS): 1 / 2007 / N/A* 2 / 2004 / Level 3 3 / 1998 / Level 3 4 / 2004 / Uncontrolled 5 / 1998 / Uncontrolled * 2007 Model Year equipment not already supplied with a factory-equipped diesel particulate filter shall be outfitted with Level 3 VDECS. Equipment with a model year earlier than Model Year 1998 shall not be permitted. Nothing in the above shall require an emissions control device (i.e., VDECS) that does not meet OSHA standards.	
Prepared By: CDM Smith, June 2018.		

Table B: On-Road Equipment Compliance Step Down Schedule

Compliance Alternative	Engine Model Year	CARB-verified DECS (VDECS)
1	2007	N/A*
2	2004	Level 3
3	1998	Level 3
4	2004	Uncontrolled
5	1998	Uncontrolled
* 2007 Model Year equipment not already supplied with a factory-equipped diesel particulate filter shall be outfitted with Level 3 VDECS.		
Equipment with a model year earlier than Model Year 1998 shall not be permitted.		

Nothing in the above shall require an emissions control device (i.e., VDECS) that does not meet OSHA standards.

Prepared By: CDM Smith, June 2018.

4.1.1.8 Level of Significance After Mitigation

Table 4.1.1-12 and the text below summarizes the significance determinations for air quality impacts after incorporation of mitigation, all of which are based on comparisons to the baseline (2017) conditions.

Table 4.1.1-12
Summary of Air Quality Impacts After Mitigation

Pollutant	Regional Construction Emissions	Localized Construction Emissions
NO_X	**SU**	LS
CO	LS	LS
PM_{10}	LS	**SU**
$PM_{2.5}$	LS	**SU**
SO_2	LS	LS

Source: Appendix B.1 of this EIR.

Notes:
LS = Less than Significant Impact
SU = Significant and Unavoidable Impact

Prepared By: CDM Smith, January 2018.

4.1.1.8.1 Construction Impacts

Summary of Construction-Related Mitigation Measures

As detailed in Section 4.1.1.7, Mitigation Measure MM-AQ (UAL)-1 would require the use of newer models of construction equipment and heavy duty trucks that have low-emission engines or are equipped with emissions control devices. Implementation of the recommended mitigation measures would result in substantial emission reductions compared to fleet-wide average emissions for heavy-duty construction equipment and trucks in the southern California region. To provide a conservative (worst-case) estimate of mitigated emission reductions, and to account for a lack of availability of equipment at times, implementation of Mitigation Measure MM-AQ (UAL)-1 assumed that the on-road trucks would be as good as or better than the USEPA 2010 on-road emissions standards for VOC, NO_2, PM_{10}, and $PM_{2.5}$. Similarly, the mitigated off-road construction equipment fleet was assumed to be 20 percent USEPA Tier 3 compliant, 40 percent Tier 4 Interim compliant, and 40 percent Tier 4 Final compliant. Fifty percent of the USEPA Tier 3 compliant equipment was assumed to be fitted with Level 3 VDECS diesel particulate filters. Compliance with the USEPA Tier 3 and Tier 4 off-road emissions standards would also result in substantial reduction in emissions of VOC, NO_X, PM_{10}, and $PM_{2.5}$ compared to fleet-wide average emissions for heavy-duty construction equipment. The estimated effects of these measures are shown in the tables below.

Regional Construction Impacts

Impacts After Mitigation

Mitigated daily construction emissions are presented in **Table 4.1.1-13** for all criteria and precursor pollutants studied (CO, VOC, NO_X, SO_2, PM_{10}, and $PM_{2.5}$).

Table 4.1.1-13
Project Maximum Construction Emissions with Mitigation (lbs/day)

Pollutant	Peak Daily Emissions	Threshold	Significant?
Carbon monoxide, CO	178	550	No
Volatile organic compounds, VOC	27	75	No
Nitrogen oxides, NO_X	127	100	Yes
Sulfur dioxide, SO_2	1	150	No
Respirable particulate matter, PM_{10}	85	150	No
Fine particulate matter, $PM_{2.5}$	30	55	No

Source: Appendix B.1 of this EIR.

Prepared By: CDM Smith, January 2018.

As shown in Table 4.1.1-13, while the use of newer models of construction equipment and lower-emission heavy trucks would substantially reduce emissions associated with the proposed project (peak daily emissions of NO_X would be reduced from 260.4 lbs/day to 129 lbs/day), even with the inclusion of mitigation measures, regional emissions of NO_X would remain significant.

The significant regional emissions of NO_X following implementation of mitigation measures would continue to result from general heavy-duty on-site construction equipment and trucks. With mitigation, daily NO_X emissions would exceed the SCAQMD threshold of significance for approximately 3 months of the 22-month construction period, down from 7 months in the unmitigated scenario.

Summary of Level of Significance After Mitigation

With implementation of Mitigation Measure MM-AQ (UAL)-1, construction-related significant NO_X impacts associated with regional emissions would be reduced, but not to a level that would be less than significant or less than cumulatively considerable. No other feasible mitigation measures have been identified that would further reduce NO_X impacts. Therefore, impacts to regional air quality from project-related construction NO_X emissions would remain significant and unavoidable.

Localized Construction Impacts

Impacts After Mitigation

The results of localized emissions impacts of the project construction sources, incorporating mitigation, are summarized in **Table 4.1.1-14**.

Table 4.1.1-14
Project Maximum On-Site Construction Emissions with Mitigation (lbs/day)

Pollutant	Peak Daily On-Site Emissions	Construction Threshold	Significant?
NO_X	118	202	No
CO	139	2,608	No
PM_{10}	82	60	**Yes**
$PM_{2.5}$	29	19	**Yes**
SO_2	N/A	N/A[1]	N/A

Source: Appendix B.1 of this EIR.

Notes:

1. SCAQMD has not developed LSTs for SO_2.

Prepared By: CDM Smith, January 2018.

As shown in Table 4.1.1-14, the on-site construction emissions after the incorporation of mitigation would be reduced to a level less than the SCAQMD CEQA ambient air quality standards for NO_X but would remain significant for PM_{10} and $PM_{2.5}$. Therefore, the mitigated localized construction impacts of the proposed project relative to PM_{10} and $PM_{2.5}$ emissions would remain significant and unavoidable.

As stated previously, significant local emissions of PM_{10} and $PM_{2.5}$ would result from apron demolition and installation activities. These emissions would exceed the SCAQMD thresholds of significance for approximately 4 months of the 22-month construction period even with the implementation of mitigation.

Summary of Level of Significance After Mitigation

With implementation of Mitigation Measure MM-AQ (UAL)-1, localized construction emissions of PM_{10} and $PM_{2.5}$ would be reduced, but not to a level that would be less than significant or less than cumulatively considerable. No other feasible mitigation measures have been identified that would further reduce PM_{10} and $PM_{2.5}$ impacts. Therefore, impacts to localized air quality from project-related construction PM_{10} and $PM_{2.5}$ emissions would remain significant and unavoidable.

4.1.1.8.2 Operational Impacts

Unmitigated regional and localized impacts associated with operational emissions would be less than significant. Operation of the proposed project would have a beneficial result with respect to criteria pollutant emissions.

4.1.2 Human Health Risk Assessment

4.1.2.1 Introduction

As discussed in Chapter 2, *Project Description*, the proposed project would consolidate and modernize existing UAL aircraft maintenance and GSE facilities at LAX at UAL's existing East Maintenance Facility site. Such changes would result in the release of TAC from construction activities and a shift in location of TAC released from operational activities, which could have an impact on people working and living in the vicinity of the airport. The objective of this HHRA and health impact analysis is to assess incremental changes to health impacts for people exposed to TAC resulting from construction and operational changes associated with the proposed project. The HHRA and health impact analysis disclose whether implementation of the proposed project would create significant health risks for people living, working, recreating, or attending school near LAX.

The approach and methods used in this HHRA have been consistently applied over several years as part of EIR development to support LAWA projects. An overview of approach and methods, provided below, is a general roadmap to the analyses.

Construction of the proposed project would take approximately 1 year and 10 months, starting in approximately the fourth quarter of 2018 and completing in the fourth quarter of 2020.

Assessing possible impacts of TAC releases during construction is complex and requires consideration of TAC emissions from a variety of airport operations and from non-LAX-related mobile and stationary sources, as well as from construction activities. Additionally, emissions from all sources will change with time and by location. Regional sources are subject to efforts to improve air quality in the South Coast Air Basin by reducing emissions from both mobile and stationary sources, emissions from airport operations will change as aircraft and other equipment are replaced, and construction emissions will vary in time and space as different phases of the projects are begun and completed. Because of these complexities, TAC impact analyses require an approach that examines incremental impacts to air quality.

Incremental risks are assessed as follows for this assessment:

- Construction emissions were estimated using a construction schedule, provided in Appendix B.1, that included approximate durations and activities for each project component that together constitute the proposed project. Only the proposed project's on-site incremental construction emissions were considered in the HHRA.
- Operational emissions were estimated using current and future estimates of UAL's aircraft and GSE movements, and the location of current and future engine testing at LAX. Only the proposed project's incremental additional operational emissions were considered.

No investigation or modeling of non-airport sources near LAX was conducted. The SCAQMD has published a series of studies on air quality that provide data on regional air quality in the South Coast Air Basin, and these data were used to evaluate cumulative impacts of emissions on health risks. The most recent study of air quality (Multiple Air Toxics Exposure Study [MATES] IV) accounts, as much as possible, for impacts of regulatory efforts to improve air quality.[106]

The analysis described allows for comparisons of air quality impacts to assess possible health impacts:

- The air quality impacts to human health risks from proposed project construction emissions provide a measure of project impacts during the period of construction.
- The air quality impacts to human health risks from proposed project operational emissions provide a measure of project impacts during the first year of operations. The first year of operations was selected as the most conservative representation of future project emissions as discussed in Section 4.1.1.2.2.
- Comparison of regional air quality as measured in the MATES IV study with construction and operational impacts of the proposed project provides an indication of the relative impact of the project on regional air quality and related human health risk.

The remaining sections describe the development and results of the HHRA in detail. Appendix B.4 provides the detailed data supporting for this analysis.

As with all activities at facilities that accommodate vehicles and equipment that consume fuel, activities at LAX release TAC to the air. These TAC may come from motor vehicles; combustion of fossil fuels to produce hot water, steam, and power; and other sources. Impacts to human health associated with

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[106] South Coast Air Quality Management District, *Final Report – Multiple Air Toxics Exposure Study in the South Coast Air Basin – MATES- IV*, May 2015. Available: http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7.

releases of TAC may include increased cancer risks, increased chronic (long-term) non-cancer health hazards, and increased acute (short-term) non-cancer health hazards from inhalation of TAC.

4.1.2.2 Methodology

The HHRA conducted for the proposed project addresses construction and operations-related emissions. Cancer risks and chronic and acute non-cancer health hazard assessments all rely on estimating TAC concentrations in the air. Proposed project emissions are modeled using dispersion modeling to determine localized concentrations, which in turn are used to estimate the amount of TAC that people living, working, recreating, or going to school near LAX might inhale over both short (acute) and long (chronic) time frames.

4.1.2.2.1 Dispersion Modeling for Local Concentrations

Estimated emission rates, along with meteorological and geographic information, were used as inputs to an air dispersion model. The dispersion model predicted possible concentrations of TAC released during proposed project construction and the first year of operations within the study area around the airport. Modeled concentrations were used to estimate human health risks and hazards, which serve as the basis of the significance determinations for the proposed project. A detailed description of the estimation of emissions of TACs is provided in Section 4.1.1.2 above. A summary is provided below.

TAC concentrations were estimated using dispersion modeling to estimate total PM_{10} concentrations and VOC concentrations; individual organic or particulate TAC concentrations were calculated using component profiles to speciate total VOC and PM_{10} concentration estimates into individual elements and compounds (species).

Project-related concentrations for TAC from construction and operations-related sources were estimated using an air dispersion model (AERMOD Version 16216r) with the model option for 1-hour, 8-hour, and annual average concentrations selected.[107] Data used as input to the model were taken from construction and operations-based sources:

- Construction-related carcinogenic TAC emissions were modeled for each year of construction using the schedule for proposed project construction activities and projected emissions during these activities. Year-by-year emissions estimates were used to account for changes in both location and types of activities needed as the construction progresses. Incremental annual average TAC concentrations were used to estimate cancer risk over the entire construction period.
- Operations-related carcinogenic TAC emissions were modeled for each year of operation once construction was completed, based on the first year of operations using current and projected future aircraft and GSE movements, and the location of current and future engine testing activities. Incremental annual average TAC concentrations were used to estimate cancer risk for each year of a receptor's exposure period beyond the construction period.

4.1.2.2.2 Exposure Concentrations

TAC concentrations were estimated at the nearest receptor locations surrounding the airport (shown in Figure 4.1.1-1). This modeling grid was used to find locations where airport emissions would have the greatest impact. Modeled concentrations at these locations were used to estimate incremental

[107] The AERMOD modeling system is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. Additional information, documentation, and guidance regarding the AERMOD modeling system, including the model code and documentation for AERMOD Version 16216r, is available on the USEPA's website at https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models.

human health risks and hazards. These estimates assist in making determinations of the significance of health impacts for the proposed project.

In February 2015, the California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment (OEHHA) released the Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.[108] The guidance recommends the use of a software program, Hot Spots Analysis and Reporting Program Version 2 (HARP2), developed by CARB, for calculating and presenting HRA results for the Hot Spots Program. For this HHRA, HARP2 equations and calculations were utilized to address project-specific impacts.

4.1.2.2.3 Overview of Risk Assessment

This HHRA is based on estimates for TAC emissions modeled for the construction and the first year of operation of the proposed project. Baseline construction emissions are assumed to be zero. Baseline operational emissions are represented by the baseline UAL maintenance-related aircraft movements, engine testing, and GSE maintenance at the airport. Cumulative impacts, including possible impacts of airport and non-airport related activity, are discussed in Section 4.1.2.6.

Emissions sources during construction were analyzed for each construction year from 2018 through 2020.

The HHRA followed state and, as necessary, federal guidance for performance of risk assessments and was conducted as described above and defined in SCAQMD and CalEPA guidance[109,110] consisting of selection of TAC of concern, exposure assessment, toxicity assessment, and risk characterization. These steps are summarized below.

Selection of TAC of Concern

In general, TAC of concern for the HHRA are based on TAC identified under Assembly Bill AB 2588 and for which the CalEPA OEHHA has developed cancer slope factors, chronic reference exposure levels (RELs), and/or acute RELs.[111] Cancer slope factors define the relationship between inhalation of TAC and risk of

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108 California Environmental Protection Agency, *Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*, February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

109 South Coast Air Quality Management District, *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act (AB 2588)*, June 5, 2015.

110 California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I: The Determination of Acute Reference Exposure Levels for Airborne Toxicants*, March 1999. Available: https://oehha.ca.gov/air/crnr/adoption-air-toxics-hot-spots-risk-assessment-guidelines-part-i-technical-support-document; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Air Toxic Hot Spots Program Risk Assessment Guidelines, Part IV: Technical Support Document for Exposure Assessment and Stochastic Analysis*, August 2012. Available: https://oehha.ca.gov/air/crnr/notice-adoption-technical-support-document-exposure-assessment-and-stochastic-analysis-aug; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part III: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels*, June 2008. Available: https://oehha.ca.gov/air/crnr/air-toxics-hot-spots-program-risk-assessment-guidelines-part-iii-1999; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors*, updated May 2009. Available: https://oehha.ca.gov/air/crnr/technical-support-document-cancer-potency-factors-2009; California Environmental Protection Agency, *Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*, February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

111 California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Toxicity Criteria Online Database.* Available: https://oehha.ca.gov/chemicals, accessed January 19, 2017.

developing cancer. RELs define the relationship between inhalation of TAC and subsequent non-cancer health impacts. RELs are separately identified for both long- and short-term exposure durations.

The list of TAC of concern used in this HHRA was developed using regulatory lists, emissions estimates, human toxicity information, results of the LAX Master Plan HHRA, and a review of health risk assessments for construction activities included in similar EIRs.[112] This list of TAC was further refined to include only TAC with chronic RELs, acute RELs, and inhalation cancer slope factors identified by the CalEPA OEHHA. The resulting list of TAC of concern evaluated in this HHRA is provided in **Table 4.1.2-1**.

Table 4.1.2-1
Toxic Air Contaminants (TAC) of Concern for the Proposed Project

Toxic Air Contaminant	Type
Acetaldehyde	VOC
Acrolein	VOC
Benzene	VOC
1,3-Butadiene	VOC
Ethylbenzene	VOC
Formaldehyde	VOC
n-Hexane	VOC
Methyl alcohol	VOC
Methyl ethyl ketone	VOC
Propylene	VOC
Styrene	VOC
Toluene	VOC
Xylene (total)	VOC
Naphthalene	PAH
Arsenic	PM-Metal
Cadmium	PM-Metal
Chromium VI	PM-Metal
Copper	PM-Metal
Lead	PM-Metal
Manganese	PM-Metal
Mercury	PM-Metal
Nickel	PM-Metal
Selenium	PM-Metal
Vanadium	PM-Metal
Diesel PM	Diesel Exhaust
Chlorine	PM-Inorganics
Silicon	PM-Inorganics
Sulfates	PM-Inorganics

Notes:

PAH = Polycyclic aromatic hydrocarbons

112 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements,* (SCH 1997061047), Section 4.24.1, Human Health Risk Assessment, Technical Report 14a, Health Risk Assessment, and Technical Report S-9a, Supplemental Health Risk Assessment, April 2004. Available: https://www.lawa.org/en/lawa-our-lax/environmental-documents/documents-certified/2004-lax-master-plan-program/final-environmental-impact-report-feir.

Table 4.1.2-1 Toxic Air Contaminants (TAC) of Concern for the Proposed Project
PM = Particulate matter VOC = Volatile organic compounds Prepared By: CDM Smith, January 2018.

Exposure Assessment

For analysis of the proposed project, the following sensitive receptors were selected for quantitative evaluation: on-airport workers, off-airport workers, off-airport adult residents, and off-airport child residents. Each receptor type represents a unique population and set of exposure conditions. As a whole, they cover a range of exposure scenarios for people who may be affected by proposed project emissions, and include receptors that would be subject to the highest exposures for receptors located downwind and within the area of possible impact. Thus, risks and hazards for Maximally Exposed Individuals (MEI) and for receptors at various distances north, east, and south of the airport are provided to assist in evaluation of significance determinations.

The approach to assessing health risks considers all receptors. The range of risks and hazards for areas surrounding LAX thus provides information about community impacts at locations where individuals live, work, recreate, or go to school, as they compare to regulatory thresholds and to impacts associated with typical air quality in the South Coast Air Basin.

Different receptors (e.g., off-site workers, child residents) could be exposed to TAC in several ways, deemed exposure pathways. An exposure scenario that considers various pathways by which they might be exposed to TAC was developed for each receptor. As discussed below, exposure scenarios for the proposed project include a single exposure pathway – inhalation of airport-related TAC.

An exposure pathway consists of four parts:

- A TAC source (e.g., construction equipment fuel combustion);
- A release mechanism (e.g., construction equipment engine exhaust);
- A means of transport from point of release to point of exposure (e.g., local winds); and
- A route of exposure (e.g., inhalation).

If any of these elements of an exposure pathway is absent, no exposure can take place, and the pathway is considered incomplete. Incomplete pathways were not evaluated in this HHRA. In addition, some exposure pathways may be complete, but may result in little or negligible exposure. An example previously addressed in LAWA environmental documents is deposition of particulate emissions onto ground and hard surfaces, with subsequent exposure for people that contact this material on their skin and/or via hand to mouth activity. Although some deposition of particulate matter does occur, the amount of material deposited is too small to result in accumulation that may be of concern for health impacts. Other exposure pathways – including uptake from soil into homegrown vegetables, transport of TAC in soil to indoor dust and/or surface water, and other indirect pathways – were addressed quantitatively in the programmatic HHRA developed for the LAX Master Plan EIR.[113] No pathway other

113 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements,* (SCH 1997061047), Technical Report 14a, Health Risk Assessment, and Technical Report S-9a, Supplemental Health Risk Assessment, April 2004. Available: https://www.lawa.org/en/lawa-our-lax/environmental-documents/documents-certified/2004-lax-master-plan-program/final-environmental-impact-report-feir.

than inhalation was found to be an important contributor to exposure and thus to human health risk. Based on this previous analysis, pathways other than inhalation were not assessed.

For this HHRA, the inhalation pathway is the single substantive exposure pathway and is responsible for essentially all risk and hazard associated with the proposed project. Inhalation of TAC is therefore the only pathway that was quantitatively evaluated.

Toxicity Assessment

Risks from exposure to TAC were calculated by combining estimates of exposure via inhalation with appropriate toxicity criteria, as described in more detail below. A toxicity assessment for TAC of concern was conducted for the LAX Master Plan Final EIR, as described in Technical Report 14a of that EIR. Since completion of these reports, some changes have been made by the CalEPA OEHHA to toxicity criteria for a few TAC identified in Table 4.1.2-1. To maintain consistency with regulatory guidance, toxicity information from previous HHRA efforts was updated to be consistent with the most current state and federal regulatory databases for the analyses included in this report. Such criteria remained unchanged for diesel particulate matter (DPM), hexavalent chromium, benzene, formaldehyde, and nickel, all of which are associated with the greatest estimated health impacts in previous programmatic and project-specific LAWA risk assessments.

Acute RELs developed by the State of California were used in the characterization of acute non-cancer health hazards associated with the proposed project.[114] Other sources of acute toxicity criteria (e.g., Agency for Toxic Substance and Disease Registry [ATSDR]) were also evaluated as a source of acute criteria as part of this re-assessment of toxicity information.

Cancer slope factors, and chronic RELs developed by the State of California were used to characterize cancer risks and chronic non-cancer health hazards associated with longer-term inhalation of emissions from construction or operational activities.[115] Both types of toxicity criteria are based on studies of chronic exposure in animals or, in some cases, in people. Tables of the toxicity values used in the HHRA calculations are provided in Appendix B.4.

Acute RELs were used to characterize hazards associated with short-term exposure (usually from exposures on the order of 1-hour or 8-hours). RELs are based on the most sensitive, relevant, adverse health effect reported in the medical and toxicological literature. Because margins of safety are incorporated to address data gaps and uncertainties, exceeding an REL does not automatically indicate an adverse health impact.[116] Acute RELs are applicable to all receptors, children and adults, and hazards are the ratio of estimated or measured concentrations and the REL.

Risk Characterization

Assessment of chronic human health impacts due to release of TAC associated with operation of the proposed project assumes that receptors are exposed to concentrations of TACs over 9- and 30- year periods for off-site child and adult residential receptors, respectively, and a 25-year period for off-site workers.

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114 California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Toxicity Criteria Online Database.* Available: https://oehha.ca.gov/chemicals, accessed January 19, 2017.

115 California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Toxicity Criteria Online Database*. Available: https://oehha.ca.gov/chemicals, accessed January 19, 2017.

116 Margin of safety is a ratio of the no-observed-effect level to the estimated exposure dose. Margins of safety are incorporated in the development of toxicity values to account for differences in dose-response among individuals. For example, the same dose of alcohol may have a greater effect on a woman than a man, not only because a woman is smaller in body size but also because men and women metabolize alcohol at different rates.

For construction, location and magnitude of emissions were assumed to change as different portions of the project are begun and completed throughout the construction period. To incorporate this variability into the model, construction emissions were modeled separately for each year of construction from 2018 to 2020. Risks for receptors were calculated by grid point for each year of construction and then added together to determine total risk by grid point for the construction period. For the portion of the receptors' exposure period that was longer than the construction period, construction emissions were assumed to be zero.

TAC concentrations for operations were modeled for the first year of operations. Although the proposed project would result in an overall decrease in operational TAC emissions, it was projected that the centralization of TAC emissions could lead to potential impacts on human health due to the closer proximity of these emissions to people living, working, recreating, or attending school near LAX.

Grid points were identified where construction and operational impacts were likely to be maximal. Concentrations of TAC in air at these locations then formed the basis for the risk estimate. Such risk estimates are overly-conservative for most people living, working, recreating, or attending school near LAX.

For the proposed project, grid points were analyzed for several on-airport locations that are not located within the proposed project boundaries (for on-airport/off-site workers) and for several off-airport locations (for off-airport workers/residents). These locations represent MEI, based on dispersion modeling. Concentrations of each TAC at these nodes were used in calculating cancer risk, and chronic and acute non-cancer health hazard estimates. These calculations were used to identify locations with maximum cancer risks and maximum non-cancer health hazards and serve to assist determinations of significance.

MEI estimates were partially land use specific. On-airport locations were used to identify commercial and on-airport worker TAC concentrations. Off-airport locations were used to identify residential, commercial, and other sensitive land uses, such as schools, hospitals, nursing homes, daycare facilities, etc. For identified sensitive land uses without a corresponding discrete receptor, the nearest receptor that is closer to the project site was used as representative. The modeled receptor locations are shown on Figure 4.1.1-1.

Receptors placed at the fence-line (LAX boundary) represent the highest or near-highest concentrations that could be considered "off-airport." However, because no homes are located on the fence-line, concentrations in areas where people actually work or live would be lower than that at the fence-line.

Methodology for Evaluating Cancer Risks

Cancer risks were estimated by multiplying exposure estimates for carcinogenic chemicals by corresponding cancer slope factors. Results were risk estimates expressed as the probability of developing cancer. Consistent with recent OEHHA guidance,[117] cancer risks were based on an exposure duration of 30 years for adult residents (age 16 through 45), 9 years for child residents (age 0 through 9), 30 years for a resident from the third trimester through age 30, and 25 years for workers (age 16 through age 40). The methodology is conservative, as it assumes individuals would be exposed to TAC for almost every hour of each day of the receptor's respective exposure duration. Years of exposure after construction assume a risk increment equal to the future operational risk minus the baseline operational risk, calculated at each

[117] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*, February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

receptor point. Impacts of exposure to multiple TAC were accounted for by adding cancer risk estimates for exposure to all carcinogenic chemicals.

Methodology for Evaluating Chronic Non-Cancer Health Hazards

Chronic non-cancer health hazard estimates were calculated by dividing exposure estimates by RELs. RELs are estimates of highest exposure levels that would not cause adverse health effects even if exposures continue over a lifetime. The ratio of exposure concentration to reference concentration is termed the hazard quotient (HQ). An HQ greater than 1 indicates an exposure concentration greater than an exposure that is considered safe. A ratio that is less than 1 indicates that project-related (incremental) exposure was less than the highest exposure level that would not cause an adverse health effect and, hence, no impact to human health is likely. Risks of adverse effects cannot be estimated using reference doses. However, because reference concentrations are developed in a conservative fashion, HQs only slightly higher than 1 are generally accepted as being associated with low risks (or even no risk) of adverse effects, and it is generally accepted that potential for adverse effects increases as the HQ gets larger.

Impacts of exposure to multiple chemicals were accounted for by adding estimated HQs for non-carcinogenic chemicals that affect the same target organ or tissue in the body. Addition of HQs for TAC that produce effects in similar organs and tissues results in a Hazard Index (HI) that reflects possible total hazards. Several TAC have effects on the respiratory system, including acetaldehyde, acrolein, formaldehyde, xylenes, and diesel particulates. Non-cancer health hazards for the proposed project were calculated for the respiratory system, which accounted for essentially all non-cancer health hazards.

Methodology for Evaluating Acute Non-Cancer Health Hazards

Acute non-cancer risk estimates were calculated by dividing estimated maximum 1-hour TAC concentrations in air by acute RELs. An acute REL is a concentration in air below which adverse effects are unlikely for people, including sensitive subgroups, exposed for a short time on an intermittent basis. In most cases, RELs are estimated on the basis of an 1-hour exposure duration. Intermittent exposure is defined as an exposure lasting less than 24 hours and occurring no more than monthly. RELs do not distinguish between adults and children, but are established at levels that are considered protective of sensitive populations. Because margins of safety are incorporated to address data gaps and uncertainties, exceeding the REL does not automatically indicate an adverse health impact. OEHHA has developed acute RELs for several of the TAC of concern.

Short-term concentrations for TAC associated with construction of the proposed project were estimated using the same AERMOD used to estimate annual average concentrations, but with the model option for 1-hour maximum concentrations selected. These concentrations represent the highest predicted concentrations of TAC. Acute non-cancer health hazards were then estimated at each grid point by dividing estimated maximum 1-hour TAC concentrations in air by acute RELs. An HI equal to or greater than 1, the threshold of significance for acute non-cancer health impacts, indicates some potential for adverse acute non-cancer health impacts. An HI less than 1 suggests that adverse acute non-cancer health impacts are unlikely.

Methodology for Evaluating Occupational Health Hazards

Impacts to on-site workers were evaluated by comparing estimated 8-hour air concentrations of TAC at on-site locations under the proposed project for construction to the California Division of Occupational Safety and Health (CalOSHA) 8-hour Time-Weighted Average Permissible Exposure Limits (PEL-TWAs).[118]

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[118] California Occupational Safety and Health Administration, *Table AC-1, Permissible Exposure Limits for Chemical Contaminants*. Available: https://www.dir.ca.gov/title8/5155table_ac1.html, accessed January 19, 2017.

Population-Based Risks

When MEI risks exceed threshold levels, CalEPA guidance indicates that population-based risks should be calculated.[119] This type of assessment estimates the “cancer burden” that might be experienced within an exposed population. Cancer burden is the sum of individual risks for people living in the study area. For example, if 100,000 people live in an area that experiences an increased cancer risk of 10 in 1 million due to the proposed project, the chance of a single case of cancer in this population caused by the proposed project would be 1 in 100 (100,000 times 10 x 10^{-6}). As shown in Section 4.1.2.5, *Impact Analysis*, below, no MEI thresholds would be exceeded by the proposed project. Therefore, a population-based cancer burden analysis was not performed for this EIR.

Uncertainties

Uncertainties are present in all facets of HHRA. For this analysis, uncertainties identified included uncertainties associated with emission estimates and dispersion modeling, evaluation of sensitive receptor populations, exposure parameter assumptions, toxicity assessment, the assumptions inherent to the 2015 OEHHA Air Toxics Methodology, and interactions among acrolein and criteria pollutants.[120] The approach used in this EIR health impact analysis uses conservative assumptions and methods to account for multiple uncertainties. This approach is appropriate for assessing the health risks associated with the proposed project.

4.1.2.3 Existing Conditions

4.1.2.3.1 Regulatory Setting

State

CARB’s statewide comprehensive air toxics program was established in the early 1980s. The Toxic Air Contaminant Identification and Control Act (AB 1807) created California's program to reduce exposure to air toxics.

In September 1987, the California Legislature established the AB 2588 air toxics "Hot Spots" program. It requires facilities to report their air toxics emissions, ascertain health risks, and to notify nearby residents of significant risks. In September 1992, the "Hot Spots" Act was amended by Senate Bill 1731 which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan. Beginning in 2000, CARB has adopted diesel risk reduction plans and measures to reduce DPM emissions and the associated health risk. These are discussed in more detail in the following section.

In 2004, CARB adopted a control measure to limit commercial heavy duty diesel motor vehicle idling in order to reduce public exposure to DPM and other TACs. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. In general, it prohibits idling for more than 5 minutes at any location.

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119 California Environmental Protection Agency, *Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*, February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

120 California Environmental Protection Agency, *Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots* Program*, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*, February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

In addition to limiting exhaust from idling trucks, CARB promulgated emission standards for off-road diesel construction equipment such as bulldozers, loaders, backhoes, and forklifts, as well as many other self-propelled off-road diesel vehicles. A CARB regulation that became effective on June 15, 2008, aims to reduce emissions by installation of diesel soot filters and encouraging the replacement of older, dirtier engines with newer emission controlled models. The regulation requires that fleets limit their unnecessary idling to 5 minutes; there are exceptions for vehicles that need to idle to perform work (such as a crane providing hydraulic power to a boom), vehicles being serviced, or in a queue waiting for work. A prohibition against acquiring certain vehicles (e.g., Tier 0 and Tier 1) began on March 1, 2009. Implementation of the fleet averaging emission standards is staggered based on fleet size, with the largest operators to begin compliance in 2014.[121] By 2020, CARB estimates that DPM will be reduced by 74 percent and smog forming NO_X (an ozone precursor emitted from diesel engines) by 32 percent, compared to what emissions would be without the regulation.[122]

The CalEPA provides guidance on performing an HHRA through its OEHHA publications:

- Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I: The Determination of Acute Reference Exposure Levels for Airborne Toxicants, March 1999;
- Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors, updated May 2009;
- Air Toxics Hot Spots Program Risk Assessment Guidelines, Part III: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels, June 2008;
- Air Toxic Hot Spots Program Risk Assessment Guidelines, Part IV: Technical Support Document for Exposure Assessment and Stochastic Analysis, August 2012; and
- Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, February 2015.

Regional/Local

SCAQMD has jurisdiction over the air quality of the South Coast Air Basin. The SCAQMD determined that the significance criterion for cancer health risks is a 10 in 1 million increase in the chance of developing cancer. The SCAQMD also adopted a significance criterion for cancer burden. The cancer burden is the estimated increase in the occurrence of cancer cases in a population as a result of exposures to TAC emissions. The SCAQMD determined that the significance criterion for cancer burden is greater than 0.5 excess cancer cases in areas with an incremental increase in cancer risk greater than or equal to 1 in 1 million. The significance of non-cancer (acute and chronic) risks is evaluated in terms of HIs for different endpoints. The SCAQMD threshold for non–cancer risk for both acute and chronic HI is 1.0.[123]

4.1.2.3.2 Existing Health Risk in the Project Area

In June 1987, the SCAQMD published the first *Multiple Air Toxics Exposure Study (MATES),* which was the most comprehensive air toxics study ever conducted in an urban environment. This original study has been updated several times; the most recent study, MATES-IV, was published in May 2015.[124] The study

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121 California Air Resources Board, *In-Use Off-Road Diesel Vehicle Regulation, Overview*, Revised October 2016. Available: https://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf.

122 California Air Resources Board, *Facts about Emissions and Health Benefits of Regulation for In-Use Off-Road Diesel Vehicles*, revised September 20, 2007. Available: http://www.arb.ca.gov/msprog/ordiesel/documents/OFRDDIESELhealthFS.pdf.

123 South Coast Air Quality Management District, *SCAQMD Air Quality Significance Thresholds*, revised March 2015. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.

124 South Coast Air Quality Management District, *Final Report – Multiple Air Toxics Exposure Study in the South Coast Air Basin – MATES- IV*, May 2015. Available: http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7.

estimates the cancer risk from TAC emissions throughout the South Coast Air Basin by conducting a comprehensive monitoring program, an updated emissions inventory of TACs, and a modeling effort to fully characterize health risks for those living in the South Coast Air Basin. The study includes a series of maps showing regional trends in estimated outdoor inhalation cancer risk from toxic emissions. These risk maps depict inhalation cancer risk due to modeled outdoor TAC pollutant levels, and do not account for cancer risk due to other types of exposure. The study found that the largest contributors to inhalation cancer risk are diesel engines. According to MATES-IV, cancer risks in the South Coast Air Basin range from 320 in 1 million to 480 in 1 million, with an average of 418 in 1 million. These cancer risk estimates are relatively high (although substantially lower than those found in MATES-III) and indicate that current impacts associated with ongoing releases of TAC (e.g., from vehicle exhaust) and from sources of TAC from past and present projects in the region are substantial.

As part of the MATES III Study, the SCAQMD prepared a series of maps that show regional trends in estimated outdoor inhalation cancer risk from toxic emissions, as part of an ongoing effort to provide insight into relative risks. The maps' estimates represent the number of potential cancers per million people associated with a lifetime of breathing air toxics (24 hours per day outdoors for 70 years) in parts of the area. The estimated lifetime cancer risk from exposure to TACs for those residing within the vicinity of the proposed project is estimated at 884 cancers per million, while the vast majority of the area surrounding LAX ranges between 500 to 1,200 cancers per million.[125] However, the visual resolution available in the map is 1 kilometer by 1 kilometer and, thus, impacts for individual neighborhoods are not discernible on this map. In general, the risk of the project site is comparable with other areas in the Los Angeles area; the risk from air toxics is lower near the coastline, and increases inland, with higher risks concentrated near large diesel sources (e.g., freeways, airports, and ports).

The SCAQMD also provides guidance on performing an HHRA through its publication, *Supplemental Guidelines for Preparing Risk Assessment for the Air Toxics Hot Spots Information and Assessment Act* (AB 2588), June 2015. This document incorporates the updated risk methodologies established by OEHHA's 2015 Guidance Manual that take into account early childhood exposure. According to MATES-IV, although in general there has been an overall South Coast Air Basin-wide reduction in air toxics concentrations since MATES-III, application of the updated risk estimation methods recently adopted by OEHHA result in an estimated population weighted risk across the South Coast Air Basin range of 897 per million, an increase in cancer risks.

CARB also prepares a series of maps that show regional trends in estimated outdoor inhalable cancer risk from air toxic emissions. The Year 2010 Los Angeles County Central map, which is the most recently available map to represent existing conditions, shows cancer risk ranging from 500 to 1,500 cancers per million in the project area, which is generally consistent with the SCAQMD's risk maps.[126]

The data from the SCAQMD and CARB provide a slightly different range of risk. This difference is primarily related to the fact that the SCAQMD risk is based on monitored pollutant concentrations and the CARB risk is based on dispersion modeling and emission inventories. Regardless, the SCAQMD and CARB data show that an inherent health risk associated with living in urbanized areas of the South Coast Air Basin, where mobile sources (e.g., cars, trucks, trains, ships, aircraft, etc.) represent the greatest contributors to the overall risk.

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125 South Coast Air Quality Management District, *Multiple Air Toxics Exposure Study III Model Estimated Carcinogenic Risk.* Available: http://www3.aqmd.gov/webappl/matesiii/, accessed August 11, 2016.

126 California Air Resources Board, *Cancer Inhalation Risk: Local Trend Maps*. Available: http://www.arb.ca.gov/ch/communities/hlthrisk/cncrinhl/rskmapvwtrend.htm.400, accessed January 19, 2017.

Sources of Toxic Air Contaminants of Concern

Baseline sources of TACs associated with UAL's maintenance activities include both stationary and mobile sources. Stationary sources consist of aircraft maintenance facilities. Mobile sources of TACs include aircraft, GSE, and on- and off-airport vehicles. These sources generate a number of TACs of concern, including volatile organics, polycyclic aromatic hydrocarbons, metals, and other constituents.

Exposed Populations

Screening-level air dispersion modeling conducted for the LAX Master Plan Final EIR indicated that the greatest area of human health impact from airport activities is confined to the airport property (see Section 4.1.1.2, above). However, health risks from LAX may accrue to populations in the nearby area. The exposed population within this area of impact includes workers, residents, and sensitive receptors such as schools, hospitals, and nursing facilities. The airport is bound to the north and south by residential areas which are likely to contain populations that are particularly sensitive to air pollution. These population groups include children, elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases). Sensitive land uses in close proximity to the project site include the following:

- The LAX Crowne Plaza Hotel located at 5985 W. Century Boulevard, approximately 450 feet north of the project site.
- The Lennox residential neighborhood located approximately 5,875 feet to the east of the project site.
- The El Segundo residential neighborhood located approximately 5,650 feet to the southeast of the project site.
- The El Segundo residential neighborhood located approximately 5,000 feet to the southwest of the project site.
- Westchester neighborhoods located approximately 3,800 feet to the north of the project site.

4.1.2.4 Thresholds of Significance

Significance determinations for health impacts are assessed as incremental increases or decreases in cancer risks and non-cancer health hazards. A significant incremental impact to human health would occur if changes related to construction or operation of the proposed project would result in one or more of the following conditions:[127]

- An increased incremental cancer risk greater than, or equal to, 10 in 1 million (10×10^{-6}) for potentially exposed off-site workers or residents.[128]
- A cancer burden greater than, or equal to 0.5 excess cancer cases in areas within the greater than 1 in 1 million zone of impact.
- A total incremental chronic hazard index greater than, or equal to, 1 for any target organ system at any receptor location.[129]

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127 The term "significant" is used as defined in CEQA and does not imply an independent judgment of the acceptability of risk or hazard.

128 Incremental cancer risk is defined as the difference in cancer risks between the proposed project and the "without project" condition.

129 For purposes of this analysis, a health hazard is any non-cancer adverse impact on health. (Cancer-related risks are addressed separately in this analysis.) A chronic health hazard is a hazard caused by repeated exposure to small amounts of a TAC. An acute health hazard is a hazard caused by a single or a few exposures to relatively large amounts of a chemical. A hazard index is the sum of ratios of estimated exposures to TAC and recognized safe exposures developed by regulatory agencies.

- A total incremental acute HI greater than, or equal to, 1 for any target organ system at any receptor location.
- Exceedance of Permissible Exposure Limits - Time Weighted Average or Threshold Limit Values for workers.

The thresholds listed above are based on SCAQMD guidance.[130]

4.1.2.5 Impacts Analysis

The following analysis pertains to the construction and operations-related impacts of the proposed project. Air concentrations for TAC were developed using emissions estimates and dispersion modeling. Using these emission estimates, exposure parameters for receptors, and current toxicity values, cancer risks and chronic non-cancer health hazards, were calculated for adult residents, resident children ages 0 to 9 years, and off-airport workers at locations where air concentrations for TAC were predicted. Appendix B.4 provides detailed health risk modeling data supporting the impact analyses.

Locations representative of the nearest sensitive receptors were analyzed within the study area in the vicinity of the airport for each construction year from 2018 to 2020. These locations are shown on Figure 4.1.1-1.

The concentrations at these locations represent maximum concentrations of TAC predicted by the air dispersion modeling, and can be used to evaluate exposure to MEI. By definition, MEI documents a ceiling for risks and hazards for off-airport residential and commercial receptors. These calculations assumed that people live and work within this study area for the entire exposure duration. This assumption is conservative. Many people that live in the study area will work, shop, travel, recreate and participate in other activities outside of the study area.

4.1.2.5.1 Cancer Risks

Peak construction and operations-related cancer risks for MEI are presented in **Table 4.1.2-2** and summarized in the following sections; calculations are presented in Appendix B.4. As shown, construction and operations-related cancer risks would be less than significant for adult workers, as well as adult and child residents.

Residents (Adult, Child, and 30-Year)

For construction and operations-related cancer risks, adult, child, and 30-year residents were evaluated at identified residential receptors. Because construction of the proposed project is estimated to be approximately 1 year and 10 months, incremental cancer risk for residents was estimated assuming 2 years of construction; following completion of construction, it was assumed that residents would be exposed to operational project-related TAC impacts for the remaining years of their respective exposure periods.

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[130] South Coast Air Quality Management District, *SCAQMD Air Quality Significance Thresholds*, March 2015. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

Table 4.1.2-2
Incremental Peak Cancer Risks for Maximally Exposed Individuals

Receptor Type	Cancer Risks[1] (per million people)	Threshold (per million people)	Exceeds Threshold?
30-Year Resident, 30 years	1.2	10	No
Adult Resident, 30 years	0.1	10	No
Child Resident, 9 years	0.9	10	No
Adult Worker, 25 years	4.3	10	No

Source: Appendix B.4 of this EIR.

1. Cancer risk includes 2 years of construction and all remaining time of the exposure period as operational risk.

Prepared By: CDM Smith, January 2018.

Incremental cancer risks for adult, child and a 30-year residents at the peak residential receptor are estimated to be 0.1 in 1 million, 0.9 in 1 million and 1.2 in 1 million, respectively, all of which are below the threshold of significance of 10 in 1 million. For the peak construction portion of the cancer risk, DPM would contribute approximately 39 percent of the risk for residents. Hexavalent chromium would contribute approximately 48 percent. For the operations portion of the cancer risk, DPM would contribute approximately 72 percent while hexavalent chromium would contribute approximately 28 percent. The peak cancer risk location for residents is shown on **Figure 4.1.2-1**.

Adult Worker

Adult workers were evaluated at on and off-airport grid nodes. Because the exposure period of the adult worker is 25 years and construction of the project is estimated to be 1 year and 10 months, incremental cancer risk for the worker was estimated assuming 2 years of construction; following completion of construction, it was assumed that adult workers were exposed to operational impacts associated with the proposed project for the remaining 23 years of the 25-year exposure period.

Construction-related cancer risks for adult workers at the peak off-site location are estimated to be 4.3 in 1 million, below the threshold of significance of 10 in 1 million. Similarly to residents, for the construction portion of the cancer risk, DPM and hexavalent chromium would contribute the majority of the cancer risk for adult workers, approximately 36 percent and 47 percent, respectively. For the operational contribution to the cancer risk, DPM and hexavalent chromium would contribute 97 percent and 3 percent, respectively. The peak cancer risk location for adult workers is shown on Figure 4.1.2-1.

4.1.2.5.2 Chronic Non-Cancer Health Hazards

Project-related chronic non-cancer hazard indices for construction and operational impacts associated with the proposed project are provided in **Table 4.1.2-3**. Incremental hazard indices are shown for the peak year of construction and the first year of operations. As shown, chronic non-cancer human health hazards would be less than significant for both residents and workers.

LAX UAL East Aircraft Maintenance and GSE Project

Peak Unmitigated Construction Health Risks

Figure 4.1.2-1

Table 4.1.2-3
Incremental Chronic Non-Cancer Human Health Hazards for
Maximally Exposed Individuals

Year	Resident[1]	Adult Worker[1]	Significance Threshold	Exceeds Threshold?
Peak Construction Year, 2019	0.010	0.168	1	No
First Year of Operations, 2021	<0.001	0.001	1	No

Source: Appendix B.4 of this EIR.

Note:

1. Hazard indices are unitless.

Prepared By: CDM Smith, January 2018.

Resident

The maximum HI for a resident living at the peak hazard location for a single year of construction of the proposed project is 0.010, projected to occur in 2019. The maximum HI for a resident living at the peak hazard location for a single year of operations of the proposed project is <0.001. The peak residential hazard locations for construction and for operations are shown on Figure 4.1.2-1. Non-cancer hazard indices for adult residents, child residents, and the 30-year resident are the same because the OEHHA methodology does not normalize hazard indices to body weight. As shown in Table 4.1.2-3, all incremental chronic non-cancer health hazards for residential adults and for young children are would be below the significance threshold of 1.

Adult Worker

The maximum HI for an adult worker at the peak hazard location for a single year of construction of the proposed project is 0.168, projected to occur in 2019. The maximum HI for an adult worker at the peak hazard location for a single year of operations of the proposed project is 0.001. The peak commercial hazard location is shown on Figure 4.1.2-1 for construction and operations. All incremental chronic non-cancer health hazards for adult workers would be below the significance threshold of 1.

4.1.2.5.3 Acute Non-Cancer Health Hazards

Acute non-cancer health hazards were evaluated for the modeled peak day of construction and operations. One-hour exposure durations were used to represent exposure to individuals moving through or near LAX. Eight-hour exposure durations were used to represent exposure to individuals who would be on-site for longer periods of time. Both residential receptor locations and worker receptor locations were modeled for each exposure scenario to fully capture any potential risk associated with construction or operation of the proposed project.

An HI equal to or greater than 1 would indicate possible acute adverse health effects. As shown in **Table 4.1.2-4** and **Table 4.1.2-5**, for both 1-hour and 8-hour exposure periods for all receptor locations, the HQs for acute exposure to all TACs would be less than 1. Hence, no adverse health impacts are projected.

When examining construction-related acute non-cancer health hazards by target organ system, at peak 1-hour concentrations, the highest hazard target organ system is the immune system, with nickel and benzene responsible for 67.9 percent and 32.1 percent of the total risk at the peak worker location, respectively. At the peak residential location, nickel and benzene are responsible for 84.3 percent and 15.7 percent of the total risk, respectively. Exposure to other common TAC associated with construction activities, such as arsenic and formaldehyde, result in non-zero hazard indices, but do not contribute to risk affecting the highest risk organ system. Acrolein, which is associated with aircraft operations, does not contribute substantially to construction-related acute hazards. Maximum acute non-cancer health hazards associated with a 1-hour exposure to these chemicals from the proposed project construction are summarized in Table 4.1.2-4.

Table 4.1.2-4
Construction and Operations-Related Acute (1-Hour) Non-Cancer Health Hazards

Location	Acrolein[1]	Arsenic[1]	Benzene[1]	Formaldehyde[1]	Nickel[1]	Total Risk[2]	Significance Threshold	Exceeds Threshold?
Worker (Construction)	0.007	0.015	0.025	0.045	0.053	0.078	1	No
Worker (Operations)	0.027	<0.001	0.002	0.006	<0.001	0.033	1	No
Resident (Construction)	<0.001	0.003	0.002	0.002	0.009	0.011	1	No
Resident (Operations)	0.006	<0.001	<0.001	0.001	<0.001	0.007	1	No

Source: Appendix B.4 of this EIR.

Note:

1. Hazard indices are unitless.
2. TACs affect different organs in the body so the combined risk of acute exposure would not necessarily be additive between all TACs.

Prepared By: CDM Smith, January 2018.

When examining operations-related acute non-cancer health hazards by target organ system, at peak 1-hour concentrations, the highest hazard target organ system is the eyes, with acrolein and formaldehyde responsible for 80.8 percent and 18.5 percent of the total risk at the peak worker location, respectively. At the peak residential location, acrolein and formaldehyde for 80.8 percent and 18.5 percent of the total risk, respectively. Exposure to another common TAC associated with operational activities, benzene, has a non-zero hazard index, but does not contribute to risk affecting the highest risk organ system. Maximum acute non-cancer health hazards associated with a 1-hour exposure to these chemicals from the proposed project operation are summarized in Table 4.1.2-4.

When examining construction-related acute non-cancer health hazards by target organ system, at peak 8-hour concentrations, the highest hazard target organ system is the reproductive/development system, with manganese, benzene, and arsenic responsible for 64.0 percent, 17.0 percent, and 15.0 percent of the total risk at the peak worker location, respectively. At the peak residential location, manganese, benzene, and arsenic are responsible for 71.9 percent, 16.8 percent, and 7.3 percent of the total risk, respectively. Exposure to other common TAC associated with construction activities, such as formaldehyde and nickel, result in non-zero hazard indices, but do not contribute to risk affecting the highest risk organ system. Acrolein, which is associated with aircraft operations, does not contribute substantially to construction-related acute hazards. Maximum acute non-cancer health hazards associated with a 8-hour exposure to these chemicals from the proposed project construction are summarized in Table 4.1.2-5.

Table 4.1.2-5
Construction and Operations-Related Acute (8-Hour) Non-Cancer Health Hazards

Location	Acrolein[1]	Arsenic[1]	Benzene[1]	Formaldehyde[1]	Manganese[1]	Nickel[1]	Total Risk[2]	Significance Threshold	Exceeds Threshold?
Worker (Construction)	0.011	0.085	0.097	0.011	0.363	0.074	0.567	1	No
Worker (Operations)	0.014	<0.001	0.002	0.005	<0.001	<0.001	0.022	1	No
Resident (Construction)	<0.001	0.011	0.005	0.004	0.048	0.010	0.066	1	No
Resident (Operations)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	1	No

Source: Appendix B.4 of this EIR.

Note:

1. Hazard indices are unitless.
2. TACs affect different organs in the body so the combined risk of acute exposure would not necessarily be additive between all TACs.

Prepared By: CDM Smith, January 2018.

When examining operations-related acute non-cancer health hazards by target organ system, at peak 8-hour concentrations, the highest hazard target organ system is the eyes, with acrolein, formaldehyde, and manganese responsible for 69.9 percent, 27.3 percent, and 2.4 percent of the total risk at the peak worker location, respectively. At the peak residential location, acrolein, formaldehyde, and manganese are responsible for 67.6 percent, 26.4 percent, and 5.7 percent of the total risk, respectively. Exposure to another common TAC associated with operational activities, benzene, has a non-zero hazard index, but does not contribute to risk affecting the highest risk organ system. Maximum acute non-cancer health hazards associated with a 8-hour exposure to these chemicals from the proposed project operation are summarized in Table 4.1.2-5.

4.1.2.5.4 Occupational Effects

Impacts to on-site workers during construction were evaluated above by comparing estimated 8-hour air concentrations of TAC at the on-site location under the proposed project for construction to RELs to determine HIs. As in the LAX Master Plan and Specific Plan Amendment Study EIRs, it was determined that the CalOSHA 8-hour PEL-TWAs were inappropriate for addressing worker risk from a dispersion analysis.[131] All TAC concentrations were less than significant by multiple orders of magnitude because CalOSHA 8-hour PEL-TWAs were developed for on-site real-time monitoring rather than dispersion analyses. The 1-hour and 8-hour REL comparisons presented above compare the same TACs as in the CalOSHA PEL-TWA thresholds to more conservative thresholds and, therefore, have more appropriately already addressed the issue of occupational exposure. Based on that analysis, occupational risks would be less than significant.

4.1.2.5.5 Population-Based Risks

A population-based cancer burden analysis was not performed for this EIR because no MEI threshold was exceeded.

4.1.2.5.6 Summary of Impacts

The HHRA addressed incremental health impacts associated with implementation of the proposed project. The evaluation assessed cancer risks, chronic non-cancer health hazards, and acute non-cancer health hazards. The text below summarizes impact conclusions based on modeling estimates.

- Incremental cancer risks associated with implementation of the proposed project would be below the threshold of significance of 10 in 1 million for child resident, adult resident, and adult worker. Incremental cancer risk impacts would be less than significant.
- The cancer burden would be less than significant.
- Occupational risks would be less than significant.
- Incremental chronic non-cancer hazard indices associated with construction and operation of the proposed project would be below the threshold of significance for all receptor types (i.e., child resident, adult resident, and adult worker). Incremental chronic non-cancer impacts from construction and operations would be less than significant.

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131 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements,* (SCH 1997061047), Technical Report 14a, Health Risk Assessment, and Technical Report S-9a, Supplemental Health Risk Assessment, April 2004. Available: https://www.lawa.org/en/lawa-our-lax/environmental-documents/documents-certified/2004-lax-master-plan-program/final-environmental-impact-report-feir; City of Los Angeles, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Specific Plan Amendment Study*, (SCH 1997061047), Appendix G1, Human Health Risk Assessment, January 2013. Available: https://www.lawa.org/en/lawa-our-lax/environmental-documents/documents-certified/specific-plan-amendment-study/documents.

- Incremental acute non-cancer hazard indices would be equal to or below the threshold of significance of 1 at all locations of modeled peak TAC concentrations for construction and operation of the proposed project. Incremental acute non-cancer impacts would be less than significant for both workers and residents.

4.1.2.6 Cumulative Impacts

Unlike air quality, for which standards have been established that determine acceptable levels of pollutant concentrations, no standards exist that establish acceptable levels of human health risks or that identify a threshold of significance for cumulative health risk impacts. Therefore, the discussion below addresses cumulative health risk impacts and project-related contributions to those impacts, but no determination is made regarding the significance of cumulative impacts. However, the project's incremental contribution to cumulative impacts is identified, following SCAQMD policy.[132] Based on information available from the SCAQMD with respect to regional cancer risk estimates and TAC predictions, the geographic areas considered in the cumulative health risk impacts analysis include the South Coast Air Basin for cancer risk and the LAX area for non-cancer health hazards, as further described below.

4.1.2.6.1 Cancer Risk

The SCAQMD has conducted a series of urban air toxics monitoring and evaluation studies (MATES) for the South Coast Air Basin.[133] The original study was published in June 1987 and has been updated several times. The most recent study, MATES-IV, was published in May 2015.[134] According to MATES-IV, although in general there has been an overall South Coast Air Basin-wide reduction in air toxics concentrations since MATES-III, application of the updated risk estimation methods recently adopted by OEHHA results in an estimated population weighted risk across the South Coast Air Basin of 897 case per million people, an increase in the previously-reported cancer risk. As noted above, no standards exist that establish acceptable levels of human health risks or that identify a threshold of significance for cumulative health risk impacts. Therefore, there is no basis upon which to make a determination regarding the significance of these cumulative health risks. Moreover, while the MATES-IV study is an appropriate estimate of present cumulative impacts of TAC emissions in the South Coast Air Basin, it does not have sufficient resolution to determine the fractional contribution of current LAX operations to TAC in the airshed. Only possible incremental contributions to cumulative impacts can be assessed.

Meaningful quantification of future cumulative health risk exposure in the entire South Coast Air Basin is not possible. Moreover, the threshold of significance used to determine cancer risk impacts associated with the proposed project is based on the cancer risks associated with individual projects; this threshold is not appropriately applied to conclusions regarding cumulative cancer risk in the South Coast Air Basin. However, based on the relatively high cancer risk level associated with TAC in air in the South Coast Air Basin (i.e., an additional 897 cancer cases per million according to MATES-IV), the proposed project (with a maximum estimated incremental cancer risk of 4.3 cancer cases per million) would not add substantially (less than 1 percent) to the already high cumulative cancer risk in the South Coast Air Basin. This small increase estimated for the proposed project would not be measurable in collected cancer statistics against urban background conditions in the South Coast Air Basin.

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132 South Coast Air Quality Management District, *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution*, Appendix A: Background, August 2003, p. D-3.

133 General information on the original *Multiple Air Toxics Exposure Study* and subsequent updates conducted by South Coast Air Quality Management District. Available: http://www.aqmd.gov/home/air-quality/air-quality-studies/health-studies.

134 South Coast Air Quality Management District, *Final Report – Multiple Air Toxics Exposure Study in the South Coast Air Basin – MATES- IV*, May 2015. Available: http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7.

The above comparisons do not account for possible positive changes in air quality in the South Coast Air Basin in the future. SCAQMD and other agencies are consistently working to reduce air pollution. In particular, reductions in emissions of diesel particulates are being considered and implemented. Since DPM is the major contributor to estimated cancer risks, substantial reductions in diesel emissions would result in substantial reductions in cumulative cancer risks. These and other regulations intended to reduce TAC emissions within the South Coast Air Basin would reduce cumulative impacts overall. While continued, if not increased, regulation by the SCAQMD of point sources, as well as more stringent emission controls on mobile sources, would reduce TAC emissions, and whether such measures would alter incremental proposed project contributions of TAC releases to cumulative impacts would be speculative to predict.

4.1.2.6.2 Chronic Non-Cancer Health Hazards

Acrolein is the TAC of concern that is responsible for the majority of all predicted chronic non-cancer health hazards associated with LAX operations. However, for the proposed project, chronic non-cancer health hazards are primarily attributable to chlorine and manganese and, to a lesser extent, arsenic, cadmium, DPM, nickel, benzene, and formaldehyde. In 2015, USEPA published an independent study of possible annual average air concentrations within the South Coast Air Basin associated with a variety of TAC, including acrolein, chlorine, and DPM.[135] These estimates provide a means for assessing cumulative chronic non-cancer health hazard impacts of airport operations in much the same manner as cumulative cancer risks were assessed using the MATES-IV results.

Within Los Angeles County, USEPA predictions for annual average concentrations yield acrolein hazard indices by census tract ranging from 0.13 to 11, with an average of 2; DPM hazard indices ranging from 0.01 to 0.50, with an average of 0.15; and chlorine hazard indices ranging from 0.01 to 0.16, with an average of 0.06.[136] Incremental hazard indices for the proposed project (Table 4.1.2-3) were estimated to range from <0.001 to 0.17, below the threshold of significance of 1. Given the relatively small hazard indices associated with proposed project emissions, the proposed project would not add significantly to cumulative chronic non-cancer health hazards.

Because of the substantial uncertainties associated with the USEPA estimates,[137] the cumulative analysis for chronic non-cancer health hazard impacts is semi-quantitative and based on a range of possible contributions. This cumulative analysis does not address the issue of interactions among acrolein and criteria pollutants. Such interactions cannot, at this time, be addressed in a quantitative fashion. A qualitative discussion of the issue is presented in the LAX Master Plan Final EIR Technical Report S-9a, Section 7.[138]

As discussed in the LAX Master Plan Final EIR (Section 4.24.1.2), limited data are available for describing acrolein emissions. Therefore, estimates of chronic non-cancer health hazards are very uncertain. Chronic non-cancer health hazards associated with the proposed project should only be used to provide a relative comparison to South Coast Air Basin-wide conditions. These hazards should not be viewed as absolute estimates of potential health impacts. Moreover, USEPA's estimates are based on data from 2015 and are

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135 U.S. Environmental Protection Agency, *2011 National-Scale Air Toxics Assessment*, Released 2015. Available: https://www.epa.gov/national-air-toxics-assessment/2011-national-air-toxics-assessment, accessed January 18, 2018.

136 U.S. Environmental Protection Agency, *2011 National-Scale Air Toxics Assessment*, Released 2015. Available: https://www.epa.gov/national-air-toxics-assessment/2011-nata-assessment-results, accessed January 18, 2018.

137 U.S. Environmental Protection Agency, *2011 National-Scale Air Toxics Assessment*, Released 2015. Available: https://www.epa.gov/national-air-toxics-assessment/2011-national-air-toxics-assessment, accessed January 19, 2017.

138 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements,* (SCH 1997061047), Technical Report S-9a, Supplemental Health Risk Assessment, April 2004. Available: https://www.lawa.org/en/lawa-our-lax/environmental-documents/documents-certified/2004-lax-master-plan-program/final-environmental-impact-report-feir.

therefore several years old. Emissions from some important sources may have been reduced as a result of continuing efforts by SCAQMD and other agencies to improve air quality in the South Coast Air Basin. Finally, the estimates do not consider degradation of TAC in the atmosphere. Degradation may be very important for relatively reactive chemicals, such as acrolein.

4.1.2.6.3 Acute Non-Cancer Health Hazards

Acrolein, formaldehyde, and manganese are the primary TAC of concern in proposed project emissions as these pollutants are associated with jet aircraft engines and/or construction emissions. Predicted concentrations of TAC released from construction and operational activities for the proposed project estimate that acute non-cancer health hazards would be below the significance threshold of 1.

The assessment of cumulative acute non-cancer health hazards follows the methods used to evaluate cumulative acute non-cancer health hazards presented in the LAX Master Plan Final EIR (Section 4.24.1.7 and Technical Report S-9a, Section 6.3),[139] incorporating updated National-Scale Air Toxics Assessment (NATA) tables from 2015. USEPA-modeled emission estimates by census tract were used to estimate annual average ambient air concentrations. These census tract emission estimates are subject to high uncertainty, and USEPA warns against using them to predict local concentrations. Thus, for the analysis of cumulative acute non-cancer health hazards, estimates for each census tract within Los Angeles County were identified, and the range of concentrations was used as an estimate of the possible range of annual average concentrations in the general vicinity of the airport. This range of concentrations was used to estimate a range of acute non-cancer hazard indices using the same methods as described in the LAX Master Plan Final EIR (Section 4.24.1.7 and Technical Report S-9a, Section 6.1).[140] The methodology entails converting the USEPA annual average estimates to maximum 1-hour average concentrations by dividing annual average estimates by 0.08. Maximum 1-hour average concentrations were then divided by the acute REL to calculate acute non-cancer hazard indices. The range of hazard indices was then used as a basis for comparison with estimated maximum acute non-cancer health hazards for the proposed project. The relative magnitude of acute non-cancer health hazards calculated on the basis of the USEPA estimates and maximum hazards estimated for the proposed project were taken as a general measure of relative cumulative impacts. Emphasis must be placed on the relative nature of these estimates. Uncertainties in the analysis preclude estimation of absolute impacts.

When USEPA annual average estimates for each census tract in Los Angeles County are converted to possible maximum 1-hour average concentrations, acrolein acute non-cancer hazard indices are estimated to range from 0.2 to 1.3, with an average of 0.4; formaldehyde acute non-cancer hazard indices are estimated to range from 0.3 to 0.7, with an average of 0.5; and manganese acute non-cancer hazard indices are estimated to range from 0.03 to 0.1, with an average of 0.06 for locations within the HHRA study area.

Predicted overall maximum incremental acute non-cancer health hazards for the proposed project associated with acrolein peaked at 0.027 (Table 4.1.2-4); hazards associated with formaldehyde peaked at 0.045 (Table 4.1.2-4); and hazards associated with manganese peaked at 0.363 (Table 4.1.2-5).

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139 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements,* (SCH 1997061047), Section 4.24.1, Human Health Risk Assessment, and Technical Report S-9a, Supplemental Health Risk Assessment, April 2004. Available: https://www.lawa.org/en/lawa-our-lax/environmental-documents/documents-certified/2004-lax-master-plan-program/final-environmental-impact-report-feir.

140 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements,* (SCH 1997061047), Section 4.24.1, Human Health Risk Assessment, and Technical Report S-9a, Supplemental Health Risk Assessment, April 2004. Available: https://www.lawa.org/en/lawa-our-lax/environmental-documents/documents-certified/2004-lax-master-plan-program/final-environmental-impact-report-feir.

Comparing the results for the proposed project to the estimated existing risks for Los Angeles County suggests that the acute non-cancer health hazards for the proposed project would not substantially contribute to total acute non-cancer health hazards of acrolein and formaldehyde. While acute non-cancer health hazards associated with manganese and several other TACs would increase during construction, as shown in Table 4.1.2-5, the total acute hazard indices would not exceed the significance threshold during construction and would drop considerably during operations. Therefore, acute non-cancer health hazards associated with the proposed project would not be cumulatively considerable.

4.1.2.6.4 Summary of Cumulative Impacts

Although no defined thresholds for cumulative health risk impacts are available, it is the policy of the SCAQMD to use the same significance thresholds for cumulative impacts as for the project-specific impacts analyzed in the EIR.[141] If cumulative health risks are evaluated following this SCAQMD policy, the project's contribution to the cumulative cancer risk would not be cumulatively considerable under the proposed project scenario since the incremental cancer risk impacts associated with the combined construction and operation of the proposed project for all receptors would be below the individual cancer risk significance thresholds of 10 in 1 million.

With regard to hazard indices for TAC emissions, SCAQMD's policy has different significance thresholds for project-specific versus cumulative impacts. The project-specific significance threshold is 1.0 and the cumulative threshold is 3.0. Based on this SCAQMD policy, chronic non-cancer hazards and acute non-cancer health hazards associated with project-related emissions would not be cumulatively considerable.

4.1.2.7 Mitigation Measures

As described in Sections 4.1.2.5 and 4.1.2.6, health risk impacts from construction and operation of the proposed project would be less than significant and project-related contributions to cumulative impacts would not be cumulatively considerable. Therefore, no mitigation measures are required. However, as discussed in Section 4.1.1.7, Mitigation Measure MM-AQ (UAL)-1 (Construction-Related Air Quality Mitigation Measures) would reduce construction-related air pollutant emissions associated with the proposed project. Although developed to address construction-related air quality impacts from criteria pollutant emissions, this mitigation measure would also reduce health risks associated with exposure to TAC.

4.1.2.8 Level of Significance After Mitigation

Health risk impacts from construction and operation of the proposed project would be less than significant.

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141 South Coast Air Quality Management District, *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution*, Appendix D, August 2003.

4.2 Cultural Resources

4.2.1 Introduction

This cultural resources section addresses the proposed project's impacts on historical resources. The existing historical resources in the project area are described below, along with the methodology and the regulatory framework that guided the evaluation of historical resources. Impacts to historical resources that would result from the proposed project are identified, along with any measures to mitigate significant effects of the proposed project if needed.

Prior to the preparation of this EIR, an Initial Study (included as Appendix A of this EIR) was prepared using the CEQA Environmental Checklist Form to assess potential environmental impacts to cultural resources. Based on the analysis in the Initial Study, and for reasons described in the introduction to this chapter, the potential for the proposed project to cause a substantial adverse change in the significance of an archaeological resource, to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or to disturb any human remains, including those interred outside of formal or dedicated cemeteries, was determined to be less than significant and these topics do not require any additional analysis in this EIR.[142]

4.2.2 Methodology

A historic resources assessment was performed by Historic Resources Group (HRG) personnel who meet the Secretary of the Interior's Professional Qualification Standards in the disciplines of architectural history and history. Historical resources considered include prehistoric or historic buildings, sites, districts, structures, or objects that meet criteria of significance as established by the National Register of Historic Places (National Register), California Register of Historical Resources (California Register), and local jurisdictions. Their evaluation of historic significance was based on a review of existing historic designations, research of the relevant historic contexts, and analysis of the eligibility criteria and integrity thresholds for listing in the National Register or California Register, or designation as a City of Los Angeles Historic-Cultural Monument (LAHCM). The historical resources assessment utilized a two-step methodology involving research and field investigation.

The research component of the assessment used primary and secondary sources related to the development history of Los Angeles International Airport (LAX) and its immediate surrounding area. Sources included historic building permits, photographs, aerial photographs, and site plans; published local histories; previous environmental review documents and historic resources evaluations for LAX; California State Historic Resources Inventory (HRI) for Los Angeles County; and California Department of Parks and Recreation HRI Forms.

HRG performed on-site inspections of the project site and surrounding area in 2015. Their fieldwork focused on the assessment of historic integrity and the identification of character-defining features for structures located on or adjacent to the project site that could be affected by the proposed project (see Appendix C).

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142 In accordance with Assembly Bill 52, Appendix G of the State CEQA Guidelines identifies tribal cultural resources as a separate resource from other cultural resources. Similar to archaeological and paleontological resources, based on the analysis in the Initial Study and for reasons described in the introduction to this chapter, the potential for the proposed project to cause a substantial adverse change in the significance of a tribal cultural resource was determined to be less than significant and this topic does not require any additional analysis in this EIR.

4.2.3 Existing Conditions

4.2.3.1 Regulatory Context

Historical resources fall within the jurisdiction of several levels of government. Federal laws provide the framework for the identification and, in certain instances, protection of historical resources. Additionally, state and local jurisdictions play active roles in the identification, documentation, and protection of such resources within their communities. The National Historic Preservation Act of 1966, as amended (NHPA; 54 United States Code 300101 et seq.); California Environmental Quality Act (CEQA); California Register of Historical Resources (Public Resources Code 5024.1); and the City of Los Angeles Cultural Heritage Ordinance (Los Angeles Administrative Code, Section 22.171 et seq.) are the primary federal, state, and local laws governing and affecting preservation of historical resources of national, state, regional, and local significance.[143]

4.2.3.1.1 Federal

National Register

The National Register was established by the NHPA as "an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment."[144] The National Register recognizes properties that are significant at the national, state, and/or local levels. To be eligible for listing in the National Register, a resource must be significant in American history, architecture, archaeology, engineering, or culture. The National Register has established four Criteria for Evaluation to determine the significance of a resource:

1. It is associated with events that have made a significant contribution to the broad patterns of our history;
2. It is associated with the lives of persons significant in our past;
3. It embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. It yields, or may be likely to yield, information important in prehistory or history.[145]

Districts, sites, buildings, structures, and objects of potential significance that are at least 50 years in age must meet one or more of the above criteria. However, the National Register does not prohibit the consideration of properties less than 50 years in age whose exceptional contribution to the development of American history, architecture, archaeology, engineering, and culture can clearly be demonstrated. In addition to meeting the Criteria for Evaluation, a property must have integrity. "Integrity is the ability of a property to convey its significance."[146] According to National Register Bulletin 15, the National Register recognizes seven aspects or qualities that, in various combinations, define integrity. The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association.

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[143] Los Angeles Administrative Code, Chapter 9, Division 22, Article 1, Section 22.171 et seq., *Cultural Heritage Ordinance*, effective April 2, 2007. Available: http://preservation.lacity.org/sites/default/files/Cultural%20Heritage%20Ordinance.pdf.

[144] 36 Code of Federal Regulations, Section 60.2, *Effects of Listing under Federal Law*.

[145] U.S. Department of Interior, National Park Service, *National Register Bulletin 16, How to Complete the National Register Registration Form*, revised 1997. Available: https://www.nps.gov/Nr/publications/bulletins/pdfs/nrb16a.pdf. This bulletin contains technical information on comprehensive planning, survey of cultural resources, and registration in the National Register.

[146] U.S. Department of Interior, National Park Service, *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation*, 1995, p. 44. Available: https://www.nps.gov/NR/PUBLICATIONS/bulletins/pdfs/nrb15.pdf.

To retain historic integrity, a property will always possess several, and usually most, of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance.[147]

In assessing a property's integrity, the National Register criteria recognizes that properties change over time; therefore, it is not necessary for a property to retain all of its historic physical features or characteristics. The property must retain, however, the essential physical features that enable it to convey its historic identity.[148]

Secretary of the Interior's Standards

The Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards) are intended to promote responsible preservation practices that help protect irreplaceable cultural resources. They are neither technical nor prescriptive, and cannot be used to make essential decisions about which features of the historic building should be saved and which can be changed. However, once treatment is selected – preservation, rehabilitation, restoration, or reconstruction – the Standards provide treatment approaches and philosophical consistency to the work. Choosing the most appropriate treatment for a building requires careful decision making about a building's historical significance as well as taking into account a number of other considerations, including relative importance in history, physical condition, proposed use, and mandated code requirements.

Rehabilitation, the most common treatment, is the process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values. The Standards for Rehabilitation are as follows:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

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[147] U.S. Department of Interior, National Park Service, *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation*, 1995, p. 44. Available: https://www.nps.gov/NR/PUBLICATIONS/bulletins/pdfs/nrb15.pdf.

[148] "A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Like feeling, association requires the presence of physical features that convey a property's historic character. Because feeling and association depend on individual perceptions, their retention alone is never sufficient to support eligibility of a property for the National Register." U.S. Department of Interior, National Park Service, *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation*, 1995, p. 46. Available: https://www.nps.gov/NR/PUBLICATIONS/bulletins/pdfs/nrb15.pdf.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archaeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.[149]

4.2.3.1.2 State

California Register and California Environmental Quality Act

The California Register was created by Assembly Bill 2881, which was signed into law on September 27, 1992. The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change."[150] The criteria for eligibility for the California Register are based on National Register criteria.[151] Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.[152] Per Instructions for Recording Historical Resources published by the California Department of Parks and Recreation, Office of Historic Preservation (OHP), physical evidence of human activities more than 45 years old may be recorded for purposes of inclusion in OHP's filing system although, similar to the National Register, resources less than 45 years old may also be filed.[153]

The California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally Determined Eligible for the National Register;
- California Registered Historical Landmarks from No. 770 onward; and
- California Points of Historical Interest (CPHI) that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.[154]

Other resources that may be nominated to the California Register include:

- Individual historical resources;
- Historical resources contributing to historic districts;

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149 U.S. Department of Interior, National Park Service, *Secretary of the Interior's Standards for Rehabilitation*. Available: https://www.nps.gov/tps/standards/rehabilitation.htm, accessed September 4, 2016.
150 California Public Resources Code, Section 5024.1(a).
151 California Public Resources Code, Section 5024.1(b).
152 California Public Resources Code, Section 5024.1(d).
153 California Office of Historic Preservation, *Instructions for Recording Historical Resources,* March 1995.
154 California Public Resources Code, Section 5024.1(d).

- Historical resources identified as significant in historical resources surveys with significance ratings of Categories 1 through 5; and
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as a historic preservation overlay zone.[155]

To be eligible for the California Register, an historical resource must be significant at the local, state, or national level, under one or more of the following four criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Additionally, an historical resource must retain enough of its historic character or appearance to be recognizable as an historical resource and to convey the reasons for its significance.[156] Historical resources that have been rehabilitated or restored may be evaluated for listing. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. The resource must also be judged with reference to the particular criteria under which it is proposed for eligibility. It is possible that an historical resource may not retain sufficient integrity to meet the criteria for listing in the National Register but may still be eligible for listing in the California Register.[157]

Under CEQA, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment."[158] This statutory standard involves a two-part inquiry. The first part is a determination of whether the project involves an historical resource. If it does, the inquiry addresses whether the project may cause a "substantial adverse change in the significance" of the resource. State CEQA Guidelines Section 15064.5 provides that, for the purposes of CEQA compliance, the term "historical resources" shall include the following:[159]

- A resource listed in, or determined to be eligible by, the State Historical Resources Commission for listing in the California Register.
- A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements in Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat such resources as significant for purposes of CEQA unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by

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155 California Public Resources Code, Section 5024.1(e).

156 14 California Code of Regulations, Chapter 11.5, Section 4852(c), *Types of Historical Resources and Criteria for Listing in the California Register of Historical Resources*.

157 14 California Code of Regulations, Chapter 11.5, Section 4852(c), *Types of Historical Resources and Criteria for Listing in the California Register of Historical Resources.*

158 California Public Resources Code, Section 21084.1.

159 14 California Code of Regulations, Section 15064.5(a), *Determining the Significance of Impacts to Archaeological and Historical Resources*.

the lead agency to be "historically significant" if the resource meets one of the criteria for listing on the California Register.

- The fact that a resource is not listed in or determined to be eligible for listing in the California Register, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code Sections 5020.1(j) or 5024.1.

Under CEQA, generally a project that follows the Secretary of the Interior's standards shall be considered to have mitigated a significant impact on the historical resource to a level that is less than significant. CEQA Guidelines Sections 15064.5(b)(3), 15126.4(b)(1).

4.2.3.1.3 Local

City of Los Angeles Conservation Element of the General Plan

The Conservation Element includes provisions, policies, and objectives for the preservation and protection of historical sites. Chapter II, Section 5 of the City of Los Angeles General Plan Conservation Element (adopted 2001) contains the following objectives and policies applicable to the proposed project:

Objective: Protect important cultural and historical sites and resources for historical, cultural, research, and community educational purposes.

- Policy: Continue to protect historic and cultural sites and/or resources potentially affected by proposed land development, demolition or property modification activities.

City of Los Angeles Cultural Heritage Ordinance

The City of Los Angeles enacted a Cultural Heritage Ordinance in April 1962 (Los Angeles Administrative Code, Section 22.130) that defines LAHCMs for the City. According to the ordinance, LAHCMs are sites, buildings, or structures of particular historical or cultural significance to the City of Los Angeles in which the broad cultural, economic, or social history of the nation, state, or community is reflected or exemplified, including sites and buildings associated with important personages or that embody certain distinguishing architectural characteristics and are associated with a notable architect. LAHCMs are regulated by the City's Cultural Heritage Commission and the City Council.

The City of Los Angeles Cultural Heritage Ordinance establishes criteria for designating local historical resources as LAHCMs. Pursuant to the Ordinance, an LAHCM is any site, building, or structure of particular historic or cultural significance to the City of Los Angeles that meets one or more of the following criteria:

1. Reflects or exemplifies the broad cultural, economic, or social history of the nation, state, or community.
2. Is identified with historic personages or with important events in the main currents of national, state, or local history.
3. Embodies the distinguishing characteristics of an architectural type specimen, inherently valuable for a study of a period, style, or method of construction
4. Is a notable work of a master builder, designer, or architect whose individual genius influenced his or her age.

City of Los Angeles Historic Preservation Overlay Zone

The City of Los Angeles enacted the Historic Preservation Overlay Zone (HPOZ) Ordinance in 1979, which is a planning tool that enables the designation of historic districts. An HPOZ is an area of the city that is designated as containing structures, landscaping, natural features, or sites having historic, architectural, cultural, or aesthetic significance. Although most districts are primarily residential, many have a mix of single-family and multi-family housing, and some include commercial and industrial properties. Individual buildings in an HPOZ need not be of landmark quality on their own. It is the collection of a cohesive, unique, and intact collection of historic resources that qualifies a neighborhood for HPOZ status.

LAX Preservation Plan[160]

LAWA recognizes that LAX contains unique historic resources and is committed to preserving its historic resources in a methodical and thoughtful manner. To that end, LAWA has developed a Preservation Plan for LAX resources that identifies all historic resources on LAX property; identifies historic resources that LAWA commits to preserving; provides guidance on the rehabilitation of historic buildings, structures, objects, and sites located on LAX property; and creates a process for review of future projects with respect to historic resources. LAWA has committed to utilizing the LAX Preservation Plan to assist LAWA in preserving and evaluating its historic resources appropriately.

LAWA has identified five buildings, one structure, and one object that will be preserved on LAX property. These historical resources are as follows:

- Hangar One
- The Theme Building
- 1961 Airport Traffic Control Tower (ATCT)
- The Proud Bird Restaurant
- Quonset hut at 6030 Avion Drive
- World War II Munitions Bunker
- Terminal 6 Sign Tower

Of the above seven historical resources, only the Quonset hut at 6030 Avion Drive is located on or in the vicinity of the proposed project site.

The remaining historical resources on LAX property and under LAWA jurisdiction identified as historically significant in the LAX Preservation Plan consist of individually eligible resources (one of which is the combination of 6000-6016 and 6020-6024 Avion Drive, part of the last remaining buildings of the Intermediate Terminal Facility, discussed in Section 4.2.3.2 below), a small historic district, and a contributor to an off-site historic district. LAWA has determined that commitment to the long-term preservation of these remaining historical resources has the potential to substantially interfere with continued airport operations due to issues such as their location, size, building type, or type of construction. Although not identified for preservation, the LAX Preservation Plan includes procedures for implementation of projects that involve the rehabilitation, reuse, alteration, or demolition of the remaining historically significant resources. For any project that requires either extensive alteration (such that the resource would no longer convey its historic significance) or demolition, notification to the City of Los Angeles Department of City Planning's Office of Historic Resources (OHR) is required. Submitted plans to the OHR must include a plan to fully document the historic resource prior to alternation or demolition. OHR is required to review the documentation plan and submit any written comments within 15 working days from the date the documents were received.

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160 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, (SCH 2015021014), Appendix J, LAX Preservation Plan, February 2017. Available: https://cloud1lawa.app.box.com/s/ia03fbbop9u07dek6u8jxdr2hua33sdh.

4.2.3.2 Existing Conditions

4.2.3.2.1 Setting

Early Land Use and Airport Development

As outlined in the historic resources assessment (see Appendix C), prior to its development as an airport, LAX was part of Rancho Sausal Redondo, which had been granted to Antonio Ygnacio Avila by the Mexican government in 1837. Typical of the Spanish and Mexican land grant ranchos, the land was used for cattle ranching and sheep grazing. After the Mexican-American War (1846-1848) and subsequent annexation of California by the United States, the Rancho Sausal Redondo changed hands a number of times and was combined with other properties, which were later disaggregated. In 1894, a 2000-acre portion of the property was leased to local farmer Andrew B. Bennet. This property became known as the Bennett Rancho, and was used to grow crops.

Airport Development 1928-1941

Pioneering aviators began using a portion of the Bennett Rancho as a landing strip during the 1920s. At the same time, Los Angeles business leaders recognized the need for a municipal airport with facilities that exceeded those of the neighboring airports in Burbank, Glendale, and Santa Monica. The Bennett Rancho was promoted as a location for a Los Angeles municipal airport by realtor William W. Mines, after which the site became known as "Mines Field." After Mines Field was selected as the location for the 1928 National Air Races, the City of Los Angeles leased 640 acres of the field for the Los Angeles Municipal Airport in August 1928.

In 1928, the Los Angeles Department of Airports (DOA) was established to administer the airport. The airport constructed its first permanent building – Hangar One – in 1929 and development continued that year with the construction of administrative offices, a runway, and additional hangars.

Although intended as a regional airport for commercial air service, the Los Angeles Municipal Airport serviced only private pilots, flying schools and small aircraft manufacturers for several years. In 1935, the airport was improved with grading, runway construction, and a new sewer line under the direction of the Emergency Relief Administration. Two years later, the airfield was further improved under the Works Progress Administration. Plans to further upgrade for commercial airline services were halted with the onset of World War II.

The War Effort 1942-1944

The federal government assumed control of the airport in 1942, soon after the Japanese attack on Pearl Harbor. The airport was taken over for military use for the duration of World War II. Activities were focused on the needs of overseas combat operations and production at the aeronautical manufacturing companies located on and around the airport increased dramatically. A detachment from the 4th Fighter Command was stationed at the field and a mess hall, officer's quarters, and barracks were built for the Army Air Corps north of Imperial Highway and west of Sepulveda Boulevard. Airport buildings, including on-site or nearby manufacturing facilities now considered crucial to the war effort, were wrapped in camouflage.

During the war, naval gun batteries were constructed along the Pacific Coast as defensive fortifications in case of enemy attack on the mainland the DOA secured commitments from the major American commercial airlines to relocate to Los Angeles Municipal Airport after the war with the creation of a master plan for improvements to the airport. The plan included expansion of the airfield and construction of new terminals and administration buildings. In 1942-1943, a coastal defense battery unit – dubbed the "El Segundo Battery" – was erected in the coastal dunes west of the airport to protect military operations at the airport. Other improvements were made during this timeframe, including installation of an instrument landing system and extension of the runway.

The Department of Airports created a master development plan for the airport in early 1943, proposing westward expansion of the air field and construction of new terminals and administration buildings at the north of the airport property along Century Boulevard. Commitments from the major American commercial airlines to relocate to Los Angeles Municipal Airport were secured. Finalized in 1944, the new master plan proposed two phases of development: an initial stage to immediately accommodate commercial operations and a subsequent, long-range expansion to the west.

The "Intermediate Terminal Facility" 1945-1960

The project site is in an area first developed for the airport immediately after World War II which became known as the "Intermediate Terminal Facility." In 1945, Los Angeles voters passed a bond issue providing 12.5 million dollars for new airport development and construction of temporary facilities for commercial airline operations immediately commenced. Four wood-framed buildings were constructed on the north side of the airport to house airport administration along with three passenger terminals. The Intermediate Terminal Facility complex also included surface parking and an extension of the runways.

Additional office and hangar buildings were constructed by the airlines. By 1947, five major airlines had opened for business at the Los Angeles Municipal Airport. Western Airlines, a pioneering Los Angeles area airline incorporated in 1925, established its national headquarter operations at Los Angeles Airport at 6040 Avion Drive at that time. Western was previously headquartered at Burbank Airport for many years.

Amenities such as newsstands, tobacco shops, a barbershop, a restaurant, medical center, laundry, cocktail bar and lounge, and a garage were added to the Intermediate Terminal Facility, as needed. The Civil Aeronautics Administration designated Los Angeles' airport an "international-express class" airport after determining its facilities adequate for international, intercontinental, and non-stop domestic flights. By 1947, six major airlines were operating at the airport. Los Angeles Municipal Airport was officially re-named Los Angeles International Airport (LAX) on October 11, 1949.

Los Angeles' postwar economic growth would effectively mandate continued improvements and expansion of the airport. Between 1947 and 1952, the number of travelers using or passing through the airport increased over 50 percent. By 1950, all facilities were operating beyond their capacity. Using airport revenue and some federal funding the airport was able to make several upgrades to the Intermediate Terminal Facility including runway expansions, terminal building expansions, more parking facilities, and a 72-foot tall control tower added in 1951. As fully constructed, the Intermediate Terminal Facility included eight major buildings arranged in a J-shaped configuration deeply set back from Century Boulevard. Surface parking lots fronted Century Boulevard with Avion Drive and Airport Boulevard giving access to parking and the Intermediate Terminal Facilities buildings from Century Boulevard.

The Intermediate Terminal Facility was developed as an interim solution to transition LAX from a local, largely non-commercial airport at Mines Fields into the primary international airport for Southern California. Terminals and support services constructed for the Intermediate Terminal Facility were understood to be "temporary" in that they were quickly constructed to facilitate operation as an international airport while long-range planning and the ultimate construction of more permanent facilities could take place. That said, the Intermediate Terminal Facility operated as Los Angeles International Airport until the early 1960s while long-range planning for the airport focused on an area west of the Intermediate Terminal Facility, which would ultimately become today's Central Terminal Area (CTA). The Intermediate Terminal Facility proved the viability of international air travel from Los Angeles proper and established Los Angeles International Airport as the primary airport for Southern California.

The CTA has remained the hub of passenger service activity at LAX since its opening in 1961. Passenger service was phased out at the Intermediate Terminal Facility once the CTA became operational. By 1972, only the hangar and maintenance facilities buildings at 6000-6016 Avion Drive (originally constructed for American Airlines), 6020-6024 Avion Drive (originally constructed for United Airlines), and 6040 Avion Drive (originally constructed for Western Airlines), and some small, ancillary buildings remained of the Intermediate Terminal Facility. All other buildings had been razed and largely replaced by air cargo facilities. Western Airlines expanded its corporate headquarters and aircraft maintenance facilities at 6040 Avion Drive in 1963 and 1972. Western Airlines merged with Delta Air Lines in 1986 and the "Western" brand name was discontinued. 6000-6016 Avion Drive and 6020-6024 Avion Drive continue to operate as maintenance facilities today; 6040 Avion Drive is currently a cargo facility.

An aerial photograph showing the LAX Intermediate Terminal Facility circa 1947 is provided in **Figure 4.2-1**.

4.2.3.2.2 Eligible Historical Resources

Eligible historical resources located on the project site are identified in **Table 4.2-1** and shown on **Figure 4.2-2.** As shown in Table 4.2-1, two resources on the proposed project site appear to be historically significant: the two buildings at 6000-6016 and 6020-6024 Avion Drive, and the Quonset hut. LAWA is planning to relocate the Quonset Hut. This relocation is planned as part of LAWA's ongoing management of historic resources at LAX and is consistent with the preservation of this resource outlined in the LAX Preservation Plan. The relocation will occur independently of the proposed project. Therefore, this resource is not evaluated in this section.[161] The resource at 6000-6016 Avion Drive and 6020-6024 Avion Drive is further described below.

Table 4.2-1
Historical Resources on the Project Site

Property	Location	Year Built	NR	CR	LAHCM
6000-6016 and 6020-6024 Avion Drive (association with the Intermediate Terminal Facility)	On Project Site	1945 to 1947	Ineligible	Eligible	Eligible
Quonset hut at 6030 Avion Drive	On Project Site	1947	Eligible	Eligible	Eligible

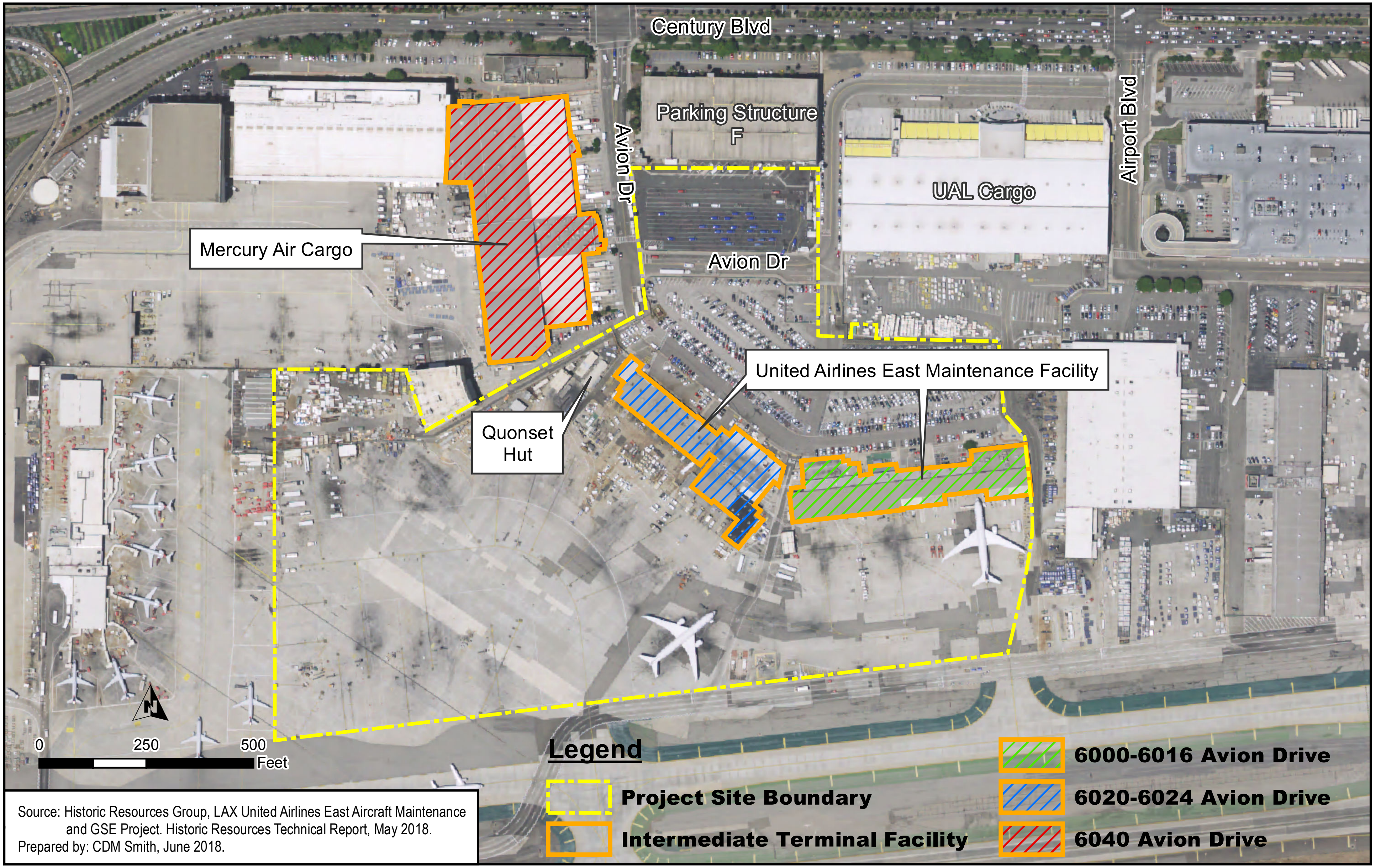
Source: Appendix C of this EIR.

Key:
NR = National Register of Historic Places.
CR = California Register of Historical Resources.
LAHCM = City of Los Angeles Historic-Cultural Monument.

161 A detailed description of the Quonset hut is provided in the LAX Preservation Plan.

Source: City of Los Angeles, Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements, Appendix S-G: Supplemental Section 106 Report, April 2004.
Prepared by: CDM Smith, January 2018.

LAX UAL East Aircraft Maintenance and GSE Project	Aerial View of LAX Intermediate Terminal Facility (1947)	Figure **4.2-1**



LAX UAL East Aircraft Maintenance and GSE Project

Historical Resources On and Adjacent to the Project Site

Figure 4.2-2

6000-6016 Avion Drive and 6020-6024 Avion Drive (1945 to 1947)

The project site is dominated by two maintenance, office, and hangar buildings located at 6000-6016, and 6020-6024 Avion Drive (see Figure 4.2-2 and **Figure 4.2-3**). 6000-6016 Avion Drive is a one- and two-story utilitarian building of steel and concrete construction. The building is irregular in plan with a flat roof. The primary north-facing façade exhibits a varied massing with projecting one- and two-story volumes. A double-door, fully glazed metal frame storefront provides the primary entrance. Fenestration is primarily metal-frame divided light hopper windows. Two loading bays with wood doors are also visible on the first floor. The south, airfield-facing portion of the building is of steel frame shed construction and contains a series of hangar bays open to the airfield. Alterations include a projecting metal-frame, glazed addition on the north façade and some replacement doors and windows.

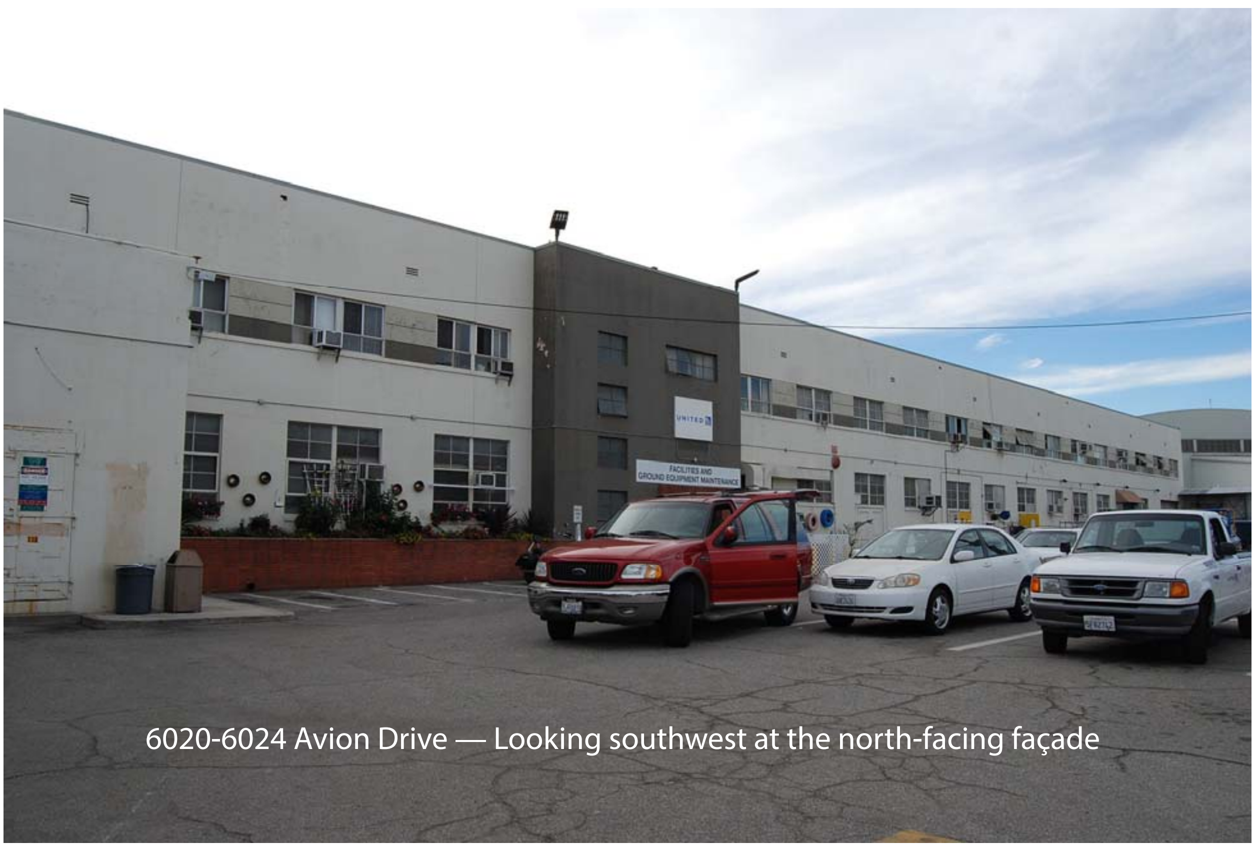
6020-6024 Avion Drive is a one- and two-story utilitarian building of steel and concrete construction. The building is irregular in plan with a flat roof. The primary north-facing façade is dominated by a two-story office volume featuring a recessed double-door entry. Fenestration is primarily metal-frame multi-light hopper windows. A single-story projecting volume with loading dock is attached at the building's eastern end. The south-facing façade contains a series of truck loading bays clad in corrugated steel. Alterations include red-brick decorative trim on the north façade, replacement doors and windows, and additions to the south façade.

6000-6016 and 6020-6024 Avion Drive, along with 6040 Avion Drive located west of the project site, are the last remaining buildings of the Intermediate Terminal Facility, constructed between 1945 and 1947 to temporarily house airport administration and airline offices, passenger terminals, hangars, and aircraft service facilities. The Intermediate Terminal Facility buildings lined Avion Drive, which looped around a central surface parking lot south of Century Boulevard. The facility originally consisted of four wood frame buildings, one housing the airport administration, weather service, and Civil Aeronautics Administration, and the other three serving as passenger terminals. Additional buildings were constructed by airlines for their own offices and hangars. The three surviving buildings are part of the latter group. Each originally consisted of two stories of airline administrative offices facing Avion Drive, with hangars behind.

Operation of the Intermediate Terminal Facility provided the transition of the airport from a small regional facility into the primary international airport for Southern California. The three surviving Intermediate Terminal Facility buildings represent an important milestone in the evolution of Los Angeles International Airport and its establishment as a viable concern. These buildings are, therefore, significant under National Register Criterion A, California Register Criterion 1, and LAHCM criteria for their association with events that have made a significant contribution to the broad patterns of Los Angeles history.

As noted above, only three buildings remain of the Intermediate Terminal Facility. One of these, the former Western Airlines facility at 6040 Avion Drive (located west of the project site), has been substantially altered by two large additions and alteration of the primary façade. This building no longer conveys the period during which the Intermediate Terminal Facility was active and, therefore, is not eligible for listing in the National Register or California Register, or for local designation as an LAHCM. The two other buildings, 6000-6016 and 6020-6024 Avion Drive (located within the project site), have also both undergone some alteration and do not retain sufficient integrity for listing in the National Register. However, resources lacking sufficient integrity for listing in the National Register may still be eligible for listing in the California Register. Although the two intact, surviving Intermediate Terminal Facility buildings at 6000-6016 and 6020-6024 Avion Drive do not retain sufficient integrity to be eligible for the National Register, both do retain most of their original massing, cladding, fenestration and entrance openings. Therefore, they retain sufficient integrity to be eligible for listing in the California Register and for designation as an LAHCM. Together, they are considered two component parts of a single historical resource, significant for its association with the Intermediate Terminal Facility period at LAX.

6000-6016 Avion Drive - Looking southeast at the north-facing façade



6020-6024 Avion Drive — Looking southwest at the north-facing façade

Source: Historic Resources Group, November 2017.
Prepared by: CDM Smith, March 2018.

4.2.4 Thresholds of Significance

A significant impact on historical resources would occur if the proposed project would result in:

- A substantial adverse change in the significance of an "historical resource" as defined by State CEQA Guidelines Section 15064.5(a). Substantial adverse change means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the National Register, California Register, and/or local register.

This threshold is derived from Appendix G of the State CEQA Guidelines.

In addition, the following thresholds related to historical resources from the L.A. CEQA Thresholds Guide are applicable to the proposed project:[162]

A project would normally have a significant impact on historical resources if it would result in a substantial adverse change in the significance of an historical resource. A substantial adverse change in significance would occur if the project would involve:

- Demolition of a significant resource;
- Relocation that does not maintain the integrity and [historical/architectural] significance of a significant resource;
- Conversion, rehabilitation, or alteration of a significant resource which does not conform to the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings; or
- Construction that reduces the integrity or significance of important resources on the site or in the vicinity.

4.2.5 Impacts Analysis

As discussed in Section 4.2.3.2 above, investigation of the project site identified two buildings at 6000-6016 and 6020-6024 Avion Drive that together appear eligible for listing in the California Register and for designation as an LAHCM. The project site also contains a Quonset hut at 6030 Avion Drive that is eligible for listing in the National Register and California Register and for designation as an LAHCM. As previously noted, the Quonset hut is planned for relocation to a different location on the airport by LAWA prior to, and independent of, the proposed project. The Quonset hut would, therefore, not be affected by the proposed project.

The proposed project would involve demolition of 6000-6016 and 6020-6024 Avion Drive, which together have been found to be eligible for listing in the California Register and for designation as an LAHCM. Demolition of 6000-6016 and 6020-6024 Avion Drive would result in a significant impact to an historical resource.

Demolition of an historical resource cannot be mitigated to a less-than-significant level. (Public Resources Code [PRC] Section 15126.4(b)(2)) However, pursuant to the PRC, documentation of an historical resource, by way of historic narrative, photographs, or architectural drawings, can serve to reduce the effect of demolition of the resources, even though such documentation will not mitigate the effects to a point where clearly no significant effect on the environment would occur. According to the California

162 City of Los Angeles, *L.A. CEQA Thresholds Guide, Your Resource for Preparing CEQA Analyses in Los Angeles*, 2006.

Office of Historic Preservation, "CEQA requires that all feasible mitigation be undertaken even if it does not mitigate below a level of significance. In this context, recordation serves a legitimate archival purpose." When data recovery is the only feasible mitigation, studies shall be deposited with the California Historical Resources Regional Information Center (CHRIS).

The LAX Preservation Plan specifies the procedures to be followed in the event of demolition of an historical resource. Specifically, demolition of a historic resource will require notification to OHR, including submittal of a documentation plan that fully documents the historic resource prior to demolition. OHR is required to review the documentation plan and submit any written comments within 15 working days from the date the documents are received. LAWA will comply with the procedures outlined in the adopted LAX Preservation Plan. Nevertheless, even with compliance with these procedures, the impact of the proposed project on historical resources would remain significant.

4.2.6 Cumulative Impacts

The cumulative impacts analysis evaluates the impacts of the project on historical resources in conjunction with other development projects at/adjacent to LAX, as listed in Table 3-1.

As noted in Section 4.2.5, the proposed project would result in a significant impact to an historical resource, 6000-6016 and 6020-6024 Avion Drive, by resulting in the demolition of the buildings. None of the cumulative projects listed in Table 3-1 is located in close proximity to the historical resource located at 6000-6016 and 6020-6024 Avion Drive (see Figure 3-1). Therefore, no cumulative impacts to this historical resource would occur.

Moreover, the proposed project would not have a direct or indirect impact on any other historical resources located in the general project area, such as the Theme Building, the 1961 ATCT, or the Terminal 6 Sign Tower. All of these resources are located within the LAX CTA, over one third of a mile east of the proposed project site, and separated from the project site by Sepulveda Boulevard and the ramps leading into and out of the CTA. Therefore, the proposed project would not contribute to any cumulative impacts to these resources.

4.2.7 Mitigation Measures

As indicated in Section 4.2.5, impacts of the proposed project on historical resources would be significant. No feasible mitigation measures are available to further reduce the impact to 6000-6016 and 6020-6024 Avion Drive beyond compliance with the LAX Preservation Plan.

4.2.8 Level of Significance After Mitigation

No feasible mitigation measures are available that would reduce impacts to 6000-6016 and 6020-6024 Avion Drive beyond compliance with the LAX Preservation Plan. Therefore, impacts to historical resources from the proposed project would be significant and unavoidable.

4.3 Greenhouse Gas Emissions

4.3.1 Introduction

This greenhouse gas (GHG) analysis examines GHG and global climate change (GCC) impacts that would result from construction and operational activities associated with the proposed project. This section describes applicable Federal, State, and local regulations that address GHG emissions and GCC in California and the City of Los Angeles; existing climate conditions and influences on GCC are also described. The analysis accounts for energy and resource conservation measures that have been incorporated into the proposed project, as well as pertinent State-mandated GHG emission reduction measures.[163] The analysis also assesses cumulative and project-related contributions to GCC that would result from the proposed project. Air quality effects associated with criteria pollutant (ambient air pollutant) emissions are discussed in Section 4.1, *Air Quality and Human Health Risk*, of this EIR. GHG emission calculations prepared for the proposed project are provided in Appendix B of this Draft EIR.

4.3.1.1 Global Climate Change

Briefly stated, GCC is a change in the average climatic conditions of the earth, as characterized by changes in wind patterns, storms, precipitation, and temperature. The baseline by which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. Many of the recent concerns over GCC use these data to extrapolate a level of statistical significance, specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change (IPCC) developed several emission projections of GHGs needed to stabilize global temperatures and climate change impacts. The IPCC predicted that the global mean temperature change from 2005 to 2100, given six ambient carbon dioxide (CO_2) scenarios, could range from 1.5 to 4.8 degrees Celsius (C). Regardless of analytical methodology, global average temperature and mean sea level are expected to rise under all scenarios.[164]

Climate models applied to California's conditions project that, under different scenarios, temperatures in California are expected to increase by 2.1 to 8.6 degrees Fahrenheit (F). Almost all climate scenarios include a continuing trend of warming through the end of the century given the substantial amounts of GHGs already released, and the difficulties associated with reducing emissions to a level that would stabilize the climate. According to the 2012 Report from the California Climate Change Center, the following climate change effects are predicted in California over the course of the next century.[165]

- A diminishing Sierra snowpack threatens the State's water supply, reduces generation of hydroelectric power, and increases the probability of wildfires along electrical transmission line corridors.
- Increasing temperatures, as noted above, of up to approximately 9 degrees F under the higher emission scenarios, leading to increases in the number of days when ozone pollution levels are exceeded in most urban areas.

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163 See Section 6.5, *Energy Impacts and Conservation*, in Chapter 6, *Other Environmental Considerations*, of this EIR for discussion of energy efficiency measures.

164 Intergovernmental Panel on Climate Change, *Climate Change 2014 – Mitigation of Climate Change, Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2014, p. 439. Available: http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter6.pdf.

165 California Climate Change Center, *Our Changing Climate 2012 - Vulnerability & Adaptation to the Increasing Risks from Climate Change in California*. Available: http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf.

- Coastal erosion along the length of California and sea water intrusion into the Sacramento-San Joaquin River Delta from rise in sea level. This would exacerbate flooding in already vulnerable regions.
- Increased vulnerability of forests due to pest infestation and increased temperatures.
- Increased challenges for the State's important agricultural industry from water shortages, increasing temperatures, and saltwater intrusion into the Sacramento-San Joaquin River Delta.
- Increased electricity demand, particularly in the hot summer months.

As such, temperature increases would lead to adverse environmental impacts in a wide variety of areas, including: sea level rise, reduced snowpack resulting in changes to existing water resources, increased risk of wildfires, and public health hazards associated with higher peak temperatures, heat waves, and decreased air quality.

4.3.1.2 Greenhouse Gases

Parts of the Earth's atmosphere act as an insulating blanket, trapping sufficient solar energy to keep the global average temperature in a suitable range. The blanket is a collection of atmospheric gases called GHGs. These gases – primarily water vapor, CO_2, methane (CH_4), nitrous oxide (N_2O), ozone, chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) – all act as effective global insulators, reflecting back to earth visible light and infrared radiation. Human activities, such as producing electricity and driving vehicles, have elevated the concentrations of these gases in the atmosphere. Many scientists believe that these elevated levels, in turn, are causing the earth's temperature to rise. A warmer earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Climate change is driven by "forcings" and "feedbacks." Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. A feedback is "an internal climate process that amplifies or dampens the climate response to a specific forcing."[166] The global warming potential (GWP) is "a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide" Individual GHG species have varying GWP and atmospheric lifetimes.[167] The carbon dioxide equivalent (CO_2e) – the mass emissions of an individual GHG multiplied by its GWP – is a consistent methodology for comparing GHG emissions because it normalizes various GHG emissions to a consistent metric. The reference gas for GWP is CO_2, which has a GWP of 1. Compared to CH_4's GWP of 25, CH_4 has a greater global warming effect than CO_2 on a molecule-per-molecule basis. **Table 4.3-1** identifies the GWP of several select GHGs.

In estimating GHG emissions, the *GHG Protocol Corporate Accounting and Reporting Standard* (GHG Protocol), developed by the World Business Council for Sustainable Development and World Resources Institute, provides standards and guidance for preparing a GHG emissions inventory.[168] The standard is written primarily from the perspective of a business developing a GHG inventory. The GHG Protocol provides the accounting framework for nearly every GHG standard and program in the world, from the International Standards Organization to the European Union Emissions Trading Scheme to The Climate Registry (Registry), as well as hundreds of GHG inventories prepared by individual companies.

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166 National Research Council of the National Academies, *Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties*, 2005.

167 U.S. Environmental Protection Agency, *Glossary of Climate Change Terms.* Available: https://19january2017snapshot.epa.gov/climatechange/glossary-climate-change-terms_.html, accessed November 21, 2017.

168 World Business Council for Sustainable Development and World Resources Institute, *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition*, March 2004. Available: http://ghgprotocol.org/sites/default/files/ghgp/standards/ghg-protocol-revised.pdf.

Table 4.3-1 Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases		
Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100 Year Time Horizon)
Carbon Dioxide	50-200	1
Methane	15	25
Nitrous Oxide	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Perfluromethane (CF_4)	50,000	7,390
PFC: Perfluroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland, 2007: *Changes in Atmospheric Constituents and in Radiative Forcing*. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.[169]

Prepared By: CDM Smith, March 2018.

The GHG Protocol divides GHG emissions into three source types of "scopes," ranging from GHGs produced directly by the business to more indirect sources of GHG emissions, such as employee travel and commuting. Direct and indirect emissions can be generally separated into three broad scopes as follows:

- Scope 1. All direct GHG emissions.
- Scope 2. Indirect GHG emissions from consumption of purchased electricity, heat, or steam (i.e., GHG emissions generated at the power plant that provides electricity at the demand of the site/facility).
- Scope 3. Other indirect (optional) GHG emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, and construction.

The Airports Council International (ACI) has an Airport Carbon Accreditation (ACA) program that evaluates an airport's GHG emissions according to similar principles.

4.3.2 Methodology

The assumptions used to estimate GHG emissions from construction and operational sources are the same as those discussed in Section 4.1, *Air Quality and Human Health Risk* (see Section 4.1.1.2, *Methodology* for the air quality analysis). The discussion below provides a description of methodology elements that are specific to analyzing GHG emissions.

GHG impacts are treated as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective. In its notice of proposed amendments to the CEQA Guidelines

169 Global Warming Potential values have been updated in IPCC's subsequent assessment report, the Fifth Assessment Report. However, in accordance with international and U.S. convention to maintain the value of the carbon dioxide "currency," GHG emission inventories are calculated using the GWPs from the IPCC Fourth Assessment Report.

pertaining to GHG, the California Natural Resources Agency (CNRA) noted that the impacts of GHG emissions should be considered in the context of a cumulative impact, rather than a project impact. The public notice states:

> "While the Proposed Amendments do not foreclose the possibility that a single project may result in greenhouse gas emissions with a direct impact on the environment, the evidence before [CNRA] indicates that in most cases, the impact will be cumulative. Therefore, the Proposed Amendments emphasize that the analysis of greenhouse gas emissions should center on whether a project's incremental contribution of greenhouse gas emissions is cumulatively considerable."[170]

It is the accumulation of GHGs in the atmosphere that may result in global climate change. Climate change impacts are cumulative in nature, and thus no typical single project would result in emission of such a magnitude that it, in and of itself, would be significant on a project basis. A typical single project's GHG emission will be small relative to total global or even statewide GHG emissions. Thus, the analysis of significance of potential impacts from GHG emissions related to a single project is already representative of the long-term impacts on a cumulative basis. As such, the assessment of significance is based on a determination of whether the GHG emissions from the proposed project represent a cumulatively considerable contribution to GCC impacts.

A number of methodologies and significance thresholds have been proposed to analyze the impacts of GHG emissions on GCC. However, at the time of this analysis, no definitive thresholds or methodologies that are applicable to the proposed project have been formally adopted for determining the significance of the project's cumulative contribution to GCC in CEQA documents.

Various guidance documents, such as The Climate Registry General Reporting Protocol (version 2.1, January 2016);[171] the joint California Air Resources Board (CARB), California Climate Action Registry (CCAR), and International Council for Local Environmental Initiatives (ICLEI) Local Government Operations Protocol (LGOP) (version 1.1, May 2010);[172] the Association of Environmental Professionals (AEP) Community-wide GHG Emissions Protocol;[173] and the ACI ACA program propose generally consistent methodologies for preparing GHG inventories.[174] These methodologies were developed for varying purposes, and not specifically for CEQA. Relying on these guidance documents, this analysis addresses both direct and indirect GHG emissions, which are defined as follows:

- Direct Emissions: Direct sources of GHG emissions from the proposed project include on-airport stationary sources, including heating/cooling; operational changes to surface traffic activity and surface traffic flows within the airport area; construction and operation equipment; construction haul trips; and construction worker commute trips.
- Indirect Emissions: Indirect sources of GHG emissions related to the proposed project include the consumption of purchased electricity, solid waste disposal, water usage, and wastewater treatment.

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170 California Natural Resources Agency, *Notice of Public Hearings and Notice of Proposed Amendment of Regulations Implementing the California Environmental Quality Act*, 2009.

171 The Climate Registry, *General Reporting Protocol, version 2.1*, January 2016. Available: https://www.theclimateregistry.org/tools-resources/reporting-protocols/general-reporting-protocol/.

172 California Air Resources Board, *Local Government Operations Protocol, Version 1.1.* Available: https://www.arb.ca.gov/cc/protocols/localgov/pubs/lgo_protocol_v1_1_2010-05-03.pdf.

173 Association of Environmental Professionals (AEP), *Forecasting Community-Wide Greenhouse Gas Emissions and Setting Reduction Targets*, Draft: May 2012. Available: https://www.califaep.org/images/climate-change/Forecasting_and_Target_Setting.pdf .

174 Airport Carbon Accreditation, *Greenhouse Gas Protocol.* Available: http://www.airportcarbonaccredited.org/airport/4-levels-of-accreditation/ghg-protocol.html.

CARB believes that consideration of so-called indirect emissions provides a more complete picture of the GHG footprint of a facility: "As facilities consider changes that would affect their emissions – addition of a cogeneration unit to boost overall efficiency even as it increases direct emissions, for example – the relative impact on total (direct plus indirect) emissions by the facility should be monitored. Annually reported indirect energy usage also aids the conservation awareness of the facility and provides information" to CARB to be considered for future strategies by the industrial sector.[175] For these reasons, CARB requires the calculation of direct and indirect GHG emissions as part of the Assembly Bill (AB 32) reporting requirements. Additionally, the Governor's Office of Planning and Research (OPR) guidance for lead agencies conducting GCC analyses in CEQA documents indicates that lead agencies should "make a good-faith effort, based on available information, to calculate, model, or estimate … GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities."[176] Therefore, direct and indirect emissions have been calculated for the proposed project. Because potential impacts from GHG emissions are long-term, GHG emissions are calculated on an annual basis.

The analysis considers only those GHG emissions resulting from the proposed project that would lead to a net change (increase or decrease) in incremental emissions compared to future conditions without the proposed project. The proposed project would not change the number of airline passengers traveling to/through the airport, or the number of aircraft operations. The only notable change in aircraft operations associated with the proposed project would be the change in the routes and distances of aircraft that are taxiing or being towed on the ground between the passenger terminal gates and the aircraft maintenance areas. Consolidation of UAL's west hangar maintenance operations into the east hangar complex would reduce aircraft taxiing/towing distances and, consequently, would reduce GHG emissions, as compared to those under baseline conditions. Operational stationary sources, including natural gas boilers and water heaters, a diesel-operated emergency generator, and a maintenance-related spray booth, would be installed as part of the proposed project. These sources would replace existing equipment and would service similar capacities to existing sources. UAL operates a Title V facility at LAX; therefore, the replacement equipment would be subject to review and approval by the South Coast Air Quality Management District (SCAQMD) under new source review and other regulations. Where required, the project equipment would meet Best Available Control Technology (BACT). Thus, GHG emissions from new stationary operational sources would be the same as, or lower than, emissions under baseline conditions.

As described in Chapter 2, *Project Description*, the proposed project would be designed as a "Pad-of-the-Future," with dual 400 hertz (Hz) electric power for all aircraft parking positions, either through stationary or portable ground power units (GPUs), stationary or portable pre-conditioned air (PCA) units, and electrification of GSE maintenance activities. Although the proposed project would provide infrastructure for electric equipment, the GSE fleet would not change as a result of the proposed project. The portable GPUs and PCA units to be used at the facility would include existing diesel, gasoline, and electric-powered units.

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175 California Environmental Protection Agency, Air Resources Board, Planning and Technical Support Division Emission Inventory Branch, *Staff Report: Initial Statement of Reasons for Rulemaking, Proposed Regulation for Mandatory Reporting of Greenhouse Gas Emissions Pursuant to the California Global Warming Solutions Act of 2006 (Assembly Bill 32)*, October 19, 2007.

176 State of California, Office of Planning and Research, Technical Advisory, CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review, June 19, 2008, p. 5. Available: http://opr.ca.gov/docs/june08-ceqa.pdf.

4.3.2.1 Construction

GHG emissions associated with construction of the proposed project were calculated based on methodologies provided in The Climate Registry *General Reporting Protocol* (GRP) Version 2.1.[177] The GRP is the guidance document that LAWA and other members of The Climate Registry must use to prepare annual GHG inventories for the Registry. Therefore, for consistency, the GRP also was used in this impact analysis. However, to adapt the GRP for CEQA purposes, the following refinement to the GRP operational and geographical boundaries was necessary. The GRP requires all direct and indirect emissions owned or controlled by the reporting entity to be reported; under CEQA, only emission sources that would materially change as part of the proposed project in a manner and to an extent that may result in a significant impact on the environment are required to be analyzed. Indirect emissions associated with construction activities, such as related to purchased electricity, solid waste disposal, water usage, and wastewater disposal, would be speculative and negligible compared to the direct emissions. Analysis of these indirect emissions would not alter the significance conclusions reached in this analysis, and would not increase the severity of a significant impact. Therefore, these emissions, which would normally be included in an inventory prepared pursuant to the GRP for purposes of The Climate Registry, were not included in this analysis.

In accordance with guidance from SCAQMD, GHG emissions from construction have been amortized over the 30-year lifetime of the proposed project to enable comparison to SCAQMD and City of Los Angeles CEQA thresholds of significance (i.e., total construction GHG emissions were divided by 30) and then added to annual operational emissions estimated to occur with project implementation.[178]

The proposed project construction-related sources for which GHG emissions were calculated include:

- Off-road construction equipment;
- On-road equipment and delivery/haul trucks;
- Construction worker trips;
- Incremental operational worker trips during construction; and
- Increased aircraft GPU usage during construction.

A description of the off-road construction equipment, on-road construction equipment, delivery/haul truck trips, and construction worker trips associated with construction of the proposed project is provided in Section 4.1, *Air Quality and Human Health Risk,* Section 4.1.1.2. The parameters used to develop construction GHG emissions for these sources, including construction schedule, equipment usage, and load factors, are the same as those outlined for the construction criteria air pollutant emissions analysis, and are also presented in Section 4.1.1.2, with supporting information presented in Appendix B.1 of this Draft EIR. With respect to incremental operational worker trips during construction, as described in Section 4.1, during construction, some of the activities that currently occur at the East Maintenance Facility, including administration and GSE maintenance, would be conducted at the West Maintenance Facility. Employees whose work would be conducted at the West Maintenance Facility during construction would park in existing UAL parking lots at the West Maintenance Facility. The majority of employees at LAX live in areas that are located east of the airport.[179] Therefore, the relocation of maintenance activities to the west side of the airport would increase vehicle miles traveled (VMT) by maintenance employees from their places of residence to the worksite during construction. Also, as described in Section 4.1, some

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177 The Climate Registry, *General Reporting Protocol, Version 2.1*, January 2016. Available: https://www.theclimateregistry.org/tools-resources/reporting-protocols/general-reporting-protocol/.

178 South Coast Air Quality Management District, *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*, October 2008, p. 3-9.

179 Los Angeles World Airports Security Badge Office, 2015.

of the existing electrified aircraft parking spaces at the East Maintenance Facility would be unavailable during construction. Aircraft that previously would have used these electrified aircraft parking spaces would use diesel GPUs instead. As a result, off-road GPU activity is expected to temporarily increase during construction. The methodologies and assumptions pertaining to the increase in portable GPUs during construction are described in Section 4.1.

4.3.2.2 Operations

As indicated above, the only anticipated change in aircraft operations associated with implementation of the proposed project is the reduction in aircraft taxiing/towing distances between the passenger terminal gates and the maintenance hangar area. This change, in turn, would result in a reduction in overall GHG emissions. Similarly, overall building square footage related to UAL's operations would be reduced as a result of the project, thus operational GHG emissions associated with electrical demand for heating/cooling and lighting of the UAL maintenance building area would also decrease (see Chapter 6, *Other Environmental Considerations*, of this EIR).[180] The proposed project would also be designed and constructed in accordance with LAWA's Sustainable Design and Construction Policy, which requires that the new building be designed to achieve the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Silver certification, which would reduce energy demands compared with the existing facility.

As mentioned above and discussed in Section 4.1, *Air Quality and Human Health Risk*, stationary sources being replaced as part of the proposed project would service a similar capacity as existing sources and be subject to BACT, resulting in operational GHG emissions that would be similar to, or less than, existing conditions.[181]

During project operations, all employees would be located at the East Maintenance Facility. This would involve relocation of employees who currently work at the West Maintenance Facility. As noted above, the majority of employees at LAX live in areas that are located east of the airport. Therefore, the consolidation of maintenance activities on the east side of the airport would reduce VMT by maintenance employees from their places of residence to the worksite. In addition, consolidation of UAL's maintenance activities into a single facility would eliminate vehicle trips between the two maintenance facilities that occur under baseline conditions. These reductions in VMT would result in reduced GHG emissions, which would be a beneficial impact of the proposed project.[182]

4.3.3 Existing Conditions

4.3.3.1 Regulatory Setting

4.3.3.1.1 International Plans and Policies

International Governmental Panel on Climate Change

In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess "the scientific, technical and socioeconomic information relevant to understanding the scientific basis of

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180 The expected reduction in GHG emissions associated with the reduction in building area was not quantified in the analysis; no credit is taken for this reduction. Potential impacts associated with the combined energy consumption from proposed improvements to the East Maintenance Facility, in conjunction with the reasonably foreseeable future use of the West Maintenance Facility, are addressed in the discussion of cumulative energy impacts in Chapter 6, *Other Environmental Considerations*, of this EIR.

181 The expected reduction in GHG emissions associated with operational stationary sources was not quantified in the analysis; no credit is taken for this reduction.

182 The reduction in GHG emissions associated with the reduced VMT associated with worker trips and trips between the two existing maintenance facilities was not quantified in the analysis; no credit is taken for this reduction.

risk of human-induced climate change, its potential impacts, and options for adaption and mitigation." Since its inception, the IPCC has delivered five comprehensive scientific reports about climate change, with the latest (the Fifth Assessment Report) released in four parts between September 2013 and November 2014.[183]

United Nations Framework Convention on Climate Change

On March 21, 1994, the U.S. joined other countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.[184]

Kyoto Protocol

The Kyoto Protocol is a treaty made under the UNFCCC. More than 160 countries, accounting for 55 percent of global emissions, have signed the protocol, under which they commit to reduce their emissions of GHGs or engage in emissions trading. The U.S. symbolically signed the Kyoto Protocol in 1998, however, the U.S. Senate has not ratified the protocol. The original GHG reduction commitments made under the Kyoto Protocol expired at the end of 2012. An extension of the commitment period to December 31, 2020 was agreed to at the Doha, Qatar, meeting held December 8, 2012.[185]

Paris Agreement

Negotiations held to discuss measures to be taken after the end of the Kyoto Protocol commitment period resulted in the 2015 adoption of the Paris Agreement.[186] The U.S. formally entered the Paris Agreement in September 2016 through an executive order, however, the agreement was not submitted to Congress for approval. In June 2017, the U.S. announced its intent to withdraw from the agreement. The earliest effective date of a withdrawal by the U.S. is November 2020.

4.3.3.1.2 Federal Plans, Policies, and Regulations

USEPA Endangerment Findings

In 2010, the U.S. Environmental Protection Agency (USEPA) adopted an endangerment finding for GHGs under Clean Air Act (CAA) Section 202(a) under which the Administrator determined that (1) six GHGs, taken in combination, endanger both the public health and welfare of current and future generations, and (2) the combined emissions of GHGs from new motor vehicles contribute to this GHG air pollution.[187] These findings themselves did not impose any requirements on industry or other entities. However, this

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183 Intergovernmental Panel on Climate Change, History. Available: https://www.ipcc.ch/organization/organization_history.shtml, accessed November 8, 2017.

184 United Nations, *United Nations Framework Convention on Climate Change,* 1992. Available: https://unfccc.int/resource/docs/convkp/conveng.pdf, accessed November 21, 2017.

185 United Nations, *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. Available: http://unfccc.int/kyoto_protocol/items/2830.php, accessed November 21, 2017.

186 United Nations, *Paris Agreement*, 2015. Available: http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf; United Nations, *Framework Convention on Climate Change - Adoption of the Paris Agreement*, December 12, 2015. Available: https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf.

187 U.S. Environmental Protection Agency, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, Final Rule*, Federal Register, Vol. 74, No. 239, December 15, 2009, pp. 66496 - 66546. Available: https://www.epa.gov/sites/production/files/2016-08/documents/federal_register-epa-hq-oar-2009-0171-dec.15-09.pdf.

action was a prerequisite for implementing GHG emissions standards for vehicles. On July 25, 2016, USEPA finalized the first steps toward addressing GHG emissions from aircraft engines by determining that GHGs emitted from certain classes of engines used in certain aircraft contribute to the air pollution that endangers public health and welfare.[188] USEPA has not proposed rules for aircraft engine GHG emissions standards.

GHG and Fuel Efficiency Standards for Passengers Cars and Light-Duty Trucks

In April 2010, the USEPA and National Highway Traffic Safety Administration (NHTSA) finalized GHG standards for new (model year 2012 through 2016) passenger cars, light-duty trucks, and medium-duty passenger vehicles that would decrease CO_2 emission limits for a combined fleet of cars and light trucks. If all of the necessary emission reductions were made from fuel economy improvements, the standards would correspond to a combined fuel economy of 30.1 miles per gallon (mpg) in 2012 and 35.5 mpg in 2016.[189] The agencies issued a joint Final Rule for a coordinated National Program for model years 2017 to 2025 light-duty vehicles on August 28, 2012, that would correspond to a combined fuel economy of 36.6 mpg in 2017 and 54.5 mpg in 2025.

GHG and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles

In October 2010, the USEPA and NHTSA announced a program to reduce GHG emissions and to improve fuel efficiency for medium- and heavy-duty-vehicles (model years 2014 through 2018). These standards were signed into law on August 9, 2011.[190] In October 2016, USEPA and NHTSA adopted Phase 2 GHG and fuel efficiency standards for medium- and heavy-duty engines and vehicles. The standards are expected to lower CO_2 emissions by approximately 1.1 billion metric tons and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program.[191]

Fuel Efficiency Standards for Construction Equipment

The federal government sets fuel efficiency standards for nonroad diesel engines that are used in construction equipment. The regulations, contained in 40 CFR Parts 1039, 1065, and 1068, include multiple tiers of emission standards. Most recently, EPA adopted a comprehensive national program to reduce emissions from nonroad diesel engines by integrating engine and fuel controls as a system to gain the greatest emission reductions. To meet these Tier 4 emission standards, engine manufacturers will produce new engines with advanced emission control technologies.[192]

4.3.3.1.3 State Plans, Policies, and Regulations

The legal framework for GHG emission reduction in California has come about through Executive Orders, legislation, and regulation. The major components of California's climate change initiatives are reviewed below.

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188 U.S. Environmental Protection Agency, Regulatory Announcement, *EPA Finalizes First Steps to Address Greenhouse Gas Emissions from Aircraft Engines*, July 2016. Available: https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100P1UN.TXT.

189 U.S. Environmental Protection Agency, *Regulatory Announcement: EPA and NHTSA Finalize Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks*, April 2010. Available: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100AKHW.PDF?Dockey=P100AKHW.PDF.

190 U.S. Environmental Protection Agency, Regulatory Announcement, *EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles*, August 2011. Available: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100BOT1.PDF?Dockey=P100BOT1.PDF.

191 U.S. Environmental Protection Agency, *Final Rule for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2*. Available: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-greenhouse-gas-emissions-and-fuel-efficiency#rule-history, accessed March 1, 2018.

192 U.S. Environmental Protection Agency, *Regulations for Emissions from Vehicles and Engines-Regulations for Emissions from Heavy Equipment with Compression-Ignition (Diesel) Engines*. Available: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-heavy-equipment-compression, accessed April 18, 2018.

California Environmental Quality Act (CEQA)

CEQA requires lead agencies to consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval. GHG emissions have the potential to adversely affect the environment because they contribute to global climate change. In turn, global climate change has the potential to raise sea levels, affect rainfall and snowfall, and affect habitat.

Senate Bill (SB) 97, enacted in August 2007, requires OPR to prepare guidelines to submit to the CNRA regarding feasible mitigation of GHG emissions or the effects of GHG emissions as required by CEQA.[193] The CNRA adopted amendments to the State CEQA Guidelines addressing GHG emissions on December 30, 2009. The amendments became effective on March 18, 2010. The guidelines are reflected in this EIR.

The significance of GHG emissions are specifically addressed in State CEQA Guidelines Section 15064.4. Section 15064.4 calls for a lead agency to make a "good-faith effort" to "describe, calculate or estimate" GHG emissions in CEQA environmental documents. Section 15064.4 further states that the analysis of GHG impacts should include consideration of (1) the extent to which the project may increase or reduce GHG emissions; (2) whether the project emissions would exceed a locally applicable threshold of significance; and (3) the extent to which the project would comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions." The guidelines also state that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program (including plans or regulations for the reduction of GHG emissions) that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (State CEQA Guidelines Section 15064(h)(3)). The State CEQA Guidelines do not, however, set a numerical threshold of significance for GHG emissions.

Title 24 Energy Standards

Although not originally intended to reduce GHG emissions, California's Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. The latest amendments were made in June 2015 and went into effect on January 1, 2017. The premise for the standards is that energy efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and onsite fuel combustion (for example, for water heating or from the use of onsite generators) result in GHG emissions. Therefore, increased energy efficiency in buildings results in fewer GHG emissions on a building-by-building basis.

Green Building Standards

The 2013 California Green Building Standards Code (24 CCR Part 11; also referred to as CALGreen) took effect January 1, 2014.[194] The Green Building Standards, as updated (2016), require that every new building constructed in California reduce water consumption by 20 percent, divert 50 percent of construction waste from landfills, and install low-pollutant-emitting materials. They also require separate water meters for nonresidential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects and mandatory inspections of energy systems (e.g., heat furnace, air conditioner, and mechanical equipment) for nonresidential buildings larger

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193 California Senate Bill 97, Chapter 185, Statutes of 2007.

194 24 California Code of Regulations, Part 11, California Building Standards Commission, *2016 California Green Building Standards Code (CALGreen)*.

than 10,000 square feet to ensure that all are working at their maximum capacity and according to their design efficiencies.

Executive Order S-3-05

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets for all of California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.[195]

Executive Order B-30-15

In 2015, California Governor Edmund G. Brown issued Executive Order B-30-15 to establish a California GHG emissions reduction target of 40 percent below 1990 levels by 2030.[196]

California Assembly Bill 32

Assembly Bill 32 (AB 32), titled the California Global Warming Solutions Act of 2006 (Pavley) and signed by Governor Schwarzenegger in September 2006, required CARB to adopt regulations to require the reporting and verification of Statewide GHG emissions and to monitor and enforce compliance with the program.[197] In general, the bill required CARB to reduce Statewide GHG emissions to the equivalent of those in 1990 by 2020. CARB adopted regulations in December 2007 for mandatory GHG emissions reporting. In December 2008, CARB approved the AB 32 Climate Change Scoping Plan (Scoping Plan) outlining the state's strategy to achieve the 2020 GHG emissions limit. The Scoping Plan proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California's energy sources, save energy, create new jobs, and enhance public health. On August 24, 2011, the Scoping Plan was re-approved by CARB, including the final supplement to its functional equivalent document, as required by CEQA. The First Update to the Scoping Plan, which will guide the continued development and implementation of the state's efforts to fight climate change, was approved by CARB on May 22, 2014.

Part of the Scoping Plan includes an economy-wide cap-and-trade program, which sets a statewide limit on sources responsible for 85 percent of California's GHG emissions, and established a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The program is designed to provide covered entities the flexibility to seek out and implement the lowest-cost options to reduce emissions. The final cap-and-trade plan was approved on October 21, 2011 and went into effect on January 1, 2013.

In late 2017, CARB adopted an update to the Scoping Plan to reflect the Executive Order B-30-15 GHG reduction target of 40 percent below 1990 levels by 2030, a target also identified in SB 32, described below.[198]

California Senate Bill 32

Senate Bill 32 (SB 32), which extends the California Global Warming Solutions Act of 2006 (AB 32) beyond 2020, was approved in the 2015/2016 legislative session and approved by the Governor on September 8, 2016.[199] SB 32 requires CARB to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions to ensure that statewide greenhouse

195 California Executive Order S-3-05, June 1, 2005.
196 California Executive Order B-30-15, April 29, 2015.
197 California Assembly Bill 32, Chapter 488, Statutes of 2006.
198 California Air Resources Board, *California's 2017 Climate Change Scoping Plan*. Available: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf, accessed on April 2, 2018 .
199 California Senate Bill 32, Chapter 249, Statutes of 2016.

gas emissions are reduced to at least 40 percent below the 1990 statewide greenhouse gas emissions limit no later than December 31, 2030, the target established by Executive Order B-30-15. CARB recently adopted a strategy for achieving this goal, which takes into account the key programs associated with implementation of the AB 32 Scoping Plan--such as GHG reduction programs for cars, trucks, fuels, industry, and electrical generation--and builds upon, in particular, existing programs related to the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; much cleaner cars, trucks, and freight movement; power generation for the State using cleaner renewable energy; and strategies to reduce methane emissions from agricultural and other wastes by using it to meet the State's energy needs. The 2017 Scoping Plan also addresses, for the first time, GHG emissions from natural and working lands, including the agriculture and forestry sectors.[200]

California Senate Bill 375

Under Senate Bill 375 (SB 375), the Sustainable Communities and Climate Protection Act of 2008, each metropolitan planning organization (MPO) in the state is required to develop Sustainable Community Strategies through integrated land use and transportation planning and to attain per capita GHG reduction targets for passenger vehicles set by CARB by 2020 and 2035.[201] CARB issued an 8 percent per capita reduction target for the Southern California Association of Governments (SCAG) region for 2020 and a target of 13 percent per capita reduction by 2035. SCAG adopted the latest Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) for the six-county Southern California region on April 7, 2016, as described below.[202]

California Assembly Bill 1493

Enacted on July 22, 2002, Assembly Bill 1493 (AB 1493), commonly known as the Pavley law (named for then-Assembly Member Fran Pavley, who sponsored the bill), required CARB to develop and adopt regulations that will lead to a reduction in GHGs emitted by passenger vehicles and light-duty trucks. Subsequent regulations adopted by CARB, often referred to as the Pavley regulations, apply to 2009 through 2016 vehicles. CARB estimated that the regulations would reduce GHG emissions from the light-duty and passenger vehicle fleet by 18 percent in 2020 and by 27 percent in 2030, compared to recent years.[203] In 2011, the U.S. Department of Transportation, USEPA, and California announced a single timeframe for proposing fuel and economy standards, thereby aligning the Pavley regulations with the federal standards for passenger cars and light-duty trucks.[204] Emission estimates included in this analysis account for the Pavley standards.

California Advanced Clean Cars Program

In January 2012, CARB approved a new emissions-control program for vehicles of model years 2017 through 2025. The program combines the control of smog, soot, and GHG into a single package of standards referred to as the Advanced Clean Cars program (13 CCR §1962.1 and 1962.2). The Advanced Clean Cars requirements include new GHG standards for model year 2017 to 2025 vehicles. The Advanced

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200 California Air Resources Board, California's 2017 Climate Change Scoping Plan, https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf, accessed on April 2, 2018.

201 California Senate Bill 375, Chapter 728, Statutes of 2008.

202 Southern California Association of Governments, *Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life*, adopted April 7, 2016. Available: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.

203 California Air Resources Board, *Fact Sheet: Climate Change Emission Control Regulations*, December 10, 2004. Available: https://www.arb.ca.gov/cc/ccms/factsheets/cc_newfs.pdf.

204 U.S. Department of Transportation, *EPA, DOT and California Align Timeframe for Proposing Standards for Next Generation of Clean Cars*, January 21, 2011. Available: https://www.transportation.gov/briefing-room/epa-dot-and-california-align-timeframe-proposing-standards-next-generation-clean-cars.

Clean Cars Program also includes amendments to the low emission vehicle (LEV) amendments (referred to as the LEV III regulations; 13 CCR §1900 et seq.), zero emission vehicle (ZEV) regulations, and the Clean Fuels Outlet Regulation. The LEV III regulations are aimed at reducing criteria pollutant and GHG emissions from light- and medium-duty vehicles. The ZEV regulation requires manufacturers to produce an increasing number of the very cleanest cars available, including battery electric, fuel cell, and plug-in hybrid electric vehicles. The Clean Fuels Outlet regulation is designed to ensure that fuels such as electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to market.[205,206]

Executive Order S-01-07 and the Low Carbon Fuel Standard

California Executive Order S-01-07 established a statewide goal to reduce the carbon intensity of transportation fuels sold in California by at least 10 percent by 2020 from 2005 levels. The Executive Order also mandated the creation of Low Carbon Fuel Standard (LCFS) for transportation fuels. The LCFS requires that the lifecycle GHG emissions for the mix of fuels sold in California decline on average. Each fuel provider may meet the standard by selling fuel with lower carbon content, using previously banked credits from selling fuel that exceeded the LCFS, or purchasing credit from other fuel providers who have earned credits.[207]

Renewable Portfolio Standard

Senate Bill 1078 (SB 1078; Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, the Governor signed Executive Order S-14-08, which expands the State's Renewable (Energy) Portfolio Standard (RPS) to 33 percent renewable power by 2020. On September 15, 2009, the Governor issued Executive Order S-21-0911 requiring CARB, under its AB 32 authority, to adopt regulations to meet a 33 percent RPS target by 2020. The CARB regulations use a phased-in or tiered requirement to increase the amount of electricity from eligible renewable sources over an eight-year period beginning in 2012. CARB adopted the regulations in September 2010.

In March 2011, the Legislature passed Senate Bill XI-2 (SB XI-2), which was signed into law by the Governor the following month. SB XI-2 requires utilities to procure renewable energy products equal to 33 percent of retail sales by December 31, 2020, and also established interim targets: 20 percent by December 31, 2013, and 25 percent by December 31, 2016. According to the Los Angeles Department of Water and Power (LADWP), the utility provider for the City of Los Angeles, LADWP achieved the 25 percent renewable energy milestone in 2016.[208] Senate Bill SB 350 of 2015 (Chapter 547, Statutes of 2015) increased the renewable portfolio standard to 50 percent by the year 2030.

4.3.3.1.4 Regional Plans, Policies, and Regulations

Regional Transportation Plan/Sustainable Communities Strategy

In accordance with Senate Bill 375, described above, SCAG developed a Sustainable Communities Strategy to reduce per capita GHG emissions within its jurisdiction. SCAG adopted the 2012-2035 RTP/SCS on April 4, 2012. The RTP/SCS included an extensive list of individual transportation projects that aim to

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205 California Air Resources Board, *Advanced Clean Cars Program Homepage*, page last reviewed January 18, 2017. Available: https://www.arb.ca.gov/msprog/acc/acc.htm.

206 California Air Resources Board, *News Release: California Air Resources Board Approves Advanced Clean Car Rules*, January 27, 2012.

207 17 California Code of Regulations, Section 95480 et seq., *Low Carbon Fuel Standard*.

208 City of Los Angeles, Los Angeles Department of Water and Power, *LADWP Achieves 25 Percent Renewable Energy Milestone*, undated. Available: http://www.ladwpnews.com/ladwp-achieves-25-percent-renewable-energy-milestone-2/.

improve the region's mobility and air quality and revitalize the economy. Following adoption of the RTP/SCS, subsequent amendments of the project list were approved on June 6, 2013 and September 11, 2014. The 2012-2035 RTP/SCS aimed to reduce emissions from transportation sources to comply with SB 375 and meet SB 375 regional GHG emission reduction targets for light duty vehicles, improve public health, and reduce air emissions. On April 7, 2016, SCAG's Regional Council adopted the 2016-2040 RTP/SCS, with subsequent amendments of the project list on April 6, 2017 and July 6, 2017. The 2016-2040 RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The Plan charts a course for closely integrating land use and transportation. It outlines more than $556.5 billion in transportation system investments through 2040.[209,210]

4.3.3.1.5 Local Plans, Policies, and Regulations

Green LA

In May 2007, the City of Los Angeles introduced *Green LA - An Action Plan to Lead the Nation in Fighting Global Warming* (Green LA).[211] Aimed at reducing the City's GHG emissions by 35 percent below 1990 levels by 2030, the plan calls for an increase in the City's use of renewable energy to 35 percent by 2020 in combination with promoting water conservation, improving the transportation system, reducing waste generation, greening the ports and airports, creating more parks and open space, and greening the economic sector. Green LA identifies objectives and actions in various focus areas, including airports. The goal for Los Angeles' airports is to "green the airports," and the following actions are identified: (1) fully implement the Sustainability Performance Improvement Management System (discussed below); (2) develop and implement policies to meet the USCGB'sLEED® green building program rating standards in future construction; (3) improve recycling, increase use of alternative fuel sources, increase use of recycled water, increase water conservation, reduce energy needs, and reduce GHG emissions; and (4) evaluate options to reduce aircraft-related GHG emissions.

ClimateLA

In 2008, the City of Los Angeles followed up Green LA with an implementation plan called *ClimateLA – Municipal Program Implementing the Green LA Climate Action Plan* (ClimateLA).[212] A Departmental Action Plan for LAWA is included in ClimateLA, which identifies goals to reduce CO_2 emissions 35 percent below 1990 levels by 2030 at LAX and Van Nuys Airport (also owned and operated by LAWA), implement sustainability practices, and develop programs to reduce the generation of waste and pollutants. Actions are specified in the areas of aircraft operations, ground vehicles, buildings and facilities, and construction.

Executive Directive No. 10

As part of the City's efforts to reduce GHG emissions and promote long-term sustainability, in July 2007, Mayor Antonio Villaraigosa issued Executive Directive No. 10 regarding environmental stewardship practices.[213] Consistent with the goal specified in Green LA to make the City of Los Angeles a worldwide

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[209] Southern California Association of Governments, *Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life*, adopted April 7, 2016. Available: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.

[210] Southern California Association of Governments, *2016-2040 RTP/SCS - 2016 RTP/SCS Amendments*. Available: http://scagrtpscs.net/Pages/2016RTPSCSAmendments.aspx; accessed April 19, 2018.

[211] City of Los Angeles, *Green LA - An Action Plan to Lead the Nation in Fighting Global Warming*, May 2007. Available: http://environmentla.org/pdf/GreenLA_CAP_2007.pdf.

[212] City of Los Angeles, ClimateLA - Municipal Program Implementing the Green LA Climate Action Plan, 2008.

[213] City of Los Angeles, Office of the Mayor, Mayor Antonio R. Villaraigosa, *Executive Directive No. 10, Subject: Sustainable Practices in the City of Los Angeles*, July 18, 2007. Available: https://www.lacity.org/sites/g/files/wph1101/f/villaraigosa_ed10.pdf.

leader in green buildings, Executive Directive No. 10 requires that City departments, including LAWA, create and adopt a "Statement of Sustainable Building Policies," which should encompass sustainable design, energy and atmosphere, materials and resources, water efficiency, and landscaping and transportation resources. In addition, City departments and offices must create and adopt sustainability plans that include procedures, programs, and policies that are designed to improve internal environmental efficiency. Finally, City departments are required to submit annual sustainability reports to the Mayor for review. ClimateLA, which was adopted subsequent to Executive Directive No. 10, also includes goals supportive of green building and energy efficiency through building design and retrofits.

Sustainable City pLAn

In 2014, Mayor Eric Garcetti launched the City of Los Angeles' first-ever Sustainable City Plan ("pLAn"). The pLAn is a comprehensive and actionable policy roadmap that prepares the City for an environmentally healthy, economically prosperous, and equitable future for all.[214] Mayor Garcetti released the pLAn in April 2015 along with corresponding Executive Directive No. 7 that incorporates the pLAn into city-wide management.[215] The framework of pLAn is organized into three sections – environment, economy, and equity – addressing a total of 14 topics, each of which sets forth a vision of milestones to transform Los Angeles over the next 20 years and highlighting near- and long-term outcomes. With respect to the environment, the topics are local water, local solar, energy-efficient buildings, carbon and climate leadership, and waste and landfills. Through the pLAn, Mayor Garcetti committed the City to becoming a national leader in carbon reduction and climate action by eliminating coal from the City's energy mix, prioritizing energy efficiency, and inspiring other cities to take similar action. The Plan sets targets of reducing GHG emissions below 1990 levels by at least 45 percent by 2025, 60 percent by 2035, and 80 percent by 2050.

Resilient Los Angeles

In March 2018, Mayor Eric Garcetti released *Resilient Los Angeles*, a comprehensive, strategically coordinated approach to urban resilience.[216] This plan addresses a range of challenges facing Los Angeles, including preparing for climate adaptation. One of the key climate adaptation initiatives in the resiliency plan is the goal of accelerating reductions in GHG emissions and meeting or exceeding climate resilience outcomes consistent with the Paris Climate Agreement by 2020. In addition, one of the actions in *Resilient Los Angeles* is to leverage the modernization at LAX to incorporate sustainability and resilience measures.

City of Los Angeles Green Building Code (LAGBC)

In December 2013, the Los Angeles City Council approved Ordinance No. 182,849, which updated Chapter IX of the Los Angeles Municipal Code (LAMC)to incorporate portions of the 2013 CALGreen Code and add other conservation-related measures to the LAGBC for residential and non-residential development. The requirements of the adopted LAGBC, as updated (2017), apply to new building construction, building renovations, and building additions within the City of Los Angeles.[217] Key measures in the LAGBC related to energy use that apply to nonresidential buildings include a requirement that energy conservation for

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214 City of Los Angeles, Office of the Mayor, Mayor Eric Garcetti, *Sustainable City pLAn, Transforming Los Angeles, Environment - Economy - Equity*, April 8, 2015. Available: http://plan.lamayor.org/wp-content/uploads/2017/03/the-plan.

215 City of Los Angeles, Office of the Mayor, Mayor Eric Garcetti, *Executive Directive No. 7, Subject: Sustainable City pLAn*, April 8, 2015. Available: https://www.lacity.org/sites/g/files/wph281/f/Executive_Directive_No._7_Sustainable_City_pLAn.pdf.

216 Mayor Eric Garcetti, *Resilient Los Angeles*, March 2018. Available: https://www.lamayor.org/sites/g/files/wph446/f/page/file/Resilient%20Los%20Angeles.pdf.

217 City of Los Angeles, Los Angeles Municipal Code, Chapter IX, Article 9, *Green Building Code*, as amended.

new buildings must meet or exceed California Energy Commission (CEC) requirements set forth in the California Building Energy Efficiency Standards.

LAWA Sustainability Plans and Guidelines

LAWA adopted the Sustainability Performance Improvement Management System (SPIMS) in August 2007 as a tool for identifying sustainability objectives, implementing actions to achieve the objectives, establishing targets, and continually monitoring progress. This was followed by LAWA's Sustainability Plan, developed in April 2008, which described LAWA's sustainability practices and set goals and actions that LAWA would undertake to implement its long-term objectives and targets.[218]

In 2008, LAWA developed Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects, which were subsequently updated in 2009 and 2010.[219] These guidelines were developed to provide a comprehensive set of performance standards focusing on sustainability specifically for airport projects on a project-level basis. Based on these guidelines, LAWA implemented numerous steps to increase its sustainability practices related to daily airport operations, many of which directly or indirectly contributed to a reduction in GHG emissions. Actions that LAWA undertook included promoting and expanding non-stop shuttle services to the airport in an effort to reduce the number of vehicle trips to the airport, establishing an employee rideshare program, using alternative fuel vehicles, purchasing renewably-generated green power from LADWP, and reducing electricity consumption by installing energy-efficient lighting, variable demand motors on terminal escalators, and variable frequency drives on fan units at terminals and LAWA buildings.[220] Subsequently, LAWA consolidated its design standards into the LAWA Design and Construction Handbook, which includes sustainable guidelines for all construction projects.

On September 7, 2017, LAWA adopted the *Sustainable Design and Construction Policy*.[221] Under this policy, new buildings and major building renovation projects are required to achieve a minimum of LEED® Silver certification. New LAWA or tenant building construction and building renovation projects that are not eligible for LEED® certification, such as runways, taxiways, and civil infrastructure, or are exempted by LAWA's Sustainability Review Committee, are required to meet LAGBC Tier 1 requirements. Projects that cannot meet USGBC's or LAWA's LEED® Eligibility Criteria or LAGBC Tier 1 requirements, or are exempted by LAWA's Sustainability Review Committee, must adhere to LAWA's Sustainable Design and Construction Requirements, which incorporate sustainability concepts from the LEED® system as well as the LAGBC, Envision, and other airport sustainability guidelines.[222] The requirements will ensure that all projects at LAWA facilities are environmentally responsible and resource-efficient throughout the structure's life-cycle, from siting to design, construction, operation, maintenance, and renovation, reflecting LAWA's commitment to sustainability.

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218 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Sustainability Plan*, April 2008. Available: https://www.lawa.org/-/media/sustainability/resources/final_sustainability_plan.ashx.

219 City of Los Angeles, Los Angeles World Airports, *Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects*, Version 5.0, February 2010. Available: http://losangelesairport.net/uploadedFiles/LAWA/pdf/LSAG%20Version%205.0%20021510.pdf.

220 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Sustainability Report 2015*. Available:. https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2015.pdf.

221 City of Los Angeles, Los Angeles World Airports, *LAWA Sustainability Design and Construction Policy*, adopted September 7, 2017. Available: http://lawa.granicus.com/MetaViewer.php?view_id=4&clip_id=448&meta_id=31352.

222 City of Los Angeles, Los Angeles World Airports, *Los Angeles International Airport Sustainable Design & Construction Requirements*, August 4, 2017. Available: https://www.lawa.org/en/lawa-businesses/lawa-documents-and-guidelines/lawa-design-and-construction-handbook.

LAWA Commitment to Carbon Management Goals

In August 2016, LAWA adopted an internal commitment to reduce GHG emissions from LAWA owned and operated sources 45 percent below 1990 levels by 2025, 60 percent by 2035, and 80 percent by 2050.[223] Additionally, in 2017, LAWA upgraded LAX's ACA, which is granted by ACI, from "Level 2 Reduction" to Level 3 (Optimization).[224] Airports are certified under ACA at four progressively stringent levels of participation with recognition of improvements at each stage. The first stage, Level 1 Mapping, requires airports to produce a Scope 1 and 2 "carbon footprint" for the airport, along with evidence of a publicly available environmental/carbon policy endorsed at the highest level of airport management. Independent verification of an airport's carbon footprint is required on entry into the program, and then again every two years on renewal at the same level, or upon each upgrade. The ACA program notes that the carbon footprint serves as the basis for developing carbon management and engagement plans (Level 2 Reduction and Level 3 Optimization). An airport may then also seek to achieve carbon neutrality for CO_2 emissions under its direct control (Scope 1 and 2) by offsetting its residual emissions which it cannot reduce by other means (Level 4 Neutrality).

It is important to note that LAWA's internal commitment to the GHG emissions reduction goals identified above, as reflected in the ACI certification that LAWA has achieved for Level 3 Optimization, takes into account a wide array of existing and anticipated GHG reduction programs and improvements, which will continue to be implemented and may be refined, adjusted, and added to by LAWA in the course of achieving the goals set for 2025, 2035, and 2050. Examples of such GHG reduction programs and improvements for LAWA owned and operated sources include, but are not limited to, the following:

- **LAWA's Clean Fleet Program.** LAWA introduced alternative fuel technology to its fleet in 1993. LAWA currently operates the nation's largest alternative-fuel airport fleet consisting primarily of compressed natural gas (CNG), liquefied natural gas (LNG), propane, full-electric, hybrid-electric, and bi-fuel vehicles.[225] In 2016, approximately 60 percent of the LAX fleet was powered by alternative fuel.[226] In an effort to increase its electric vehicle fleet, LAWA adopted its first electric vehicle purchasing policy (EVPP) on June 15, 2017. The EVPP will improve air quality in and around LAX as LAWA gradually increases the percentage of all-electric vehicle purchases to 100 percent by 2035.[227] In addition, on October 5, 2017, LAWA approved an update to the LAX Alternative Fuel Vehicle Requirement (AFV Requirement).[228] The original AFV Requirement, which was adopted in 2007 and is included in all operator contracts, permits, leases and licenses, was updated to allow LAWA to take advantage of evolving technological developments in clean vehicles. The update also adds enforcement provisions to ensure compliance by operators at LAX. The LAX Alternative

223 Flint, Deborah, Chief Executive Officer, Los Angeles World Airports, *Memorandum, Subject: LAWA's Commitment to Carbon Management Goals*, August 31, 2016.

224 City of Los Angeles, Los Angeles World Airports, *News Release: Los Angeles World Airports (LAWA) Leads the Way on Sustainability – Van Nuys Airport Recognized as Only One of Two General Aviation Airports in World to Achieve Airport Carbon Accreditation "Level 2 – Reduction" Tier; LAX Progresses to "Level 3 – Optimization" as Only One of Three U.S. Airports at this Tier*, September 18, 2018. Available: https://www.lawa.org/en/News%20Releases/2017/News%20Release%2025.

225 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Sustainability Report 2015*. Available:. https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2015.pdf.

226 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports 2016 Sustainability Report*. Available:. https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2016.pdf.

227 City of Los Angeles, Los Angeles World Airports, *Electrical Vehicle Purchasing Policy* , adopted June 15, 2017. Available: https://lawa.org/-/media/lawa-web/tenants411/file/lawa_ev_purchasing_policy.ashx.

228 City of Los Angeles, Los Angeles World Airports, Alternative Fuel Vehicle Requirement Program (LAX Only), adopted October 5, 2017. Available: http://lawa.granicus.com/GeneratedAgendaViewer.php?view_id=4&clip_id=455.

Fuel Vehicle Program is projected to improve air quality at LAX and throughout the Los Angeles region. LAWA demonstrated its commitment to the EVPP and AFV Requirements through the recent approval to purchase new electric buses. With this purchase, LAWA's airfield bus fleet will be all-electric. This purchase is projected to reduce GHG emissions by 308 tons per year.[229]

- **Green Power Purchase.** LAWA has been purchasing green power from LADWP for several years. More specifically, LAWA voluntarily purchased 15.9 million kilowatt-hours (kWh) of green power in 2016, which equates to 10 percent of the total energy consumed at LAX.[230] In addition, LAWA has been a U.S. EPA Green Power Partner since 2002.[231]
- **Lighting Retrofit Projects.** LAWA continues to replace lights and fixtures that serve terminals, streets, parking lots, and the airfield at LAX with a mix of energy efficient equipment.[232] LAWA installed over 5,700 linear feet of light ribbon in the Central Terminal Area (CTA) between 2014 and 2016. The project complies with CALGreen and LAGBC Tier 1 requirements. As part of this project, LAWA removed and replaced 78 high pressure sodium street lights in front of the Tom Bradley International Terminal with 91 new light-emitting diode (LED) light poles, resulting in an almost 45 percent reduction in electricity usage.[233]
- **Energy Efficiency Projects.** LAWA continues to upgrade air handling equipment and perform regular maintenance to improve energy efficiency of air handling units. LAWA replaces old computers and related equipment with Energy Star certified office equipment.
- **Ground Support Equipment Emissions Reductions Policy.** LAWA encourages airlines and other GSE operators to meet emissions targets through conversion or retirement of conventionally-fueled equipment used to service aircraft.[234]
- **The Utility Monitoring Infrastructure Project (UMIP).** LAWA is in the midst of a program to add sub-meters for utilities across the LAX campus. One of the goals of the project is to allow LAWA to monitor energy usage at each of its facilities at the building level. Currently, LAWA is able to monitor electricity and natural gas consumption via the utility providers' invoices and meters, but these meters do not always correspond to a single structure.
- **Central Utility Plant.** LAWA recently replaced the 50-year-old Central Utility Plant (CUP) at LAX with a new 90,000 square foot facility. The new CUP, which achieved LEED® Gold certification, is a state-of-the-art computerized facility that provides heating and cooling for the CTA at LAX, and includes a co-generation system that simultaneously generates electrical power and steam. The new chillers, high-efficiency motors, and variable frequency drives save over 6.5 million kWh annually. The new turbines and boilers use natural gas and state-of-the-art pollution control equipment, resulting in a reduction of nearly 4,900 tons of CO_2 emissions annually. The CUP's heat

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229 City of Los Angeles, Los Angeles World Airports, *Board of Airport Commissioners Approve Purchase of 20 Electric Buses for Airside Use at LAX*, April 20, 2018. Available: https://www.lawa.org/News%20Releases/2018/News%20Release%2049.

230 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports 2016 Sustainability Report*. Available:. https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2016.pdf.

231 U.S. Environmental Protection Agency, Green Power Partnership, *Green Power Partner List*. Available: https://www.epa.gov/greenpower/green-power-partner-list, accessed March 1, 2018.

232 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Sustainability Report 2015*. Available: https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2015.pdf.

233 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports 2016 Sustainability Report*. Available: https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2016.pdf.

234 LAWA set a target of 2.65 grams per horsepower-hour of hydrocarbons plus nitrogen oxides (g/bhp-hr) by December 31, 2021. UAL is currently operating below this target.

reflective roof helps decrease cooling load, and heat recovered from the gas turbines is used to heat water and provide heat to terminal space.[235]

- **Sustainable Construction Practices.** LAWA's has incorporated Sustainable Construction Practices into the design and construction of new projects. These practices are designed to reduce emissions from construction through increased use of low emission equipment and alternative fuels.[236]

In addition to the above, the continued implementation of LAWA's sustainability programs will support LAWA's ability to achieve its carbon management goals.

In summary, LAWA's internal commitment to reduce GHG emissions from LAWA owned and operated sources will be implemented through a variety of programs and improvements through 2025, 2035, and 2050 including, but not limited to, the programs described above. LAWA's GHG reduction goals are aimed at organization-wide improvements and are not intended or designed to be applied on an individual project-by-project basis.

4.3.3.2 Existing Greenhouse Gas Setting

According to the IPCC, in 2010, worldwide man-made emissions of GHGs were approximately 49,000 million metric tons of CO_2e ($MMTCO_2e$).[237] Total U.S. GHG emissions in 2016 were 6,511 $MMTCO_2e$, or about 13 percent of worldwide GHG emissions.[238]

California, due in part to its large size and large population, is a substantial contributor of global GHGs, and is the second largest contributor to GHG emissions in the United States (Texas is first). As mandated by the Global Warming Solutions Act of 2006 (AB 32), CARB is required to compile GHG inventories for the State of California, including establishment of the 1990 Greenhouse Gas Emissions Level. Inventories have been prepared for 2000 through 2015. Based on the 2015 GHG inventory data (i.e., the latest year for which data are available), California emitted 440.4 $MMTCO_2e$ if emissions associated with imported electrical power are included, and approximately 405 $MMTCO_2e$ if these emissions are excluded.[239]

Table 4.3-2 identifies and quantifies statewide anthropogenic GHG emissions and sinks in 1990 and 2015.[240,241] Although a large overall contributor to GHG emissions, California had the fourth lowest CO_2 emissions per capita from fossil fuel combustion in the U.S., due to the success of its energy efficiency and

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235 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports 2016 Sustainability Report*. Available: https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2016.pdf.

236 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Design and Construction Handbook: Design Standards and Guide Specifications, Division I – General Requirements*, July 2017. Available: https://www.lawa.org/en/lawa-businesses/lawa-documents-and-guidelines/lawa-design-and-construction-handbook/design-standards-and-guide-specifications.

237 Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)], *Climate Change 2014 – Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change – Summary for Policymakers, 2015, p. 5.*

238 U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016*, April 12, 2018. Available: https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf.

239 California Air Resources Board, *California Greenhouse Gas Inventory for 2000-2015 - by Category as Defined in the 2008 Scoping Plan*, June 6, 2017. Available: https://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-15.pdf.

240 Per USEPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016* (p. ES-1), "The term 'anthropogenic,' in this context, refers to greenhouse gas emissions and removals that are a direct result of human activities or are the result of natural processes that have been affected by human activities (IPCC 2006)." Available: https://www.epa.gov/sites/production/files/2016-04/documents/us-ghg-inventory-2016-main-text.pdf.

241 The term "sink," in this context, refers to a natural or artificial reservoir that accumulates and stores greenhouse gases for an indefinite period.

renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.[242]

Table 4.3-2
State of California GHG Emissions[1]

Category	Total 1990 Emissions ($MMTCO_2e$)	Percent of Total 1990 Emissions	Total 2015 Emissions ($MMTCO_2e$)	Percent of Total 2015 Emissions
Transportation	150.7	35%	164.6	37%
Electric Power	110.6	26%	83.7	19%
Commercial	14.4	3%	14.7	3%
Residential	29.7	7%	23.2	5%
Industrial	103.0	24%	91.7	21%
Recycling and Waste	--[2]	--[2]	8.7	2%
High GWP/Non-Specified[3]	1.3	<1%	19.1	4%
Agriculture	23.4	5%	34.7	8%
Forestry	0.2	<1%	--[4]	--[4]
Forestry Sinks	-6.7	--	--[4]	--[4]
Net Total	**426.6**	**100%**	**440.4**	**100%**

Sources: California Air Resources Board, *Staff Report: California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit*, November 16, 2007. Available: http://www.arb.ca.gov/cc/inventory/pubs/reports/staff_report_1990_level.pdf, accessed November 2015; California Air Resources Board, *California Greenhouse Gas Inventory for 2000-2015 – by Category as Defined in the 2008 Scoping Plan*, June 6, 2017. Available: https://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-15.pdf, accessed November 21, 2017.

Notes:
1. Numbers may not add due to rounding.
2. Included in other categories for the 1990 emissions inventory.
3. High GWP gases are not specifically called out in the 1990 emissions inventory.
4. Revised methodology under development (not reported for 2014).

Prepared By: CDM Smith, November 2017.

Between 1990 and 2010, the population of California grew by approximately 7.5 million (29.8 to 37.3 million).[243] This represents an increase of approximately 25 percent from 1990 population levels. In addition, the California economy, measured as gross state product, grew from $773 billion in 1990 to 1.97 trillion in 2010, representing an increase of approximately 154 percent (over twice the 1990 gross state product).[244] Despite the population and economic growth, California's net GHG emissions only grew by approximately 6 percent. The California Energy Commission attributes the slow rate of growth to the success of California's renewable energy programs and its commitment to clean air and clean energy.[245]

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[242] U.S. Energy Information Administration, *Energy-Related Carbon Dioxide Emissions at the State Level, 2000-2013*, October 2015.

[243] California Department of Finance, Demographic Research Unit, *Report E-5 Population and Housing Estimates for Cities, Counties, and the State*, January 1, 2011–2015 with 2010 Benchmark, May 1, 2015.

[244] California Department of Finance, *California State Gross Domestic Product*, (GDP) 1963 to 2016, last updated May 11, 2017. Available: http://www.dof.ca.gov/Forecasting/Economics/Indicators/Gross_State_Product/, accessed November 21, 2017. Estimated gross state product for 1990 and 2010 are based on current dollars as of May 2017.

[245] California Energy Commission, *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004*, December 2006.

4.3.4 Thresholds of Significance

For the purposes of the UAL East Aircraft Maintenance and GSE Project EIR analysis, and in accordance with Appendix G of the State CEQA Guidelines, environmental impacts related to GHG emissions are considered significant if the proposed project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

4.3.4.1 Quantitative Threshold

Section 15064.7 of the State CEQA Guidelines defines a threshold of significance as an identifiable quantitative, qualitative, or performance level of a particular environmental effect, compliance with which determines the level of impact significance. CEQA gives wide latitude to lead agencies in determining what impacts are significant and does not prescribe thresholds of significance, analytical methodologies, or specific mitigation measures. CEQA leaves the determination of significance thresholds to the reasonable discretion of the lead agency and encourages lead agencies to develop and publish thresholds of significance to use in determining the significance of environmental effects. However, neither SCAQMD nor the City of Los Angeles have yet established project-level specific quantitative significance thresholds for GHG emissions. State CEQA Guidelines Section 15183.5 encourages lead agencies to make use of programmatic mitigation plans and programs from which to tier when they perform any individual project analyses. However, the City of Los Angeles has not developed a Greenhouse Gas Reduction Plan meeting the requirements set forth in State CEQA Guidelines Section 15183.5.(b)

On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG Significance threshold for projects where the SCAQMD is the lead agency.[246] For industrial projects where SCAQMD is the lead agency, the SCAQMD's adopted threshold is 10,000 metric tons of carbon dioxide equivalent per year ($MTCO_2e$/yr). Selection of 10,000 $MTCO_2e$/yr as a mass emissions threshold of significance for industrial projects was based largely on the GHG emissions associated with the natural gas consumption characteristics of numerous facilities evaluated by the SCAQMD. Selection of that threshold for industrial projects also took into consideration that industrial facilities typically containing stationary source equipment are largely permitted or regulated by the SCAQMD, consequently providing some ability to directly address GHG emissions. In addition to stationary sources, the threshold is intended to include mobile (off-road and on-road) sources. In developing the threshold, SCAQMD identified three land use definitions: industrial, residential, and commercial. At this time, this adopted threshold applies to only industrial projects where the SCAQMD is the lead agency. Although SCAQMD is not the lead agency for the proposed UAL East Aircraft Maintenance and GSE Project, the main source of GHG emissions associated with the proposed project is considered to be comparable to that of a stationary industrial source. The proposed project is an aircraft and GSE maintenance facility, and certain activities and equipment at the facility are regulated as stationary sources (e.g., as noted previously, the natural gas boilers and water heaters, a diesel-operated emergency generator, and a maintenance-related spray booth). However, the proposed project activities would be similar to those that occur at other stationary industrial facilities. Similar to other industrial facilities, activities at the proposed project would include

246 South Coast Air Quality Management District, *Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group Meeting #8, Diamond Bar*, January 28, 2009. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-8/ghg-meeting-8-minutes.pdf?sfvrsn=2.

use of machinery and heavy equipment to repair engines and other components, as well as the manufacture of components needed to complete the repairs. As with typical industrial facilities, industrial chemicals would be used and stored onsite, including solvents, oils, and other substances. Also, as with other industrial facilities, mobile sources would travel to and from the project site. The mobile sources associated with the proposed project would include aircraft as well as trucks and passenger vehicles, whereas typical industrial facilities are only associated with trucks and passenger vehicles. However, all of these mobile sources were assumed to emit GHG. As a result, for the purposes of this analysis, the adopted 10,000 $MTCO_2e$/yr threshold was used.

4.3.4.2 Plan Consistency Threshold

This EIR also uses a second “plan consistency” impact significance threshold. The proposed project’s GHG emission would be significant if they conflict with an applicable state regional, or local plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

4.3.5 Impacts Analysis

4.3.5.1 Project GHG Emissions

4.3.5.1.1 Construction Emissions

Annual GHG emissions for construction of the proposed project are presented in **Table 4.3-3**, which, as indicated in the table, would total 5,897.7 $MTCO_2e$. As noted in Section 4.3.2.1, construction emissions were amortized over the lifetime of the proposed project, which is assumed to be 30 years. The total CO_2e amortized over the 30-year life of the proposed project is equal to 196.6 $MTCO_2e$ per year. See Appendix B.1 for detailed calculations.

Table 4.3-3
Construction-Related Greenhouse Gas Emissions for the Proposed Project
(in Metric Tons CO_2e per Year)

Emission Source	2018	2019	2020	Project Total
Off-Road, On-Site Equipment	274.6	1,668.4	71.6	2,014.6
On-Road, On-Site Trucks	101.6	688.7	303.6	1,093.9
On-Road, Off-Site Workers	83.2	1,049.5	843.9	1,976.6
On-Road, Off-Site Deliveries	181.7	343.1	0.1	524.9
On-Road, Off-Site Operational Workers	10.1	59.6	38.2	107.9
On-Site Aircraft GPUs	16.1	98.5	65.2	179.9
All Sources (Metric Tons):	**667.4**	**3,907.8**	**1,322.5**	**5,897.7**

Source: Appendix B.1 of this EIR.

Note: Totals may not add due to rounding.

Prepared By: CDM Smith, May 2018.

4.3.5.1.2 Operational Emissions

As noted in Section 4.3.2.2, aircraft taxiing/towing distance would decrease as a result of the proposed project. As shown in **Table 4.3-4**, that, alone, would lead to a net decrease in CO_2e compared to existing conditions. Additionally, project-related operational energy demands associated with lighting and heating of the consolidated hangar would be reduced when compared with existing conditions due to the reduction in project-related building area and the use of more efficient lighting and heating, ventilation, and air conditioning systems (HVAC); these reductions were not quantified and no credit is taken for these reductions. When the amortized construction emissions are added to the incremental operational emissions presented in the table, the resulting net GHG emissions would be lower than emissions under existing conditions (a decrease of 691.6 $MTCO_2e$/yr), which would be a beneficial result of the proposed project. Therefore, project-related incremental emissions would not exceed the 10,000 $MTCO_2e$/yr threshold and impacts of the proposed project related to GHG emissions would be less than significant.

Table 4.3-4
Amortized Construction and Operational Greenhouse Gas Emissions for the Proposed Project as Compared with the Existing Conditions (in Metric Tons CO_2e per Year)

Emissions Source	Exiting Conditions	Proposed Project	Incremental Difference
Aircraft Taxiing, East Hangar	683.1	1,214.5	531.3
Aircraft Taxiing, West Hangar	1,424.9	-	-1,424.9
Aircraft Towing, East Hangar	65.6	116.5	51.0
Aircraft Towing, West Hangar	45.6		-45.6
Total Operational[1]	2,219.2	1,331.0	-888.2
Amortized Construction	-	196.6	196.6
Total Net[2]	**2,219.2**	**1,527.6**	**-691.6**

Source: Appendix B.2 of this EIR.

Notes:

CO_2e = carbon dioxide equivalent

1. Totals may not add due to rounding.
2. Operational emission reductions associated with a decrease in project-related operational square footage and an increase in more efficient lighting and HVAC was not quantified, but would serve to further reduce operational GHG emissions.

Prepared By: CDM Smith, May 2018.

4.3.5.2 Consistency with Greenhouse Gas Reduction Plans

International and Federal plans, policies, and regulations are aimed at global and national GHG emissions, respectively. These plans, policies, and regulations do not apply at the individual project level. Therefore, the focus of the assessment of the project's consistency with GHG reduction plans is on plans, policies, and regulations adopted by state, regional, and local agencies that address GHG emissions.

4.3.5.2.1 Local

Implementation of the proposed project would not conflict with local plans, policies, and regulations adopted for the purposed of reducing GHG emissions, including Green LA, ClimateLA, Executive Directive No. 10, the Sustainable City pLAn, Resilient Los Angeles, LAGBC, and LAWA's Sustainable Design and Construction Policy and commitment to carbon management goals.

Green LA includes the goal for LA's airports to "green the airports," including the need for sustainability programs, LEED® green building rating standards in future construction, improvements in recycling, increased use of alternative fuel sources, increased use of recycled water, increased water conservation, reduced energy needs, reduced GHG emissions, and evaluation of options to reduce aircraft-related GHG emissions. Implementation of the proposed project would comply with LAWA's sustainability requirements and would be designed and constructed to achieve LEED® Silver certification. As such, the proposed project would be consistent with the airport-related goals of Green LA by increasing energy efficiency in new construction, increasing recycling and water conservation, and reducing GHG emissions, in conjunction with LAWA's overall program for recycling, conservation, and GHG reductions.

ClimateLA identifies goals to reduce CO_2 emissions 35 percent below 1990 levels by 2030 at LAX, implement sustainability practices, and develop programs to reduce the generation of waste and pollutants. Actions are specified in the areas of aircraft operations, ground vehicles, electrical consumption, building construction, and other actions. Implementation of the proposed project would not increase the number of aircraft operations or ground vehicles. Moreover, project-related aircraft and ground vehicle movements would decrease due to the decreased distance between the UAL gates in the CTA and the East Maintenance Facility. As shown in Section 6.5, *Energy Impacts and Conservation,* of this EIR, the energy efficiency of the new building area associated with the proposed project would be substantially better than that of the existing building areas on a per square foot basis. Implementation of the proposed project would comply with LAWA's sustainability requirements. Building construction would feature the use of low-emitting carpets, adhesives, sealants, paints and coatings, which is recognized as a GHG reduction action in ClimateLA, and LAWA's requirements for the use of low emission construction equipment (e.g., Tier 4 engines) would also serve to reduce GHG emissions associated with construction. The proposed project would not include any landscaped areas that would require watering.

Executive Directive No. 10 requires City departments to create and adopt a statement of sustainable building policies. LAWA has sustainability programs, with which implementation of the proposed project would comply.

As noted above, the Sustainable City Plan (pLAn) framework related to the environment focuses on local water, local solar, energy-efficient buildings, carbon and climate leadership, and waste and landfills. Implementation of the proposed project would include sustainability measures that would serve to reduce water demands. Restroom facilities would be equipped with low- or ultra-low-flow systems, which would be consistent with the pLAn goals relating to water conservation. The building would be equipped with energy efficient lighting fixtures and controls with occupancy sensors where appropriate to reduce energy consumption, and the heating, ventilation, and air conditioning controls within occupied areas would be designed to reset temperatures to maximum efficiency without sacrificing occupant comfort. Natural lighting would be provided in the hangar bays through the use of transparent or translucent panels in the sidewalls. In addition, non-hazardous construction and demolition debris generated at the site would be recycled or salvaged to the extent required to meet LEED® Silver certification. The emphasis of pLAn relative to carbon and climate leadership is to reduce GHG emissions, improve GHG efficiency, and eliminate coal power as a source of electricity for the City and invest in green energy. With respect to reducing GHG emissions, as shown in Table 4.3-4, the proposed project would result in lower GHG emissions than the existing UAL maintenance operations. With respect to coal-free electricity, although the project proponent has no control over this aspect of the plan, LAWA has been purchasing, and plans to continue to purchase, green energy for LAX, as noted in Section 4.3.3.1.5.

Resilient Los Angeles includes an action for LAWA to leverage the modernization at LAX to incorporate sustainability and resilience measures. As noted above, implementation of the proposed project would comply with LAWA's sustainability requirements and would be designed and constructed to achieve LEED® Silver certification. As such, the proposed project would be consistent with this action.

With the construction practices and design features identified above, the proposed project would comply with the applicable requirements of the LAGBC and LAWA's Sustainable Design and Construction Policy. Compliance with these plans, policies, and regulations would be consistent with LAWA's commitment to reducing GHG emissions from LAWA owned and operated sources as part of its overall carbon management goals.

Based on the above analysis, the proposed project would not conflict with local plans, policies, and regulations adopted for the purposed of reducing GHG emissions.

4.3.5.2.2 State and Regional

State and regional plans, policies, and regulations are generally aimed at setting statewide and regional policy, and are not directed at individual projects. Additionally, these plans and policies – including Executive Order S-3-05, Executive Order B-30-15, the AB 32 Scoping Plan, SB 32, and SCAG's 2016-2040 RTP/SCS – do not provide a specific basis for calculating what the proposed project's hypothetical "fair share" of statewide or regional emissions reductions might be (See *Center for Biological Diversity v. California Department of Fish and Wildlife* [2015] 62 Cal.4th 205, 225-226.). It should also be noted that the Executive Orders referenced, including the GHG reduction trajectories, directly apply to State agencies and not to local agencies or the private sector. Similarly, the AB 32 Scoping Plan and SB 32, including the 2017Scoping Plan for SB 32, are directed toward statewide programs, as identified through the California Air Resources Board, and do not directly limit GHG emissions from individual projects. Statewide programs and initiatives directly implementing GHG reductions called for in AB 32 and SB 32 include, but are not limited to, the Renewable Portfolio Standard, the Low Carbon Fuel Standard, the Mobile Source Strategy, the Sustainable Freight Action Plan, the Short-Lived Climate Pollutant Reduction Strategy, SB 375 (which in Southern California is implemented by SCAG's RTP/SCS), the Cap-and-Trade Program, and the proposed Integrated Natural and Working Lands Action Plan.

GHG emissions occurring from construction and operation of the proposed project would be less than the SCAQMD threshold of significance, which is intended to achieve the level of GHG reductions set forth in Executive Order S-3-05 which, in turn, would achieve the GHG reduction goal of AB 32 (i.e., Executive Order S-3-05 includes the GHG reduction goal to reduce statewide GHG emissions to 1990 levels by 2020, which is the same goal as in AB 32).[247] In addition, the SCAQMD threshold of significance was set to allow small projects to proceed without conflicting with the statewide EO S-3-05 2050 GHG reduction goal of 80 percent below 1990 levels.[248] As a result, GHG emissions from the proposed project would not conflict with statewide and regional plans and policies such as AB 32, whose purpose is to reduce statewide emissions to 1990 levels by 2020; Executive Order S-3-05, whose 2050 goal is 80 percent below 1990 levels; Executive Order B-30-15 and SB 32, which call for interim reductions in statewide GHG emissions to 40 percent below 1990 levels by 2030; the 2017 Scoping Plan; or the SCAG 2016-2040 RTP/SCS, which outlines a vision for land use and transportation for the region that would achieve state GHG emissions reduction goals.

In summary, the proposed project would not conflict with state, regional and local plans, policies, and regulations adopted for the purpose of reducing the emissions of GHGs. Therefore, the impact of the proposed project would be less than significant.

4.3.5.3 Summary of Impacts

Based on the information presented above in Sections 4.3.5.1 and 4.3.5.2, the GHG impacts associated with construction and operation of the proposed project are summarized as follows:

- Implementation of the proposed project compared to baseline conditions would result in a decrease in GHG emissions. Therefore, impacts associated with project-related GHG emissions would be less than significant.

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[247] South Coast Air Quality Management District, *Board Meeting Date: December 5, 2008, Agenda No. 31: Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans*, December 5, 2008. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2.

[248] South Coast Air Quality Management District, *Board Meeting Date: December 5, 2008, Agenda No. 31: Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans*, December 5, 2008. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2.

- Implementation of the proposed project would not conflict with state, regional, and local plans, policies, or regulations adopted for the purpose of reducing GHG emissions. Therefore, impacts associated with applicable plans, policies, and regulations would be less than significant.

4.3.6 Cumulative Impacts

As discussed previously in Section 4.3.2, GHG impacts are exclusively cumulative impacts; hence, an evaluation of cumulative GHG impacts is already provided above and no further analysis is necessary.[249]

4.3.7 Mitigation Measures

As indicated in Section 4.3.5, GHG impacts associated with construction and operation of the proposed project would be less than significant; therefore, no mitigation measures are required. However, as discussed in Section 4.1, *Air Quality and Human Health Risk*, Mitigation Measure MM-AQ (UAL)-1 (Construction-Related Air Quality Mitigation Measures) would reduce construction-related air pollutant emissions associated with the proposed project. Although developed to address construction-related air quality impacts, this mitigation measure would also reduce construction-related GHG emissions associated with the proposed project.

4.3.8 Level of Significance after Mitigation

GHG impacts associated with construction and operation of the proposed project would be less than significant.

[249] Potential impacts associated with the combined energy consumption from proposed improvements to the East Maintenance Facility, in conjunction with the reasonably foreseeable future use of the West Maintenance Facility, are addressed in the discussion of cumulative energy impacts in Chapter 6, *Other Environmental Considerations*, of this EIR.

4.4 Transportation/Traffic

This section addresses traffic impacts of the proposed project. Traffic impacts from construction of the proposed project are addressed in Section 4.4.1, *Construction Transportation/Traffic*. Traffic impacts from operation of the proposed project are addressed in Section 4.4.2, *Operational Transportation/Traffic*.

Prior to the preparation of this EIR, an Initial Study (included as Appendix A of this EIR) was prepared using the CEQA Environmental Checklist Form to assess potential environmental impacts on transportation/traffic. Based on the analysis in the Initial Study, the potential for the project to result in a change in air traffic patterns, substantially increase hazards due to a design feature or incompatible uses, result in inadequate emergency access, or conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities, was determined to be less than significant and these topics do not require any additional analysis in this EIR.

4.4.1 Construction Transportation/Traffic

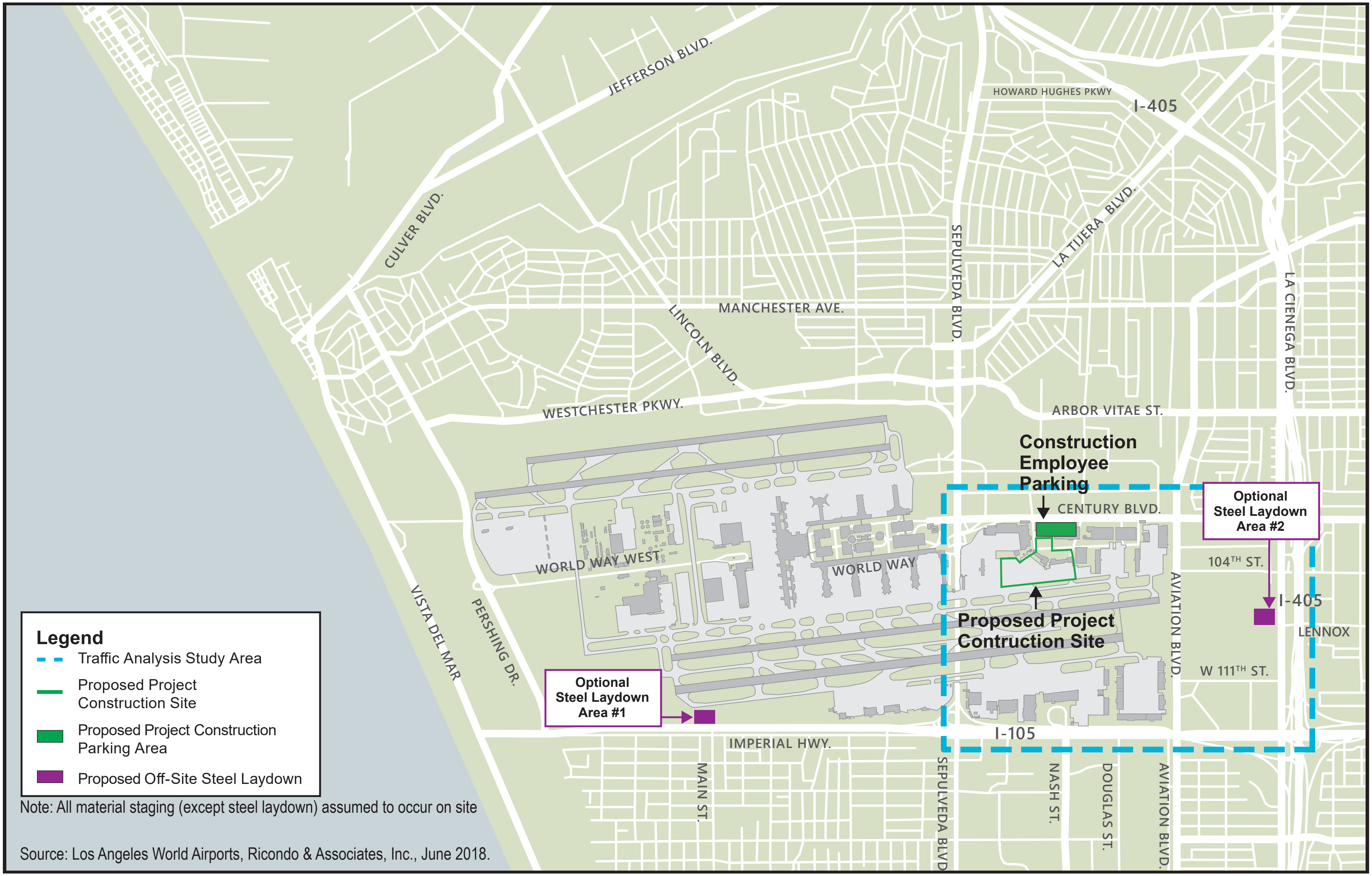
4.4.1.1 Introduction

The traffic analysis presented in this section addresses the proposed project's construction traffic impacts. The construction traffic impacts were determined for both the peak construction period for the proposed project (August 2019) and the peak cumulative condition (October 2019) (refer to Section 4.4.1.5 for details). The peak construction month for the proposed project does not correspond to the peak cumulative condition, which includes traffic from the construction of other projects anticipated to be under construction during the construction schedule (November 2018 through late 2020).

This proposed project construction traffic analysis builds upon relevant analysis and assumptions, including those for the cumulative impacts analysis (i.e., past, present, and reasonably foreseeable probable future projects). Analysis procedures and data from previous LAX EIRs were applied and updated as appropriate for the proposed project's cumulative impact analysis.

The construction traffic analysis study area is depicted in **Figure 4.4.1-1**. It is assumed that construction contractor parking would occur at Parking Garage F, which is located north of the current East Maintenance Facility on the south side of Century Boulevard. During construction, some of the existing activities that currently occur at the East Maintenance Facility, including administration and GSE maintenance, would be conducted at the West Maintenance Facility. This would require the relocation of up to 70 employees from the East Maintenance Facility to the West Maintenance Facility during construction. Aircraft maintenance would continue to be conducted at both the West Maintenance Facility and on the ramp area at the East Maintenance Facility during construction. Employees who would continue to work on the east side of the airport during construction and who currently park in Parking Lot H, a surface parking lot located south of Avion Drive, would instead park in Parking Garage F during construction. Employees whose work location would shift to the West Maintenance Facility during construction would park in existing UAL parking lots at the West Maintenance Facility.

The majority of construction staging would occur onsite. Steel laydown would occur offsite; UAL has identified two potential steel laydown areas, identified on Figure 4.4.1-1. While two steel laydown areas have been identified, only one of them would be utilized depending on availability of the sites for this use at the time the project is started. Deliveries to the steel laydown area, and between the laydown area and the project site, would occur outside of the morning (7:00 a.m. to 9:00 a.m.) and evening (4:30 p.m. to 6:30 p.m.) commuter peak hours.



UAL East Aircraft Maintanance and GSE Project	Construction Traffic Analysis Study Area	Figure 4.4.1-1

This analysis assesses construction-related traffic impacts at off-airport intersections associated with the construction of the proposed project, including the traffic impacts of construction equipment, material delivery trucks, and truck trips associated with the proposed project. As stated in Chapter 2, *Project Description*, construction shifts would be scheduled to avoid the morning commuter peak period (7:00 a.m. to 9:00 a.m.) and evening commuter peak period (4:30 p.m. to 6:30 p.m.) and, as noted above, steel deliveries would occur outside of the commuter peak hours; thus, the only project-related construction traffic impacts would be from construction truck deliveries of materials other than steel. Construction activities and staging for the proposed project would be coordinated with LAWA's CALM Team.

This direct impact analysis addresses, in particular, the impacts from construction-related traffic that would occur during the peak construction period for the proposed project. The construction traffic analysis combines peak project-related construction traffic volumes with roadway traffic volumes occurring in the a.m. and p.m. commuter peak hours. The analysis identifies the construction-related traffic impacts generated by the proposed project on the off-airport public roadway system.

4.4.1.2 Methodology

4.4.1.2.1 Overview

As noted above, this analysis focuses on construction traffic impacts of the proposed project. The analysis methodology for this EIR is based largely on the approach used for the Bradley West Project EIR,[250] West Aircraft Maintenance Area (WAMA) Project EIR,[251] Midfield Satellite Concourse (MSC) EIR,[252] the Landside Access Modernization Program EIR,[253] and the LAX Terminals 2 and 3 (T2/3) Modernization Project EIR.[254] The analyses, procedures, and relevant data from these previous projects are applicable to the proposed project because these projects share many of the same characteristics related to construction truck peaking patterns and travel paths.

The construction traffic study area includes intersections and roadways that would be directly or indirectly affected by the construction of the proposed project. Construction material staging for the proposed project is assumed to occur onsite, with the exception of steel laydown, which would occur offsite. The construction traffic study area for this analysis includes those roads and intersections that would most likely be used by truck traffic associated with construction of the proposed project. The procedures are also consistent with the information and requirements defined in City of Los Angeles Department of Transportation (LADOT)Transportation Impact Study Guidelines.[255]

The following steps and assumptions were used to develop the analysis methodology:

- The construction traffic study area depicted in Figure 4.4.1-1 was defined to incorporate the local area roadways that serve as the primary travel paths that would be used by construction truck traffic to access the proposed project site, equipment and materials staging areas.

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250 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Bradley West Project,* (SCH 2008121080), September 2009.

251 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) West Aircraft Maintenance Area Project,* (SCH 2012091037), February 2014.

252 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Midfield Satellite Concourse*, (SCH 2013021020), June 2014.

253 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, (SCH 2015021014), Section 4.12.3, Construction Surface Transportation, and Appendix P, Construction Traffic, February 2017.

254 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Terminals 2 and 3 Modernization Project*, (SCH 2016081034), June 2017.

255 City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.

- Intersection turning movement traffic volume data were collected at key traffic study area intersections over a two-year period (2014 to 2015). Traffic counts at intersections within the City of Los Angeles were generally obtained from 7:00 a.m. to 10:00 a.m., and from 3:00 p.m. to 6:00 p.m., consistent with the City of Los Angeles Transportation Impact Study Guidelines. The counts at the remaining intersections under other jurisdictions were obtained from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Due to ongoing construction of the Metro Crenshaw/LAX Transit Corridor project along Aviation Boulevard, traffic counts in the area were not updated as they are not considered representative of typical baseline conditions; the most recent traffic counts available were used instead. The traffic count periods were established to obtain traffic count data during the a.m. and p.m. peak commuter periods and represent the most recent counts at the construction traffic study area intersections. Additional traffic counts were conducted in February 2018 at the intersections of Airport Boulevard/Century Boulevard, Avion Drive/Century Boulevard, Avion East/Avion South, and the driveways of Parking Garage F and Parking Lot H, which are all located in close proximity to the project site. These additional counts were completed because no recent traffic counts exist at these intersections and were needed to establish baseline activity near the future East Maintenance Facility, as well as estimate traffic activity and demand from Parking Garage F and Parking Lot H. These counts were used as a basis for preparing the construction traffic analysis and assessing project-related traffic impacts. For purposes of the construction truck traffic analysis, the a.m. peak hour corresponding to the commuter peak periods was determined to be 7:00 a.m. to 8:00 a.m., while the p.m. peak hour was determined to be 4:00 p.m. to 5:00 p.m.

The following describes the methodology and assumptions underlying the various traffic conditions considered in this traffic analysis, and how the proposed project's direct and cumulative impacts were identified relative to those conditions. Data in support of the analysis are provided in Appendix D.

4.4.1.2.2 Determination of Baseline Traffic Conditions

Baseline conditions used in the analysis of project-related construction traffic impacts are defined as the existing conditions within the construction traffic study area at the time the NOP was published (December 2017). LAWA conducts annual driveway volume counts at various locations throughout the airport (including those adjacent to public parking lots, employee parking lots, cargo facilities, rental car facilities, and off-airport parking facilities). LAWA also collects annual traffic volume counts each August along the Central Terminal Area (CTA) roadways to estimate annual airport traffic volumes. Considering the location of the study area intersections, it was determined that each intersection contains a mix of both airport-related traffic and non-airport-related traffic. Consequently, both the driveway count data and CTA data were used to establish a growth rate to adjust the 2015 traffic volumes to 2017 levels. These data are reasonably representative of existing traffic conditions at the time the EIR Notice of Preparation was published (December 2017). The a.m. traffic volumes were increased by 15.7 percent, while the p.m. traffic volumes were increased by 15.5 percent.[256] These volumes were used to determine the 2017 baseline volumes for use in the construction traffic analysis and to assess project-related construction traffic impacts. Given temporary effects of street closures caused by construction of the nearby Metro Crenshaw/LAX Transit Corridor project, the use of these data (i.e., the driveway count and CTA roadway data) provides the most accurate assessment of baseline traffic patterns within the study area. The following steps were taken to develop baseline traffic conditions information.

Prepare Model of Study Area Roadways and Intersections

A model of construction traffic study area roadways and intersections was developed to assist with intersection capacity analysis (i.e., geometric configuration, quantitative delineation of capacity, and

256 Ricondo and Associates, LAX UAL Traffic Volume Adjustment, December 2017.

operational characteristics of intersections likely to be affected by the proposed project's construction traffic). The model was developed using TRAFFIX,[257] a commercially available traffic analysis software program designed for developing traffic forecasts and analyzing intersection and roadway capacities. The model uses widely accepted traffic engineering methodologies and procedures, including the Transportation Research Board Critical Movement Analysis (CMA) Circular 212 Planning Method,[258] which is the required intersection analysis methodology for traffic impact studies conducted within the City of Los Angeles.

Calculate Baseline (2017) Levels of Service

Intersection levels of service were calculated using the most recent intersection traffic volumes coinciding with the a.m. peak hour (7:00 a.m. to 8:00 a.m.) and the p.m. peak hour (4:00 p.m. to 5:00 p.m.). These levels of service defined existing baseline conditions, which served as a basis of comparison for assessing traffic impacts generated by construction of the proposed project.

4.4.1.2.3 Determination of Baseline Plus Peak Proposed Project Traffic Conditions

This construction traffic analysis was designed to assess the direct impacts associated with the construction of the proposed project, as well as the effects of future cumulative conditions. For purposes of determining direct project-related impacts, two traffic scenarios were developed consisting of baseline traffic described above plus the additional traffic that would be generated by the proposed project construction activity (i.e., truck trips) during the peak construction period. The following steps were conducted to determine the Baseline Plus Peak proposed project traffic volumes. Detailed traffic volumes of Baseline Plus Peak are presented in Appendix D.1-2.

Analyze Peak Proposed Project Construction Activity

Truck trips associated with construction of the proposed project during the peak month of construction activity were estimated and distributed throughout the construction traffic study area network. The trips were estimated based on a review of the proposed project construction schedule. Project-related construction trips were summarized to delineate peak month inbound and outbound construction truck trips by hour of the day. The construction truck trip distribution patterns were based on regional patterns developed for the proposed project and specific haul route information. Detailed information regarding traffic distribution patterns is presented in Appendix D.1-4.

Estimate Baseline (2017) Plus Peak Proposed Project Traffic Volumes

The estimated Baseline Plus Peak proposed project (referred to hereinafter as Baseline Plus Project) traffic volumes were estimated by adding the proposed project volumes during the peak proposed project activity period (August 2019) to the baseline (2017) volumes.

4.4.1.2.4 Determination of Future Cumulative Traffic Conditions

In addition to the Baseline Plus Project condition described above, future cumulative traffic conditions were analyzed. For this traffic analysis, cumulative traffic conditions were assessed for the period during the overall proposed project construction program when the cumulative construction traffic associated with other LAX development programs would be greatest. This peak cumulative period was estimated to occur during October 2019.

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257 Dowling Associates, TRAFFIX Version 7.7.

258 Transportation Research Board, Transportation Research Circular No. 212, *Interim Materials on Highway Capacity*, January 1980.

In accordance with State CEQA Guidelines Section 15130(b), there are essentially two options for determining cumulative development for evaluating cumulative impacts:

c. List past, present, and reasonably foreseeable probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or
d. Summarize projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program.

For purposes of analyzing the proposed project's cumulative construction traffic impacts, a hybrid of the two approaches was used. Section 4.4.1.5 provides descriptions of cumulative projects and how the construction traffic generation related to those projects would overlap with that of the proposed project (cumulative projects are described in Chapter 3, *Overview of Project Setting*, and listed in Table 3-1). Also, using the "projection" approach, background traffic was increased to reflect additional growth from non-specific projects, which may include both airport- and/or non-airport related projects. The construction traffic analysis assumed (1) airport-related traffic was grown proportionally in accordance with projected passenger levels, as described in greater detail below, and (2) a 2 percent annual growth in background traffic, which produces a conservative traffic volume scenario that would account for additional construction-related traffic in the event that additional construction projects are initiated during the timeframe evaluated for this study. This annual growth rate assumption is consistent with previous direction first provided by LADOT for use in the LAX South Airfield Improvement Project (SAIP) EIR construction traffic analysis[259] and subsequently used for construction traffic studies prepared for other LAX EIRs.

Cumulative conditions were determined based on two sets of future cumulative traffic volume conditions, as described below. Detailed traffic volumes related to the cumulative conditions are presented in Appendix D.1-2.

4.4.1.2.5 Cumulative Traffic (October 2019) Without Project

This scenario combines baseline traffic volumes with growth from all sources other than the proposed project to determine the overall peak cumulative traffic conditions during the construction period for the proposed project. The following steps were taken to develop the traffic volumes for this scenario.

Develop October 2019 Focused Traffic Study Area Roadway Network

Though it is possible additional improvements would be in place prior to the peak cumulative traffic period (October 2019), for purposes of this analysis, it has been conservatively assumed that no additional roadway improvements would be in place. Therefore, the baseline 2017 traffic study area roadway network was held constant to 2019.[260]

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259 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) South Airfield Improvement Project,* (SCH 2004081039), October 2005.

260 While additional cumulative projects, such as the Landside Access Modernization Program, are scheduled to occur during the cumulative peak month (October 2019), the timing of potential temporary roadway closures, if any, is unknown at the time of the analysis. Any roadway network modifications would be included in the construction traffic management plan (CTMP) for that project that would be developed in accordance with the CALM Review Procedures outlined in LAWA's Design & Construction Handbook (referred to as a Site Logistics Plan) and would be reviewed by LAWA prior to implementation. Due to the unknown timing of potential closures or improvements, it is reasonable to assume the roadway network would remain constant from 2017 to 2019.

Estimate October 2019 Cumulative (Without Project) Traffic Volumes

Cumulative (October 2019) traffic volumes were estimated using the following process:

- Baseline traffic volumes were grown to 2019 based on the assumption that passenger activity levels at LAX were approaching 85 million annual passengers (MAP) in 2017, and will continue to increase until they reach 96.6 MAP. This passenger level represents the upper limit of the Southern California Association of Governments (SCAG) aviation forecast for LAX[261] and was conservatively assumed to occur by 2025. Assuming passenger activity increases at a steady rate between the baseline year of 2017 and 2019, it was estimated for purposes of this analysis that MAP levels at LAX would reach approximately 88 MAP by 2019. Airport-related traffic was grown proportionally in accordance with MAP levels while background traffic was grown at 2 percent per year to account for local background traffic growth through 2019. This annual growth rate is more conservative than what is projected for the South Bay/LAX area in the 2010 Congestion Management Program,[262] which estimates an annual growth of approximately 0.3 percent.

Construction trips associated with the peak period of cumulative construction (October 2019) were estimated based on the estimated labor component of total construction cost and the timeline for each concurrent project (with the exception of the LAX Northside Development project, for which construction trip information was obtained from the traffic consultants involved in preparation of the traffic study for the LAX Northside Development EIR;[263] and the Landside Access Modernization Program and the Terminals 2 and 3 Modernization Project, for which information was obtained from the respective EIRs).[264,265] Some of these projects have similar restrictions on construction work periods as the proposed project, but some do not; thus, the cumulative analysis takes into account construction truck trips and construction employee trips during the peak hour, if no construction work period restrictions were stipulated. The cumulative development projects that were considered as part of this analysis and the estimated trips associated with these cumulative development projects are described in more detail below.

4.4.1.2.6 Cumulative Traffic (October 2019) With Project

The project-related construction traffic volumes occurring during the peak cumulative period were added to the Cumulative Traffic (October 2019) "Without Project" traffic volumes described in the previous section. This is a traffic scenario that represents the estimated total peak hour traffic volumes (consisting of background traffic, traffic related to ambient growth, traffic related to other projects, and proposed project construction traffic) that would use the construction traffic study area intersections during the cumulative peak in October 2019.

4.4.1.2.7 Determination of Impacts and Mitigation Measures

The following steps were conducted to calculate intersection levels of service, identify impacts, and identify mitigation measures for significant impacts. Detailed intersection level of service (LOS) and volume-to-capacity ratio (v/c) outputs are presented in Appendix D.1-3.

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261 Southern California Association of Governments, *Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life*, Aviation & Airport Ground Access Appendix, adopted April 7, 2016. Available: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.

262 Los Angeles County Metropolitan Transportation Authority, *Congestion Management Program*, Appendix D, Exhibit D-1, South Bay/LAX Area, 2010.

263 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Northside Plan Update*, Appendix E, Traffic Study, December 2014.

264 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, (SCH 2015021014), Appendix O, Off-Airport Traffic Study, February 2017.

265 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Terminals 2 and 3 Modernization Project*, (SCH 2016081034), June 2017.

Analyze Intersection and Roadway Levels of Service

The levels of service of the construction traffic study area intersections and roadways were analyzed using TRAFFIX. Intersection LOS (v/c) was estimated using the CMA planning level methodology, as defined in Transportation Research Board Circular 212,[266] in accordance with LADOT's Transportation Impact Study Guidelines,[267] and the L.A. CEQA Thresholds Guide.[268] Intersection LOS (v/c) was analyzed for the following conditions:

- Baseline
- Baseline Plus Peak Project Traffic
- Future Cumulative Traffic (October 2019) Without Project
- Future Cumulative Traffic (October 2019) With Project

Identify Project Impacts

Project-related impacts associated with construction of the proposed project were identified for intersections that would be significantly affected by project-related traffic, consistent with the approach established in the LADOT Transportation Impact Study Guidelines. The thresholds described in Section 4.4.1.4 were used to determine impact significance. Project-related impacts and cumulative impacts were determined by comparing the LOS (v/c) results for the following:

- **Baseline Plus Peak Proposed Project Compared with Baseline:** This comparison is utilized to isolate the impacts of the proposed project.
- **Cumulative Impacts:** Cumulative impacts were determined using a two-step process. Initially, the "Cumulative Traffic (October 2019) With Project" condition was compared to the baseline condition to determine if a significant cumulative impact would occur relative to baseline conditions. A cumulative impact was deemed significant if it would exceed the threshold of significance. If a cumulative impact was determined to be significant, then a second comparison of the "With Project" vs. the "Without Project" LOS (v/c) conditions was made to determine if the project's contribution to the significant cumulative impact would be "cumulatively considerable" in accordance with the impact thresholds defined in Section 4.4.1.4 below.

Mitigation measures were identified for intersections determined to be significantly affected by construction-related truck traffic.

4.4.1.3 Existing Conditions

4.4.1.3.1 Regulatory Setting

The LADOT Transportation Impact Study Guidelines require that a Traffic Study be prepared if the following operational criteria are met:

- A project is likely to add 43 or more a.m. or p.m. peak hour operational trips.

In addition, the Los Angeles County *2010 Congestion Management Program for Los Angeles County*[269] provides Congestion Management Program (CMP) Guidelines to assist local agencies in evaluating regional highway and freeway impacts of land use projects on the CMP system through the preparation of a regional

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[266] Transportation Research Board, Transportation Research Circular No. 212, *Interim Materials on Highway Capacity*, January 1980.

[267] City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.

[268] City of Los Angeles, *L.A. CEQA Thresholds Guide, Your Resource for Preparing CEQA Analyses in Los Angeles*, 2006.

[269] Los Angeles County Metropolitan Transportation Authority, *2010 Congestion Management Program*, October 2010.

transportation impact analysis (TIA). A CMP TIA is necessary for all projects that include, at a minimum, the following operational trips:

- 50 or more trips added to a CMP arterial intersection during either the weekday a.m. or p.m. peak hours
- 150 or more trips added to the mainline freeway monitoring locations during either the weekday a.m. or p.m. peak hours

During the scoping of the SAIP EIR traffic study in 2004, LADOT indicated that no traffic study was required because there was "no requirement to assess the temporary traffic impacts of a project resulting from construction activities. So, the proposal to prepare a traffic study is voluntary."[270] Additionally, LADOT reiterated in January 2017 that it does not require traffic impact studies for traffic construction-related impacts.[271] LAWA determined at that time that the preparation of a traffic study is useful in order to provide a full assessment and documentation of the impacts generated by the construction of the proposed project.

The proposed project would be subject to LAWA's *Design and Construction Handbook*, which requires that Site Logistics Plans be prepared and submitted to LAWA for review and approval. The Site Logistics Plan is required to identify points of entrance locations and traffic routes for equipment, trucks, and worker vehicles; construction worker parking; staging/laydown areas; emergency vehicle access; and other information relating to project construction logistics. The *Design and Construction Handbook* also includes provisions relating to construction work hours and bulk material deliveries.[272] Specifically, the Handbook requires bulk material deliveries (e.g., aggregate, bulk cement, direct) to be scheduled during off-peak hours unless prior written approval is provided by the CALM Team. In addition, the Handbook specifies that work hours should avoid peak commuter traffic periods to the extent possible.

4.4.1.3.2 Baseline Conditions

As indicated above, baseline conditions relate to the facilities and general conditions that existed during a typical weekday for the hours of 7:00 a.m. to 8:00 a.m. and 4:00 p.m. to 5:00 p.m., which was determined to be the relevant peak hours for this construction analysis, as stated in Section 4.4.1.2.1.

Construction Traffic Study Area

The construction traffic study area is depicted in Figure 4.4.1-1. The geographic scope of the construction traffic study area was determined by identifying the intersections most likely to be used by construction-related trucks accessing (1) the proposed project construction site and (2) the construction employee parking and staging areas for other concurrent construction projects in the vicinity of LAX. The construction traffic study area is generally bounded by I-405 to the east, I-105 and Imperial Highway to the south, Pershing Drive to the west, and Century Boulevard to the north. Figure 4.4.1-1 depicts the proposed project construction site, which is located in the eastern portion of LAX, parallel to and south of Century Boulevard.

The primary material staging area is planned to be located on the proposed project's construction site. Steel laydown would occur off-site. Deliveries to the laydown area, and between the laydown area and the proposed project site, would occur outside of the a.m. and p.m. peak hours.

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270 Carranza, Tomas, City of Los Angeles Department of Transportation, Electronic Mail Message to Pat Tomcheck, Los Angeles World Airports, *Subject: Re: FW: LAX Traffic Methodology Memo*, July 29, 2004.

271 Ayala, Pedro, City of Los Angeles Department of Transportation, Electronic Mail Message to Pat Tomcheck, Los Angeles World Airports, *Subject: Re: Traffic Impact Studies for Construction-Related Impacts*, January 19, 2017.

272 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Design and Construction Handbook: Design Standards and Guide Specifications, Division I – General Requirements*, July 2017. Available: https://www.lawa.org/en/lawa-businesses/lawa-documents-and-guidelines/lawa-design-and-construction-handbook/design-standards-and-guide-specifications.

Traffic Study Area Roadways

The principal freeways and roadways serving as access routes for truck trips within the construction traffic study area include the following:

- I-405 (San Diego Freeway) - This north-south freeway generally forms the eastern boundary of the construction traffic analysis traffic study area and provides regional access to the airport and the surrounding area. Access to the traffic study area is provided via ramps at Century Boulevard, I-105, Imperial Highway, and three locations along La Cienega Boulevard.
- I-105 (Glenn M. Anderson or Century Freeway) - Along with Imperial Highway (described below), this east-west freeway forms the southern boundary of the construction traffic study area, and extends from the San Gabriel Freeway (I-605) on the east to Sepulveda Boulevard on the west. Access to the traffic study area is provided via ramps at Sepulveda Boulevard and along Imperial Highway. The westbound off-ramp from the I-105 Freeway to northbound Sepulveda Boulevard was widened to three lanes in March 2010.
- Aviation Boulevard - This north-south four-lane roadway bisects the traffic study area.
- Century Boulevard - This eight-lane divided roadway serves as the primary entry to the LAX CTA. This roadway also provides access to off-airport businesses and hotels and on-airport aviation-related facilities (e.g., maintenance and air cargo facilities) located between the CTA and I-405.
- Imperial Highway - This east-west roadway is located at-grade and beneath much of the elevated I-105 freeway. The number of lanes on this roadway varies from six-lanes east of the merge with I-105 to four-lanes west of the merge with I-105.
- La Cienega Boulevard - This north-south roadway parallels I-405 at the eastern boundary of the traffic study area. The roadway varies from four to six lanes.

4.4.1.3.3 Existing Traffic Conditions

Traffic conditions at the construction traffic study area intersections and existing traffic activity (peak month, hourly, and annual) are discussed below.

Traffic Study Area Intersections

The routes likely to be utilized by construction-related vehicles were reviewed to identify the intersections likely to be used by vehicles accessing the construction staging sites associated with the proposed project or the other concurrent construction project sites in the vicinity of LAX. Volume/capacity ratios at 31 area intersections were calculated for both the baseline plus peak proposed project and for the future cumulative traffic conditions. The results were then analyzed to identify those intersections that were projected to have a 0.004 (0.4 percent) or greater increase in traffic volume/capacity with the project for detailed analysis. Those intersections with a 0.003 (0.3 percent) or less increase in traffic volume/capacity from construction traffic associated with the proposed project were determined to not have any potential for significant effect and were eliminated from further analysis. Based on this review, the key intersections to be analyzed are listed below in **Table 4.4.1-1** and depicted on **Figure 4.4.1-2**. As stated in Chapter 2, *Project Description*, construction shifts would be scheduled to avoid the morning commuter peak period (7:00 a.m. to 9:00 a.m.) and evening commuter peak period (4:30 p.m. to 6:30 p.m.) and, as noted above, steel deliveries would occur outside of the commuter peak hours; thus, the only project-related construction traffic would be from construction truck deliveries (other than steel), which must use designated haul routes, which are depicted on **Figure 4.4.1.3**. Because the screening analysis determined that construction truck deliveries would not significantly utilize La Tijera and Aviation Boulevards from the north, this construction traffic analysis focuses on the Imperial Highway, Aviation Boulevard, and Century Boulevard haul routes to the construction site.

Table 4.4.1-1 Study Area Intersections	
Intersection Number	Intersection Location
1.	Aviation Boulevard and Century Boulevard
2.	Imperial Highway and Aviation Boulevard
3.	Aviation Boulevard and 111th Street
4.	Imperial Highway and I-105 Ramp
5.	Imperial Highway and I-405 Northbound Ramp
6.	Avion Drive and Century Boulevard
7.	Aviation Boulevard and 104th Street
Source: Ricondo & Associates, Inc, June 2018.	

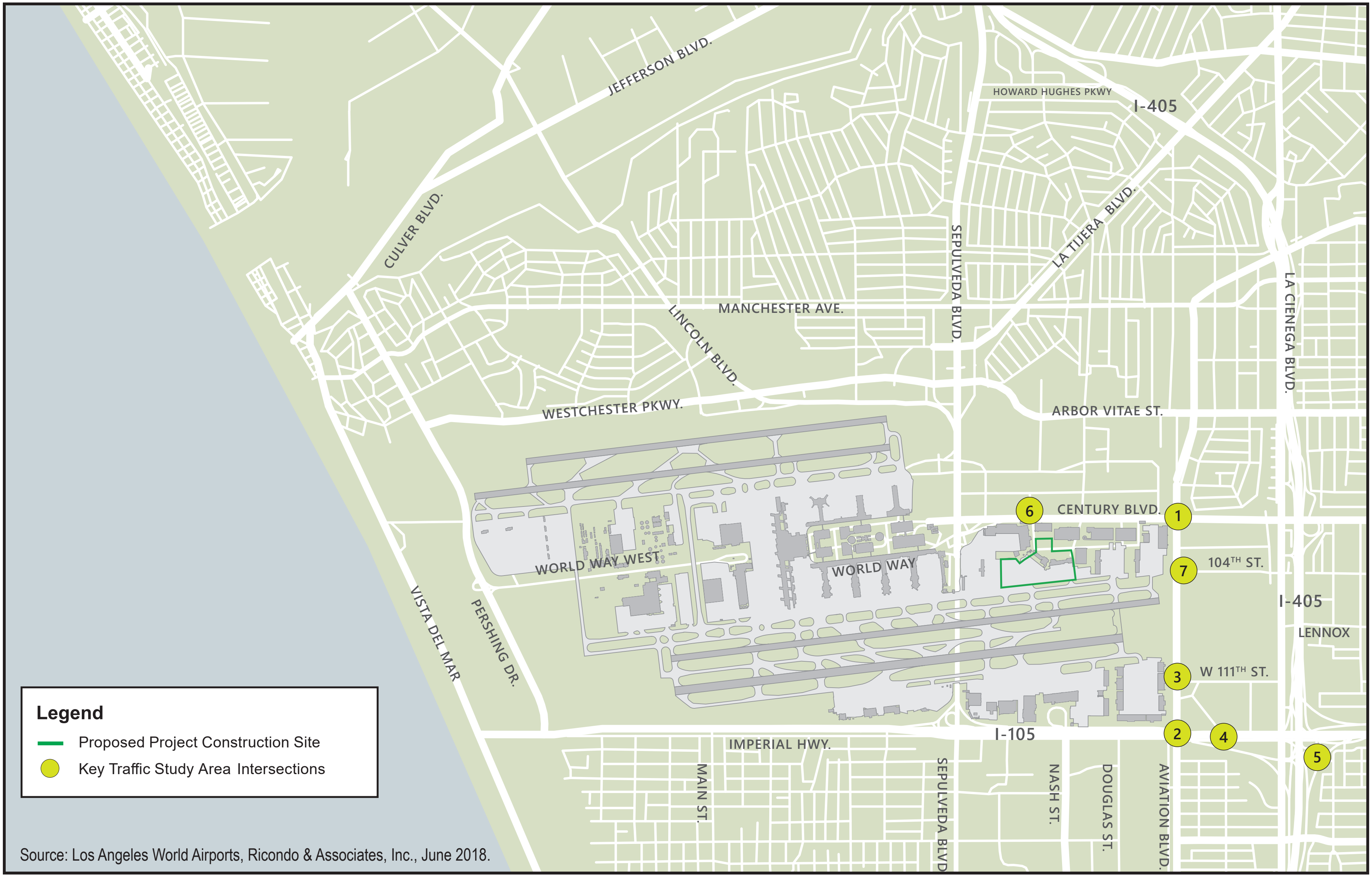
Intersection Control and Geometry

All of the construction traffic study area intersections listed in Table 4.4.1-1 and depicted in Figure 4.4.1-2 are signalized. In addition, all of the intersections are included in LADOT's Automated Traffic Surveillance and Control (ATSAC) system. The ATSAC system provides for monitoring of intersection traffic conditions and the flexibility to adjust traffic signal timing in response to current conditions. Study area intersection geometries are provided in Appendix D.1-1.

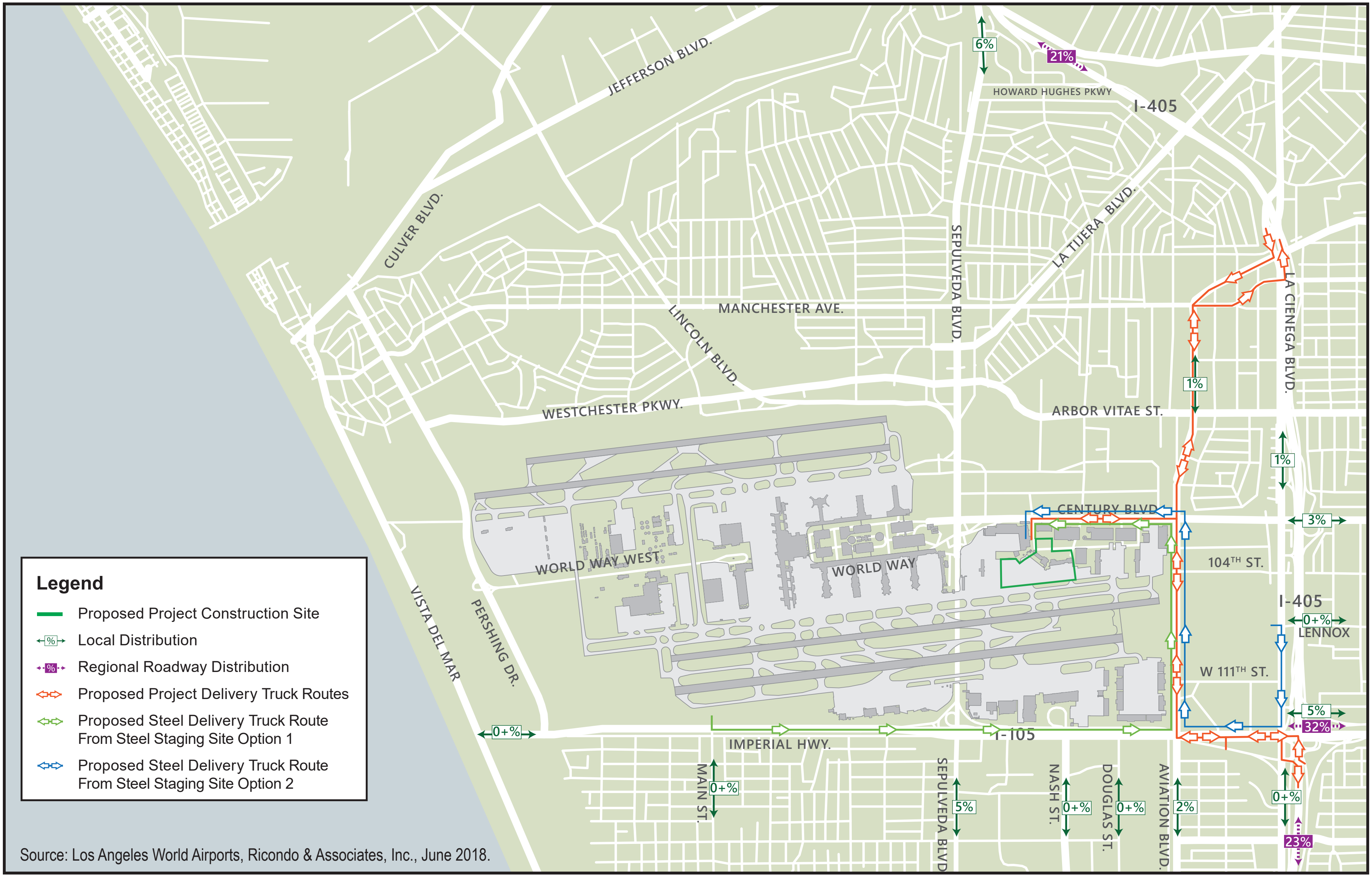
Peak Hours

The hours of analysis were chosen based on those which have available baseline traffic volumes for all intersections in the construction traffic study area, and for those hours at the start of the commuter peak periods. Using this criterion, the hours analyzed for the proposed project were:

- **AM Peak Hour (7:00 a.m. to 8:00 a.m.)** – As stated in Chapter 2, *Project Description*, construction shifts would be scheduled to avoid the morning commuter peak period (7:00 a.m. to 9:00 a.m.) The proposed project a.m. peak hour represents a period for material delivery trucks accessing/egressing the staging area (as previously stated, deliveries to the steel laydown area, and between the laydown area and the project site, would occur outside of the a.m. peak hour). The construction traffic analysis assumed that no employee trips would be on the roadways at this time, as employees would have arrived at the staging lot prior to 6:00 a.m. (i.e., the timing of the morning shift [6:00 a.m. to 2:30 p.m.] requires all employees to be on-site prior to the 7:00 a.m. to 8:00 a.m. peak hour).
- **PM Peak Hour (4:00 p.m. to 5:00 p.m.)** – As stated in Chapter 2, *Project Description*, construction shifts would be scheduled to avoid the afternoon commuter peak period (4:30 p.m. to 6:30 p.m.). The proposed project p.m. peak hour represents a period for material delivery trucks accessing/egressing the staging area (as previously stated, deliveries to the steel laydown area, and between the laydown area and the project site, would occur outside of the p.m. peak hour). The construction traffic analysis assumed that no employee trips would be on the roadways at this time, as employees would have either arrived or departed the staging lot prior to 4:00 p.m. (i.e., the timing of the morning shift [6:00 a.m. to 2:30 p.m.] assumes all employees would have departed the staging area prior to the 4:00 p.m. to 5:00 p.m. hour. Additionally, the timing of the afternoon shift [3:00 p.m. to 11:30 p.m.] would require all employees to be on-site prior to the 4:00 p.m. to 5:00 p.m. hour).



UAL East Aircraft Maintanance and GSE Project	Construction Traffic Study Area Intersections	Figure 4.4.1-2



UAL East Aircraft Maintanance and GSE Project

Proposed Project Construction Vehicle Routes & Trip Distribution

Figure

4.4.1-3

The a.m. peak hour analyzed falls entirely within the morning commuter peak period of 7:00 a.m. to 9:00 a.m., and the p.m. peak hour analyzed falls partially within the afternoon commuter peak period of 4:30 p.m. to 6:30 p.m., when background traffic is anticipated to be higher than adjacent hours. As noted above, the majority of project-related construction traffic is expected to occur during off-peak hours.

4.4.1.3.4 Baseline Intersection Analyses

Intersection LOS (v/c) was analyzed using the CMA methodology to assess the estimated operating conditions during baseline conditions for the a.m. and p.m. peak hours. This method, also known as the Circular 212 Planning Method, calculates the sum of the per-lane volumes for the critical movements and divides by an overall intersection capacity (volume-to-capacity ratio). LOS is a qualitative measure that describes traffic operating conditions (e.g., delay, queue lengths, congestion). Intersection LOS ranges from A (i.e., excellent conditions with little or no vehicle delay) to F (i.e., excessive vehicle delays and queue lengths). LOS definitions for the CMA methodology are presented in **Table 4.4.1-2**.

Table 4.4.1-2
Level of Service Definitions for Signalized Intersections

Level of Service (LOS)	Volume/Capacity Ratio Threshold	Definition
A	0.000 - 0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	VERY GOOD. An occasional approach phase is fully used; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 - 0.800	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 - 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 - 1.000	POOR. Represents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than - 1.000	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: Transportation Research Board, Transportation Research Circular No. 212, Interim Materials on Highway Capacity, January 1980.

In accordance with LADOT analysis procedures, the volume/capacity (v/c) ratio was calculated using the CMA methodology is further reduced by 0.07 for those intersections included within the ATSAC system to account for the improved operation and increased efficiency from the ATSAC system that is not captured as part of the CMA methodology. Application of the ATSAC reduction is described in Attachment D of the LADOT Transportation Impact Study Guidelines.[273]

The estimated intersection LOS (v/c) for baseline conditions is provided in **Table 4.4.1-3**. As shown in Table 4.4.1-3, 4 of the 7 intersections operated at LOS C or better during the baseline a.m. and p.m. peak periods analyzed for the proposed project. The following intersections were estimated to be operating at LOS D or worse during the baseline a.m. or p.m. peak periods:

- Aviation Boulevard and Century Boulevard (Intersection #1) – LOS D p.m. peak hour

[273] City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.

- Imperial Highway and I-105 Ramp (Intersection #4) – LOS D a.m. peak hour
- Imperial Highway and I-405 Northbound Ramp (Intersection #5) – LOS D p.m. peak hour

The LOS (v/c) results from the TRAFFIX program, including the volume, geometry and other inputs used to produce these results are provided in Appendix D.1-3.

Table 4.4.1-3
Baseline Intersection Analysis Results

Intersection		Peak Hour [1]	V/C [2]	LOS [3]
1.	Aviation Blvd. & Century Blvd.	AM Peak Hour	0.619	B
		PM Peak Hour	0.860	D
2.	Imperial Hwy. & Aviation Blvd.	AM Peak Hour	0.738	C
		PM Peak Hour	0.677	B
3.	Aviation Blvd. & 111th St.	AM Peak Hour	0.560	A
		PM Peak Hour	0.499	A
4.	Imperial Hwy. & I-105 Ramp	AM Peak Hour	0.839	D
		PM Peak Hour	0.580	A
5.	Imperial Hwy. & I-405 NB Ramp	AM Peak Hour	0.616	B
		PM Peak Hour	0.865	D
6.	Avion Drive & Century Blvd.	AM Peak Hour	0.418	A
		PM Peak Hour	0.410	A
7.	Aviation Blvd. & 104th St.	AM Peak Hour	0.635	B
		PM Peak Hour	0.569	A

Source: Appendix D.1-3 of this EIR

Notes:

1. The hours of analysis include the a.m. peak (7:00 a.m. - 8:00 a.m.) and the p.m. peak (4:00 p.m. - 5:00 p.m.).
2. Volume to capacity ratio.
3. LOS range: A (excellent) to F (failure).

4.4.1.3.5 LAWA's Coordination and Logistics Management Team

Subsequent to the approval of the LAX Master Plan, LAWA established the CALM Team. Working in cooperation with other LAWA divisions, including Terminal Operations, Airport Police, Environmental Programs Group, and Commercial Development Group, the CALM Team monitors construction traffic on the airport and oversees on-airport traffic-related logistics, including coordinating lane and roadway closures, and analyzing traffic conditions to determine the need for additional traffic controls, lane restriping, and traffic signal modifications. An approval process for proposed construction work has been established in which contractors submit request forms describing the work, when the work is proposed to take place, duration, coordination efforts with other projects, etc. If pedestrian or vehicular traffic will be impacted, the submittal form will include proposed traffic control plans. These requests are reviewed by staff from the CALM Team and various LAWA divisions, and any concerns are addressed prior to approval. The CALM Team also develops an informational campaign for construction activities, when warranted, including wayfinding signage for pedestrians to locate ground transportation facilities and parking during construction, information for commercial shuttle drivers regarding lane closures and detours, and traffic alerts on LAWA's website for the public and airport employees. A color-coded, real-time traffic conditions map for the LAX CTA is available on the LAWA website. Weekly meetings occur to discuss minimizing the construction impacts of current and future projects. Coordination with outside agencies is conducted as the individual projects necessitate.

4.4.1.4 Project-Generated Traffic

Traffic that would be generated by the proposed project is defined below for peak period of traffic generation.

4.4.1.4.1 Project Construction Traffic During Project Peak (August 2019)

The peak construction period for the proposed project is anticipated to occur during August 2019. Construction truck trips were estimated on an hourly basis over the typical busy day, which coincides with the peak period of construction, and therefore, construction employment. It is likely that this would occur over several days, or weeks, as construction of the proposed project is at its peak. As stated previously, construction employee trips would occur outside of the commuter peak hours.

For purposes of the intersection analyses, all vehicle trips were converted to "passenger car equivalents" (PCEs) to account for the additional impact that large vehicles, such as trucks, would have on roadway traffic operations. As such, the number of construction-related delivery truck trips was multiplied by a PCE factor of 2.5 consistent with the assumptions in previous LAX construction projects.

The construction schedule was reviewed to determine the specific construction elements occurring during the project peak month of August 2019. Delivery trucks carrying construction equipment and material would enter and exit the project site via Century Boulevard and Avion Drive. On the peak day of construction, a total of 333 daily haul truck trips were estimated with a maximum of 24 haul truck trips per hour, over the likely delivery schedule of 18 hours, during the project peak (August 2019). During the a.m. peak hour, it was estimated that 20 trucks would enter and exit the study area, while 18 trucks were estimated to enter and exit the study area during the p.m. peak hour. Using an assumed PCE factor of 2.5 per vehicle, it was estimated that a total of 50 PCEs (20 multiplied by 2.5) would enter and exit the study area during the a.m. peak period, while 40 PCEs (18 multiplied by 2.5) would enter and exit the study area during the p.m. peak period. As previously stated, deliveries to the steel laydown area, and between the laydown area and the project site, would occur outside of the a.m. and p.m. peak hours. Note that this volume of construction traffic would only occur during the project peak of August 2019. During July 2019, truck activity would be 10 percent lower than during August 2019. For the remainder of the construction period, the level of truck activity would be at least 25 to 50 percent lower than the peak month.

The estimated project-related construction trips (in PCEs) during the proposed project construction peak in August 2019 are summarized by hour in **Table 4.4.1-4**. The table identifies construction delivery truck trips used to transfer goods to and from the construction project site.

4.4.1.4.2 Proposed Project Construction Trip Distribution

The locations of the proposed project construction site, construction employee parking area, steel laydown area(s), and other relevant features are depicted in Figure 4.4.1-1. Figure 4.4.1-3 depicts the proposed project construction truck routes and trip distribution. As shown in Figure 4.4.1-3, trucks would use the regional freeway system (I-405 and I-105), Imperial Highway, Aviation Boulevard, Century Boulevard, and La Cienega Boulevard to access the proposed project site and the steel laydown area. The regional and local traffic flow distributions are also provided in Figure 4.4.1-3.

Truck traffic would be limited to accessing the project site and steel laydown area during construction via the regional freeway system (I-405 and I-105), Imperial Highway, Aviation Boulevard, Century Boulevard, and La Cienega Boulevard. The freeway ramps, roadways, and intersections representing the travel paths for construction-related vehicles within the construction traffic study area were determined by reviewing the designated haul routes and likely paths that would be used by vehicles traveling to the construction staging areas, and assigning those trips to the most logical routes. The traffic study area circulation routes for construction employees and trucks are described in Appendix D.1-4.

Table 4.4.1-4
Project Peak (August 2019) - Proposed Project-Related Construction Traffic PCEs

Hour		Truck[1]		Passenger Car Equivalents (PCE)[2]		Total Construction PCEs
		Trips In	Trips Out	Trips In	Trips Out	
0:00	1:00	-	-	-	-	-
1:00	2:00	-	-	-	-	-
2:00	3:00	-	-	-	-	-
3:00	4:00	-	-	-	-	-
4:00	5:00	-	-	-	-	-
5:00	6:00	23	15	58	38	96
6:00	7:00	23	26	58	65	123
7:00	**8:00**	**20**	**20**	**50**	**50**	**100**
8:00	9:00	20	20	50	50	100
9:00	10:00	24	25	60	63	123
10:00	11:00	24	25	60	63	123
11:00	12:00	19	22	48	55	103
12:00	13:00	18	18	45	45	90
13:00	14:00	18	18	45	45	90
14:00	15:00	16	16	40	40	80
15:00	16:00	16	16	40	40	80
16:00	**17:00**	**18**	**18**	**45**	**45**	**90**
17:00	18:00	18	18	45	45	90
18:00	19:00	18	18	45	45	90
19:00	20:00	20	20	50	50	100
20:00	21:00	20	20	50	50	100
21:00	22:00	10	10	25	25	50
22:00	23:00	8	8	20	20	40
23:00	0:00	-	-	-	-	-
Total		333	333	834	834	**1,668**
Summary of Modeled Traffic PCEs						
Construction AM (7:00 AM– 8:00 AM)		20	20	50	50	100
Construction PM (4:00 PM – 5:00 PM)		18	18	45	45	90

Source: CDM Smith (truck trips), April 2018; AECOM Hunt (truck schedule times), June 2018.

Notes:

1. Estimate of truck trips based on typical construction deliveries in the area.
2. Truck trips (i.e., haul trucks) were converted at a rate of 2.5 PCEs per vehicle. Delivery trucks are planned to be located on the project site. Steel laydown would occur offsite.

4.4.1.5 Future Cumulative Traffic

The components of traffic for the future cumulative traffic condition are described in this section. The future cumulative traffic condition takes into consideration past, present, and reasonably foreseeable probable future projects, as identified in Table 3-1 and shown on Figure 3-1 in Chapter 3, *Overview of Project Setting*. In addition, baseline traffic volumes were grown in accordance with the methodology described in Section 4.4.1.2.5. Given that approval, construction, and operation of local area development projects is a continuous process, the traffic associated with the construction and operation of many past and current local area developments were likely present during the latest intersection counts, and therefore were likely represented in the traffic volume data used as a basis for the traffic study.

Development projects considered in the cumulative impact analysis include LAX Master Plan projects as well as other capital improvement projects undertaken by LAWA and other local agencies. Based on information available at the time the construction traffic analysis for the proposed project was prepared, the development projects forecasted to be under construction concurrent with the proposed project construction (November 2018 through August 2020) and of a nature that would contribute to cumulative traffic impacts were identified.

Table 4.4.1-5 summarizes the estimated construction costs, and the assumed start and end dates of construction for the proposed project and each of the cumulative projects that are forecasted to be under construction concurrent with the proposed project. The estimated labor component of the total construction cost is a key element associated with estimating construction employee hours and resulting employee vehicle trips.

Table 4.4.1-5
Construction Projects Concurrent with the Proposed Project Construction Period

Concurrent Construction Project	Estimated Total Construction Cost (Millions)	Start Date	End Date	Estimated Total Construction Employee Hours (Total)
UAL East Aircraft Maintenance and GSE Project (proposed project)	$300	Nov-18	Aug-20	603,000
LAX Bradley West Project	$525	Nov-13	Nov-19	1,177,000
West Aircraft Maintenance Area Project	$67.3	Aug-14	Mar-19	425,000
Metro Crenshaw/LAX Transit Corridor Project	$2,058	Jan-15	Dec-19	2,306,000
Quonset Hut Relocation	$0.5	Nov-18	Jul-19	560
LAX Fuel Tank Installation	$22	Jun-18	Mar-19	49,000
Runway 7R-25L Rehabilitation	$200	Sep-20	Dec-21	336,000
Secured Area Access Post (SAAP) Project	$4	Mar-18	Mar-20	9,000
Terminals 2 and 3 Modernization Project	$1,400	May-18	Jun-23	3,138,000
Midfield Satellite Concourse North	$1,160	Apr-15	Apr-20	5,732,000
Terminal 1.5	$750	Oct-17	Mar-20	1,681,000
Miscellaneous Projects/Improvements	$945.5	Jan-14	Jul-20	1,480,000
LAX Northside Development[1]	N/A[1/]	Apr-16	Jun-25	N/A[1]
Landside Access Modernization Program[2]	$5,500	Jan-18	Dec-35	13,100,000
MSC South Project	$1,000	Jul-20	Jul-25	2,242,000
Airport Metro Connector 96th Street Transit Station	$623	Jan-20	Jan-23	1,397,000

Sources: LAWA; CDM Smith; Connico Incorporated, March 2016; Ricondo & Associates, Inc., June 2018.

Notes:

1. Construction traffic estimates based on monthly construction activity estimates provided by Gibson Transportation Consulting, Inc. The components of this development whose construction would overlap that of the proposed project include construction of the Argo Drain Sub-Basin Stormwater Infiltration and Treatment Facility, Receiving Station X Project and the Airport Police Facility.
2. Construction traffic estimates provided by Connico Incorporated.

The activity characteristics of the resource loaded schedule (monthly employee hours, shift times, etc.) and associated construction-related vehicle trip activity developed for other LAWA construction projects were used to estimate the construction activity associated with the other concurrent projects for which detailed construction-related trip data were not available. Specifically, the ratio of total construction employee hours to total labor cost was calculated for the Bradley West Project, WAMA, and MSC. A weighted average of this ratio was applied to the estimated labor costs associated with the other cumulative projects to provide an estimate of total employee hours required over the course of each of these other projects.[274]

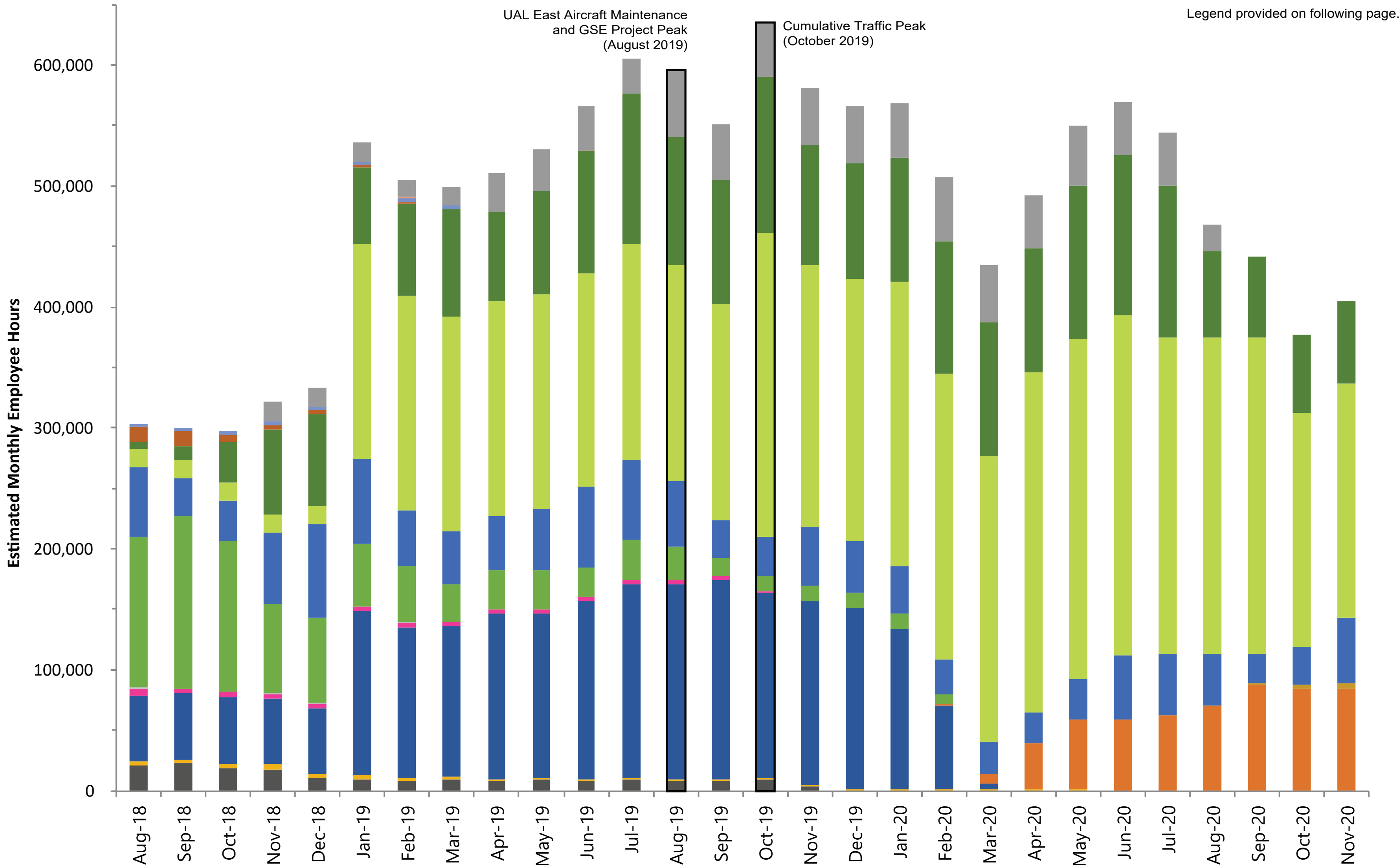
This approach was used to estimate construction employee hours and vehicle trips associated with all concurrent projects with the exception of the LAX Northside Development project, for which construction trip information and monthly construction employee hour data were obtained from the traffic consultants involved in preparation of the traffic study for the LAX Northside Development EIR. Additionally, construction employee hours and vehicle trips associated with the MSC North, Landside Access Modernization Program, Terminal 1.5 Project, and T2/3 Modernization Project were obtained based on detailed construction-related trip projections from the technical analyses prepared as part of their respective EIRs/Initial Studies.

Based on the information in Table 4.4.1-5, **Figures 4.4.1-4** provides estimated employee hours by month for the proposed project and the cumulative construction projects that are forecasted to be under construction concurrent with the proposed project construction period. The figure includes all construction projects that are forecasted to occur over the course of the construction period for the proposed project. As shown in the figure, the peak period for proposed project construction is estimated to occur in August 2019, while the overall cumulative peak during construction of the proposed project is estimated to occur in October 2019.

Using the information in Table 4.4.1-5 and the identification of the overall cumulative peak construction period illustrated in Figure 4.4.1-4, it was determined that nine cumulative projects would be undergoing construction during the cumulative peak construction period (i.e., October 2019). Estimated a.m. and p.m. peak hour vehicle trips associated with the proposed project and these nine concurrent construction projects during the cumulative peak period are provided in **Table 4.4.1-6**. Traffic volumes associated with the proposed project during the peak period for cumulative traffic were estimated based on a review of the proposed project construction schedule. As a result, project construction traffic during the peak cumulative period (October 2019) would be about 82 percent of the construction traffic activity that would occur during the peak month for the project (August 2019).

For each of the cumulative projects, with exception of the MSC North Project, Landside Access Modernization Program, and T2/3 Modernization Project, it was assumed that construction employees would access the traffic study area in the a.m. peak hour, and depart the traffic study area in the p.m. peak hour. The trip characteristics for the MSC North, Landside Access Modernization Program Project, and T2/3 Modernization Program were based on the construction schedules developed for their respective EIRs. Furthermore, it was assumed that all construction projects would use a single work shift with the exception of the MSC North, which was assumed to utilize a double-shift work schedule with the same shift split characteristics as the Bradley West Project. The Landside Access Modernization Program and T2/3 Modernization Project, primarily also have double-shift schedules, although they have brief periods where a triple shift would occur to minimize disruption of the CTA roadways during construction of those projects.

274 The profile of the monthly distribution of employee hours over the course of the Bradley West Project was used to develop a model profile based on a comprehensive resource loaded schedule, which provides a realistic surrogate for use in estimating activity from other cumulative projects for which detailed construction data are not available.



Source: CDM Smith, Gibson Transportation Consulting, Inc. (LAX Northside Area Development), Connico Incorporated (LAX Landside Access Modernization Program), Ricondo & Associates, Inc., (estimated employee hours for all other projects) June 2018.

UAL East Aircraft Maintanance and GSE Project

Estimated Employee Hours for Proposed Project and Other Concurrent Construction Projects

Figure
4.4.1-4

Legend for Figure 4.4.1-4

- UAL East Aircraft Maintenance and GSE Project (Nov '18 - Aug '20)
- West Aircraft Maintenance Area Project (Aug '14 - Mar '19)
- LAX Terminals 2 and 3 Modernization Project (May '18 - Jun '23)
- LAX Northside Development (Apr '16 - Jun '25)
- Terminal 1.5 (Oct '17 - Mar '20)
- Runway 7R-25L Rehabilitation (Sep '20 - Dec '21)
- LAX Bradley West Project (Nov '13 - Nov '19)
- Miscellaneous Projects/Improvements (Jan '14 - Jul '20)
- Quonset Hut Relocation (Nov '18 - Jul '19)
- LAX Fuel Tank Installation (Jun '18 - Mar '19)
- Landside Access Modernization Program (Jan '18 - Dec '35)
- MSC South Project (2020 - 2025)
- Secured Area Access Post (SAAP) Project (Mar '18 - Mar '20)
- Airport Metro Connector (AMC) 96th Street Transit Station (Jan '20 - Jan '23)
- Midfield Satellite Concourse North (Apr '15 - Apr '20)
- Metro Crenshaw / LAX Transit Corridor Project (Jan '15 - Dec '19)

Note: The order of projects presented in the legend correspond to the order of the stacked bar chart.

Source: CDM Smith, Gibson Transportation Consulting, Inc. (LAX Northside Area Development), Connico Incorporated (LAX Landside Access Modernization Program), Ricondo & Associates, Inc., (estimated employee hours for all other projects) June 2018.

UAL East Aircraft Maintanance and GSE Project

Estimated Employee Hours for Proposed Project and Other Concurrent Construction Projects

Figure
4.4.1-4

Table 4.4.1-6
Construction Project Trips during the Cumulative Peak Construction Period (October 2019)

Project	Construction Trips in Passenger Car Equivalents (PCEs)											
	AM Peak Hour (7:00 AM - 8:00 AM)						PM Peak Hour (4:00 PM - 5:00 PM)					
	Employees[1]		Trucks[2]		Shuttles[3]		Employees[1]		Trucks[2]		Shuttles	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Proposed Project (October 2019)[6]	-	--	43	43	--	--	--	-	38	38	--	--
Other Concurrent Projects in October 2019[4]												
LAX Bradley West Project	3	--	3	3	--[7]	--[7]	--	3	3	3	--[7]	--[7]
Metro Crenshaw/LAX Transit Corridor Project	27	--	5	5	--[7]	--[7]	--	27	5	5	--[7]	--[7]
Secured Area Access Post (SAAP) Project	2	--	3	3	--[7]	--[7]	--	2	3	3	--[7]	--[7]
Terminals 2 and 3 Modernization Project[9]	--	280	28	28	20	20	--	--	28	28	--[7]	--[7]
Midfield Satellite Concourse North[5]	354	--	93	93	--[7]	--[7]	83	354	93	93	--[7]	--[7]
Terminal 1.5	40	--	8	8	--[7]	--[7]	--	40	8	8	--[7]	--[7]
Miscellaneous Projects/Improvements	5	--	3	3	--[7]	--[7]	--	5	3	3	--[7]	--[7]
LAX Northside Development[6]	209	--	--	--	--[7]	--[7]	--	209	--	--	--[7]	--[7]
Landside Access Modernization Program[8,9]	--	--	65	65	--[7]	--[7]	--	--	65	65	--[7]	--[7]
Total for Other Concurrent Projects in October 2019	**640**	**280**	**208**	**208**	**20**	**20**	**83**	**640**	**208**	**208**	**--[7]**	**--[7]**

Source: Gibson Transportation Consulting, Inc.; Connico Incorporated, June 2016; CDM Smith, Ricondo & Associates, Inc., June2018.

Notes:

1. An occupancy factor of 1.15 employees per vehicle is included in the employee trip calculations.
2. Truck trips (i.e., haul trucks, concrete trucks) were converted at a rate of 2.5 PCEs per vehicle.
3. Employee shuttles were converted at a rate of 2.0 PCEs per vehicle. Shuttle occupancy was assumed to be 30 passengers per vehicle.
4. The ratio of peak hour trips over total monthly employee construction hours for other concurrent projects was assumed to be equal to that calculated for the proposed Bradley West Project, West Aircraft Maintenance Area, and MSC (weighted average), unless other project-specific data were available.
5. Assumed to operate with a double-shift work schedule.
6. Peak hour trips provided by Gibson Transportation Consulting. The components of this development whose construction would overlap that of the proposed project include the Argo Drain Sub-Basin Stormwater Infiltration and Treatment Facility, Receiving Station X Project and the Airport Police Facility.
7. Employee shuttles would not affect public roadways or intersections due to the location of the project construction site and the employee parking areas. In some cases, employee parking would occur in close proximity to the construction site; in other cases, employee shuttles would travel largely or exclusively on on-airport roadways.
8. Construction estimates provided by Connico Incorporated.
9. Assumed to operate with a triple-shift work schedule.

For purposes of distributing traffic within the construction traffic study area, employee parking and staging locations for the concurrent projects were identified. The assumed location of the construction employee parking and material staging area, as well as general access and circulation patterns of construction-related vehicle activity for the proposed project, are depicted in **Figure 4.4.1-5**. The contractor employee parking and staging areas for the nine concurrent construction projects during the cumulative peak period are also depicted in Figure 4.4.1-5, as well as other available staging locations in the area. The figure depicts parking and staging areas associated with the projects forecasted to be under construction concurrent with the peak cumulative period (October 2019) analyzed for this study. The regional and local area distribution patterns are generally the same as for the proposed project, with adjustments as necessary for access to the individual sites.

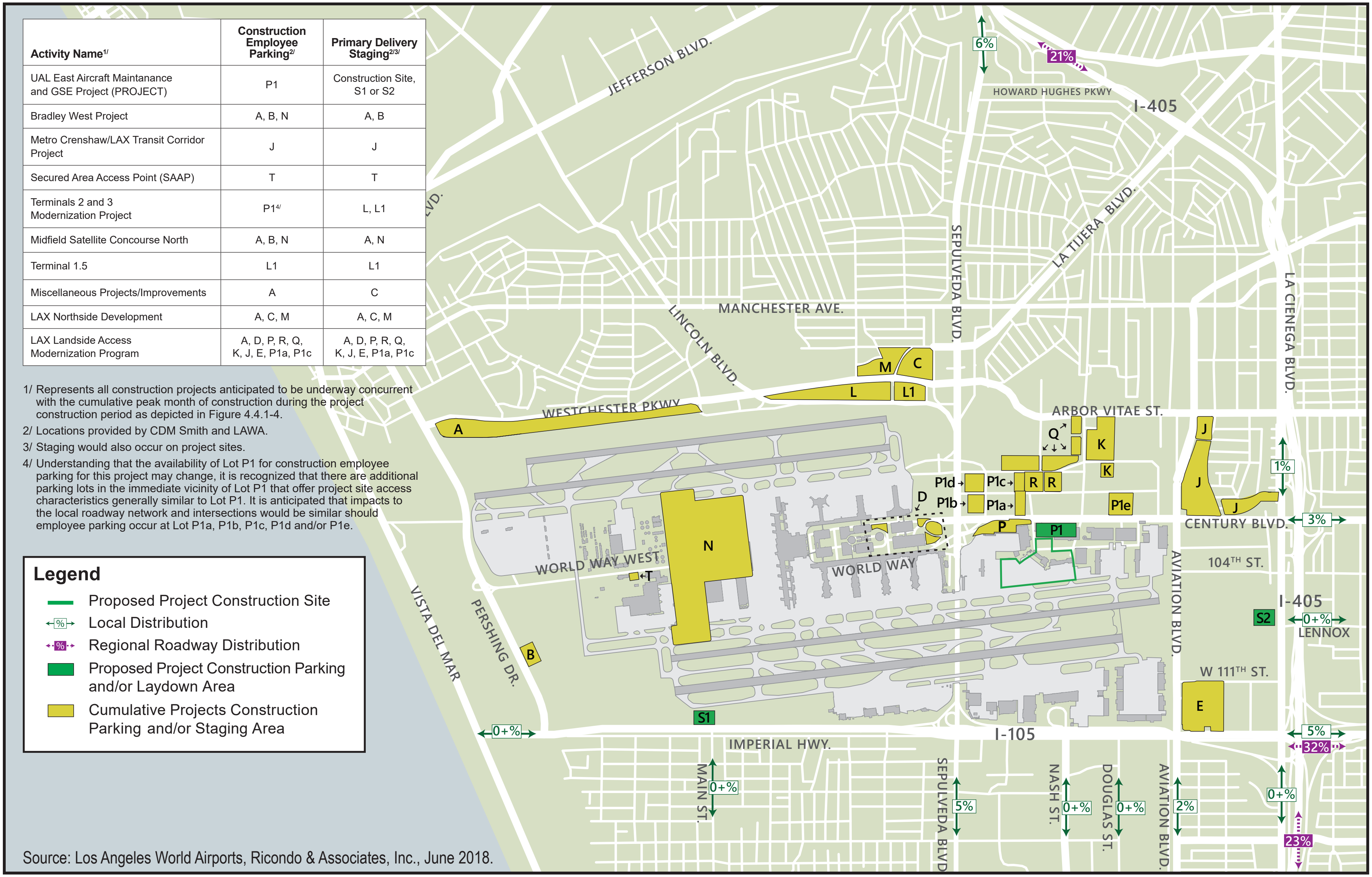
Activity Name[1/]	Construction Employee Parking[2/]	Primary Delivery Staging[2/3/]
UAL East Aircraft Maintanance and GSE Project (PROJECT)	P1	Construction Site, S1 or S2
Bradley West Project	A, B, N	A, B
Metro Crenshaw/LAX Transit Corridor Project	J	J
Secured Area Access Point (SAAP)	T	T
Terminals 2 and 3 Modernization Project	P1[4/]	L, L1
Midfield Satellite Concourse North	A, B, N	A, N
Terminal 1.5	L1	L1
Miscellaneous Projects/Improvements	A	C
LAX Northside Development	A, C, M	A, C, M
LAX Landside Access Modernization Program	A, D, P, R, Q, K, J, E, P1a, P1c	A, D, P, R, Q, K, J, E, P1a, P1c

1/ Represents all construction projects anticipated to be underway concurrent with the cumulative peak month of construction during the project construction period as depicted in Figure 4.4.1-4.

2/ Locations provided by CDM Smith and LAWA.

3/ Staging would also occur on project sites.

4/ Understanding that the availability of Lot P1 for construction employee parking for this project may change, it is recognized that there are additional parking lots in the immediate vicinity of Lot P1 that offer project site access characteristics generally similar to Lot P1. It is anticipated that impacts to the local roadway network and intersections would be similar should employee parking occur at Lot P1a, P1b, P1c, P1d and/or P1e.



Source: Los Angeles World Airports, Ricondo & Associates, Inc., June 2018.

UAL East Aircraft Maintanance and GSE Project

Employee Parking and Staging Locations for Proposed Project and Other Projects at Construction Peak

Figure
4.4.1-5

4.4.1.6 Thresholds of Significance

The construction traffic study area intersections either fall entirely within the City of Los Angeles or share a boundary with the City of El Segundo or the City of Inglewood. The intersections which fall entirely within the City of Los Angeles were evaluated for traffic impacts using the LADOT traffic impact significance criteria. Intersections lying on the boundary of multiple jurisdictions were evaluated using the more conservative threshold of significance criteria; in all of these cases the LADOT criteria were shown to have the most conservative thresholds, as the allowable project-related increase in v/c by LADOT is smaller than that of other jurisdictions.

4.4.1.6.1 City of El Segundo Impact Criteria

In the City of El Segundo, an impact is considered significant if the following threshold is exceeded:[275]

- The LOS is E or F, its final volume/capacity (v/c) ratio is 0.901 or greater, and the project-related increase in v/c is 0.020 or greater.

4.4.1.6.2 City of Inglewood Impact Criteria

In the City of Inglewood, an impact is considered significant if the following threshold is exceeded:[276]

- The LOS is F, its final v/c ratio is 1.001 or greater, and the project-related increase in v/c is 0.020 or greater.

4.4.1.6.3 City of Los Angeles Impact Criteria

In accordance with LADOT criteria defined in its Transportation Impact Study Guidelines,[277] an impact is considered to be significant if one of the following thresholds is exceeded:

- The LOS is C, its final v/c ratio is 0.701 to 0.80, and the project-related increase in v/c is 0.040 or greater; or
- The LOS is D, its final v/c ratio is 0.801 to 0.90, and the project-related increase in v/c is 0.020 or greater; or
- The LOS is E or F, its final v/c ratio is 0.901 or greater, and the project-related increase in v/c is 0.010 or greater.

The "final v/c ratio" as defined by LADOT consists of the future v/c ratio at an intersection that includes volume from the project, baseline, ambient background growth, and other cumulative development projects, but without proposed intersection traffic mitigation.

The "project-related increase" is defined as the change in the unmitigated LOS (v/c) condition between the (a) future v/c "with" the project, baseline, ambient background growth (for the cumulative impact analysis), and other cumulative development project growth, and (b) the future v/c "without" the project, but with baseline, ambient background growth, and other cumulative development project growth. The existing conditions plus project-related traffic analysis was completed as part of Impact Comparison 1, described in Section 4.4.1.7.1.

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275 City of El Segundo, Planning and Building Safety Department, *City of El Segundo, Circulation Element of the General Plan*, Policy C3-1.2, September 2004.

276 Raju Associates, Inc., *Traffic Study Assumptions and Methodology Memorandum to City of Inglewood*, October 27, 2015.

277 City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.

4.4.1.7 Impacts Analysis

4.4.1.7.1 Impact Comparison 1: Peak Project Construction Traffic Plus Baseline Traffic Measured Against Baseline

This comparison provides the basis for determining project-related impacts. The comparison is based on project-specific traffic generation during the peak construction period (August 2019) added to baseline traffic volumes. The resulting levels of service were compared to the levels of service associated with the baseline condition. A significant impact would be realized if the thresholds of significance are met or exceeded. **Table 4.4.1-7** compares LOS under baseline and project-plus-baseline conditions. As shown, no intersections are estimated to be significantly impacted under the Baseline plus Project condition.

4.4.1.7.2 Impact Comparison 2: Cumulative Construction Traffic (October 2019) Measured Against Baseline

This comparison was conducted in two steps, which is consistent with State CEQA Guidelines Section 15130. An initial comparison was conducted by comparing the LOS (v/c) associated with peak cumulative traffic volumes with the baseline levels of service. This initial comparison was conducted to determine if there would be a significant cumulative impact. If a significant cumulative impact was determined, then an additional comparison was conducted to determine if the proposed project would make a cumulatively considerable contribution to the significant cumulative impact. This second comparison was conducted by comparing cumulative conditions with and without the proposed project. Cumulatively considerable contributions are realized when the thresholds of significance defined above are met or exceeded. If the project's contribution to a significant cumulative impact is not determined to be cumulatively considerable, then the project's impact under cumulative conditions is considered less than significant.

The impact comparisons are depicted in **Table 4.4.1-8**. As shown in the table, 5 intersections would be significantly impacted during the cumulative peak construction period (October 2019). Furthermore, the proposed project's contribution to such significant cumulative impacts would be cumulatively considerable at three of the significantly impacted intersections:

- Aviation Boulevard and Century Boulevard (Intersection #1) – p.m. peak hour
- Imperial Highway and Aviation Boulevard (Intersection #2) – a.m. peak hour
- Imperial Highway and I-105 Ramp (Intersection #4) – a.m. peak hour

The project's cumulatively considerable contribution to the significant impacts at each of these intersections would be generated by haul truck traffic transferring materials to/from the proposed project site.

Table 4.4.1-7
Proposed Project - Level of Service Analysis Results - Impact Comparison 1 Baseline Compared to Project Plus Baseline

	Intersection	Peak Hour[1]	Baseline		Project Plus Baseline		Change in V/C	Significant Impact
			V/C[2]	LOS[3]	V/C[2]	LOS[3]		
1.	Aviation Boulevard and Century Boulevard	AM Peak Hour	0.619	B	0.654	B	0.035	No
		PM Peak Hour	0.860	D	0.879	D	0.019	No
2.	Imperial Highway and Aviation Boulevard	AM Peak Hour	0.738	C	0.764	C	0.026	No
		PM Peak Hour	0.677	B	0.690	B	0.013	No
3.	Aviation Boulevard and 111th Street	AM Peak Hour	0.560	A	0.573	A	0.013	No
		PM Peak Hour	0.499	A	0.511	A	0.012	No
4.	Imperial Highway and I-105 Ramp	AM Peak Hour	0.839	D	0.858	D	0.019	No
		PM Peak Hour	0.580	A	0.594	A	0.014	No
5.	Imperial Highway and I-405 Northbound Ramp	AM Peak Hour	0.616	B	0.621	B	0.005	No
		PM Peak Hour	0.865	D	0.865	D	0.000	No
6.	Avion Drive and Century Boulevard	AM Peak Hour	0.418	A	0.418	A	0.000	No
		PM Peak Hour	0.410	A	0.416	A	0.006	No
7.	Aviation Boulevard and 104th Street	AM Peak Hour	0.635	B	0.648	B	0.013	No
		PM Peak Hour	0.569	A	0.585	A	0.016	No

Source: Appendix D.1-3 of this EIR.

Notes:

1. The hours of analysis include the a.m. peak (7:00 a.m. - 8:00 a.m.), and the p.m. peak (4:00 p.m. - 5:00 p.m.).
2. Volume to capacity ratio. Includes an LADOT ATSAC benefit applied at each intersection.
3. Level of Service range: A (excellent) to F (failure).

Table 4.4.1-8
Proposed Project - Level of Service Analysis Results - Impact Comparison 2 Cumulative Traffic (October 2019)

			Baseline		Cumulative Peak (October 2019) Without Project		Cumulative Peak (October 2019) With Project			Cumulative Impact Determination		Cumulatively Considerable Determination
			[A]		[B]		[C]			[C]-[A]		[C]-[B]
	Intersection	Peak Hour[1]	V/C[2]	LOS[3]	V/C[2]	LOS[3]	V/C[2]	LOS[3]	Change in V/C	Significant Cumulative Impact?	Change in V/C	Cumulatively Considerable Contribution?
1.	Aviation Boulevard and Century Boulevard	AM Peak Hour	0.619	B	0.689	B	0.720	C	0.101	**Yes**	0.031	No
		PM Peak Hour	0.860	D	0.950	E	0.966	E	0.106	**Yes**	0.016	**Yes**
2.	Imperial Highway and Aviation Boulevard	AM Peak Hour	0.738	C	0.822	D	0.844	D	0.106	**Yes**	0.022	**Yes**
		PM Peak Hour	0.677	B	0.744	C	0.755	C	0.078	**Yes**	0.011	No
3.	Aviation Boulevard and 111th Street	AM Peak Hour	0.560	A	0.611	B	0.623	B	0.063	No	0.012	No
		PM Peak Hour	0.499	A	0.543	A	0.553	A	0.054	No	0.010	No
4.	Imperial Highway and I-105 Ramp	AM Peak Hour	0.839	D	0.930	E	0.945	E	0.106	**Yes**	0.015	**Yes**
		PM Peak Hour	0.580	A	0.635	B	0.647	B	0.067	No	0.012	No
5.	Imperial Highway and I-405 Northbound Ramp	AM Peak Hour	0.616	B	0.654	B	0.659	B	0.043	No	0.005	No
		PM Peak Hour	0.865	D	0.907	E	0.907	E	0.042	**Yes**	0.000	No
6.	Avion Drive and Century Boulevard	AM Peak Hour	0.418	A	0.533	A	0.565	A	0.147	No	0.032	No
		PM Peak Hour	0.410	A	0.452	A	0.477	A	0.067	No	0.025	No
7.	Aviation Boulevard and 104th Street	AM Peak Hour	0.635	B	0.690	B	0.701	C	0.066	**Yes**	0.011	No
		PM Peak Hour	0.569	A	0.623	B	0.633	B	0.064	No	0.010	No

Source: Appendix D.1-3 of this EIR.

Notes:

1. The hours of analysis include the a.m. peak (7:00 a.m. - 8:00 a.m.), and the p.m. peak (4:00 p.m. - 5:00 p.m.).
2. Volume to capacity ratio. Includes an LADOT ATSAC benefit applied at each intersection.
3. Level of Service range: A (excellent) to F (failure).

4.4.1.8 Mitigation Measures

As described in Section 4.4.1.5, the proposed project would have no significant impacts under Baseline plus Project condition. The proposed project's contribution to cumulatively significant impacts would be cumulatively considerable at Aviation Boulevard and Century Boulevard (Intersection #1), Imperial Highway and Aviation Boulevard (Intersection #2), and Imperial Highway and I-105 Ramp (Intersection #4).

The proposed project's contribution to significant cumulative impacts generated at each of these intersections would be due to haul truck traffic transferring materials to and from the project site during the a.m. and p.m. peak hours. Restricting haul truck trips during the a.m. and p.m. peak hours would eliminate the project-related cumulatively considerable contribution to significant cumulative impacts at all of the significantly impacted intersections.

The following mitigation measure is proposed to reduce the proposed project's contribution to cumulatively significant construction traffic impacts.

- **MM-ST (UAL)-1. Designated Truck Delivery Hours.** Truck deliveries of bulk materials (such as aggregate, bulk cement, dirt, etc.) to the project site, and hauling of material from the project site, shall be scheduled during off-peak hours to avoid the peak commuter traffic periods on designated haul routes. Peak commuter traffic periods are between 7:00 a.m. to 9:00 a.m. and 4:30 p.m. to 6:30 p.m. Monday through Friday. Any deviations to these requirements shall be approved in writing by the CALM Team prior to actual site deliveries.

4.4.1.9 Level of Significance After Mitigation

As indicated above, restricting haul truck traffic during the a.m. and p.m. peak hours would mitigate the project's contribution to significant cumulative impacts at each of the significantly impacted intersections. **Table 4.4.1-9** presents the resulting v/c and LOS under the Cumulative plus Project condition with implementation of the mitigation measure. As shown in Table 4.4.1-9, with implementation of Mitigation Measure MM-ST (UAL)-1, the proposed project's contribution to impacts at each intersection (Intersections #1, #2 and #4) would be reduced to a level that is less than cumulatively considerable.

Table 4.4.1-9
Proposed Project - Level of Service Analysis Results - Mitigation Results Cumulative Plus Project Condition

Intersection		Peak Hour[1]	Baseline		Without Project		With Project Pre Mitigation		With Project With Mitigation		Cumulative Impact Determination		Cumulatively Considerable Determination	
			[A]		[B]		[C]		[D]		[D] – [A]		[D] – [B]	
			V/C[2]	LOS[3]	V/C[2]	LOS[3]	V/C[2]	LOS[3]	V/C[2]	LOS[3]	Change in V/C	Significant Cumulative Impact?	Change in V/C	Cumulatively Considerable Contribution?
1.	Aviation Boulevard and Century Boulevard	PM Peak Hour	0.860	D	0.950	E	0.966	E	0.950	E	0.090	Yes	0.000	No
2.	Imperial Highway and Aviation Boulevard	AM Peak Hour	0.738	C	0.822	D	0.844	D	0.822	D	0.084	Yes	0.000	No
4.	Imperial Highway and I-105 Ramp	AM Peak Hour	0.839	D	0.930	E	0.945	E	0.930	E	0.091	Yes	0.000	No

Source: Appendix D.1-3 of this EIR.

Notes:

1. The hours of analysis include the a.m. peak (7:00 a.m. - 8:00 a.m.), and the p.m. peak (4:00 p.m. - 5:00 p.m.).
2. Volume to capacity ratio. Includes an LADOT ATSAC benefit applied at each intersection.
3. Level of Service range: A (excellent) to F (failure).

4.4.2 Operational Transportation/Traffic

4.4.2.1 Introduction

The proposed project would relocate and consolidate functions from the existing West Maintenance Facility to a new East Maintenance Facility, thereby shifting UAL employee traffic and delivery truck operations. Implementation of the proposed project would not result in additional traffic, but instead a reassignment of existing trips would occur. Furthermore, the site layout of the new East Maintenance Facility would result in a closure of the eastbound portion of Avion East, resulting in an operational change of vehicles and delivery trucks currently egressing Parking Garage F and the Mercury Air Group cargo facility. The primary focus of the operational traffic analysis presented in this section is the change in traffic conditions that would result from implementation of the proposed project. The operational traffic analysis completed for the proposed project accounts for increases in both background and airport-related traffic that would occur when the proposed project opens (Opening Day December 2020) and five years after opening (Plus Five Years 2025). Each of the future year conditions (2020 and 2025) includes the projected growth in both non-airport and airport-related vehicle trips. Such future growth in both background and passenger activity levels at LAX is independent of the proposed project and would occur whether the proposed project is implemented or not. The analysis also accounts for increases in traffic that would result from the construction of foreseeable projects. Additionally, the Plus Five Years 2025 scenario includes Phase 1 roadway improvements identified in the Landside Access Modernization Program EIR.[278] The following scenarios were analyzed in the proposed project operational traffic impact analysis:

- Baseline (2017) (i.e., existing traffic conditions without the proposed project);
- Baseline 2017 Plus Project 2020 (i.e., existing traffic conditions as affected by the proposed project under Opening Day conditions);
- Baseline 2017 Plus Project 2025 (i.e., existing traffic conditions as affected by the proposed project under Plus Five Years conditions);
- Future 2020 Without Project (i.e., future conditions with projected growth in background vehicle trips in the area surrounding LAX and airport-related vehicle trips projected to occur by 2020, but without the proposed project; this represents Opening Day conditions for the proposed project);
- Future 2020 With Project (i.e., the future conditions described above for the Future 2020 Without Project scenario plus the change in operational characteristics associated with the proposed project);
- Future 2025 Without Project (i.e., future conditions with projected growth in background vehicle trips in the area surrounding LAX, Landside Access Modernization Program Phase 1 roadway improvements [discussed in Section 4.4.2.5 below] and growth in airport-related vehicle trips projected to occur by 2025, but without the proposed project; this represents Plus Five Years after the opening of the proposed project); and
- Future 2025 With Project (i.e., the future conditions described above for the Future 2025 Without Project scenario plus the change in operational characteristics associated with the proposed project).

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278 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, (SCH 2015021014), Chapter 2, Description of the Proposed Project, and Section 4.12.2, Off-Airport Transportation, as revised in the Final EIR, and Appendix O, Off-Airport Traffic Study, February 2017.

4.4.2.2 Methodology

4.4.2.2.1 Overview

As noted above, this analysis focuses on traffic impacts due to operational changes caused by implementation of the proposed project.

The operational traffic study area includes intersections and roadways that would be directly or indirectly affected by the likely reassignment of existing trips upon the opening of the proposed project. The traffic analysis is also consistent with the information and requirements defined in City of Los Angeles Department of Transportation (LADOT) Transportation Impact Study Guidelines.[279]

The following steps and assumptions were used to develop the analysis methodology:

- The operational traffic study area was assumed to be consistent with that analyzed as part of the construction traffic analysis and is depicted in **Figure 4.4.2-1**. This area was defined to incorporate the local area roadways that serve as the primary travel paths used by LAX passenger and employee traffic.
- Intersection turning movement traffic volume data were collected at key traffic study area intersections over a two-year period (2014 to 2015). Traffic counts at intersections within the City of Los Angeles were generally obtained from 7:00 a.m. to 10:00 a.m., and from 3:00 p.m. to 6:00 p.m., consistent with the City of Los Angeles Transportation Impact Study Guidelines. The counts at the remaining intersections under other jurisdictions were obtained from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Due to ongoing construction of the Metro Crenshaw/LAX Transit Corridor project along Aviation Boulevard, traffic counts in the area were not updated as they are not considered representative of typical baseline conditions; the most recent traffic counts available were used instead. The traffic count periods were established to obtain traffic count data during the a.m. and p.m. peak commuter periods and represent the most recent counts at the operational traffic study area intersections. As described in Section 4.4.2.2.2, these traffic counts have been increased by 12.5 percent (a.m. peak) and 16.8 percent (p.m. peak) to account for interim growth to the baseline year (2017). Additional traffic counts were also conducted in February 2018 at the intersections of Airport Boulevard/Century Boulevard, Avion Drive/Century Boulevard, Avion East/Avion South, and the driveways of Parking Garage F and surface Parking Lot H. These additional counts were completed because no recent traffic counts exist at these intersections and were needed to establish baseline activity near the future East Maintenance Facility, as well as estimate traffic activity and demand from Parking Garage F and Parking Lot H. These counts were used as a basis for preparing the operational traffic analysis and assessing project-related traffic impacts. To provide a conservative analysis, the peak commuter peak hours were used in the operational traffic analysis, specifically 8:00 a.m. to 9:00 a.m. (a.m. peak hour) and 5:00 p.m. to 6:00 p.m. (p.m. peak hour).

The following describes the methodology and assumptions underlying the various traffic conditions considered in this traffic analysis, and how the proposed project's direct and cumulative impacts were identified relative to those conditions. Data in support of the analysis are provided in Appendix D.

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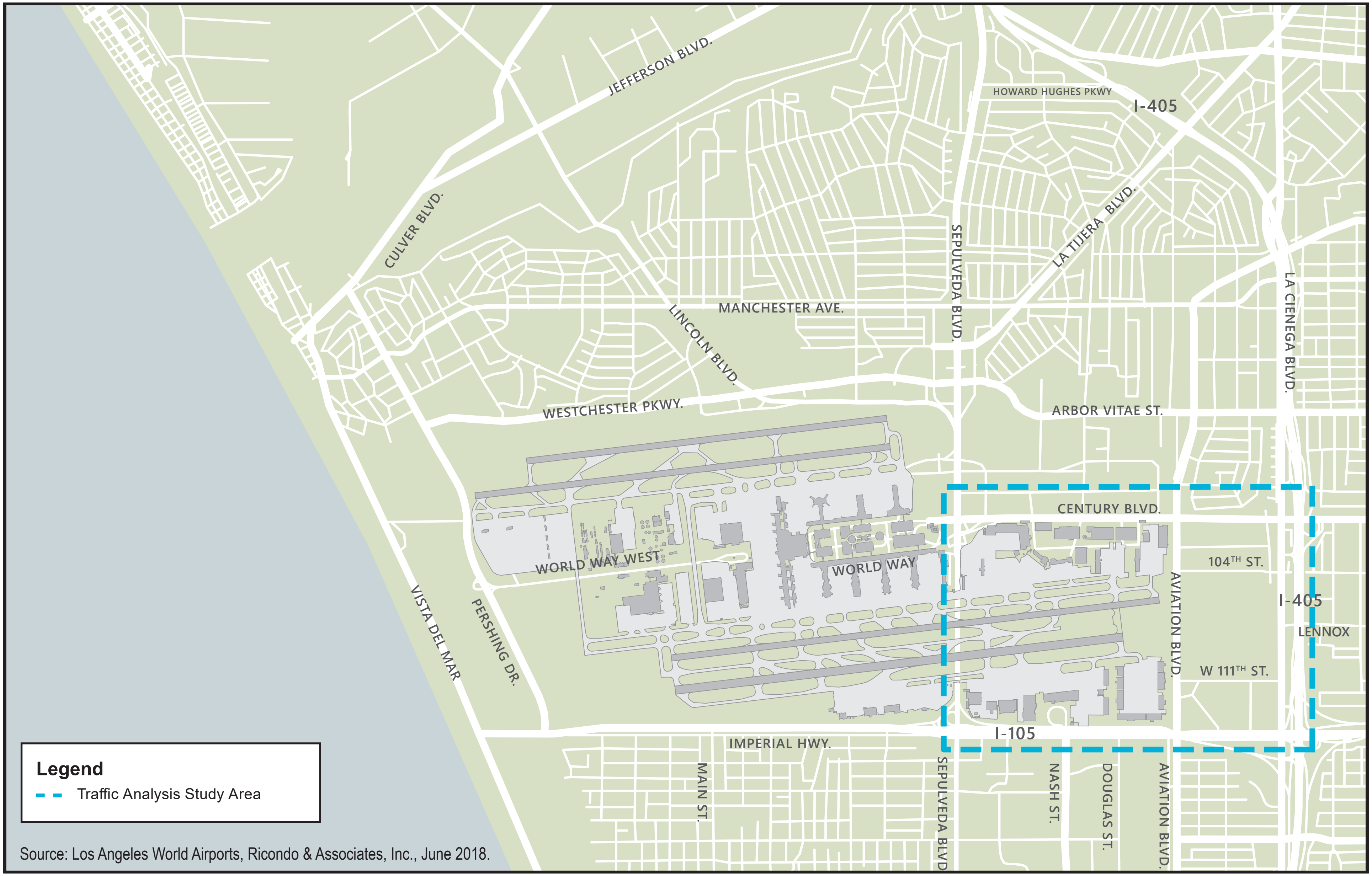
279 City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.



UAL East Aircraft Maintanance and GSE Project

Operational Traffic Analysis Study Area

Figure
4.4.2-1

4.4.2.2.2 Determination of Baseline Traffic Conditions

Baseline conditions used in the analysis of project-related operational traffic impacts are defined as the existing conditions within the operational traffic study area at the time the Notice of Preparation (NOP) was published (December 2017). LAWA conducts annual driveway volume counts at various locations throughout the airport (including those adjacent to public parking lots, employee parking lots, cargo facilities, rental car facilities, and off-airport parking facilities). LAWA also collects annual traffic volume counts each August along the Central Terminal Area (CTA) roadways to estimate annual growth in airport traffic. Considering the location of the study area intersections, it was determined that each intersection contains a mix of both airport-related traffic and non-airport-related traffic. Consequently, both the driveway count data and CTA data were used to establish a growth rate to adjust the 2015 traffic volumes to 2017 levels. Off-airport driveway volumes collected in 2015 were compared to those collected in 2017 to identify the percent change at these locations. Similarly, 2015 and 2017 CTA volumes along the upper and lower levels (inbound/outbound) were compared to identify the approximate growth in airport-related vehicles. It was assumed that these data are reasonably representative of existing traffic conditions at the time the EIR NOP was published (December 2017). Using the 2015 and 2017 driveway and CTA data described above, the a.m. peak hour traffic volumes (8:00 a.m. to 9:00 a.m.) were increased by 12.5 percent, while the p.m. peak hour traffic volumes (5:00 p.m. to 6:00 p.m.) were increased by 16.8 percent.[280] These volumes were used to determine the 2017 baseline volumes for use in the operational traffic analysis and to assess project-related traffic impacts. Given recent temporary effects of street closures caused by construction of the Metro Crenshaw/LAX Transit Corridor, traffic patterns are likely altered as vehicles are either detoured or restricted from using certain roadways. As a result, the use of 2014 to 2015 data (i.e., the driveway count and CTA roadway data) provides the most accurate assessment of baseline traffic patterns within the study area, when adjusted by the interim growth factors. The steps identified below were taken to develop baseline traffic conditions information.

Prepare Model of Study Area Roadways and Intersections

A model of operational traffic study area roadways and intersections was developed to assist with intersection capacity analysis (i.e., geometric configuration, quantitative delineation of capacity, and operational characteristics of intersections likely to be affected by the proposed project's traffic). The model was developed using TRAFFIX,[281] a commercially available traffic analysis software program designed for developing traffic forecasts and analyzing intersection and roadway capacities. The model uses widely accepted traffic engineering methodologies and procedures, including the Transportation Research Board Critical Movement Analysis (CMA) Circular 212 Planning Method,[282] which is the required intersection analysis methodology for traffic impact studies conducted within the City of Los Angeles.

Calculate Baseline (2017) Levels of Service

Intersection levels of service were calculated using the most recent intersection traffic volumes coinciding with the a.m. peak hour (8:00 a.m. to 9:00 a.m.) and the p.m. peak hour (5:00 p.m. to 6:00 p.m.). These levels of service defined existing baseline conditions which served as a basis of comparison for assessing impacts generated during operation of the proposed project.

4.4.2.2.3 Determination of Baseline Plus Project Traffic Conditions

This operational traffic analysis was designed to assess the direct impacts associated with the operations of the proposed project, as well as the effects of future cumulative conditions. For purposes of

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280 Ricondo and Associates, LAX UAL Traffic Volume Adjustment, December 2017.

281 Dowling Associates, TRAFFIX Version 7.7.

282 Transportation Research Board, Transportation Research Circular No. 212, *Interim Materials on Highway Capacity*, January 1980.

determining direct project-related impacts, two traffic scenarios were developed consisting of baseline traffic described above plus the change in traffic patterns that would result upon opening of the proposed project. For purposes of this analysis, conditions representing Opening Day (December 2020) as well as Plus Five Years (2025) were analyzed. The steps identified below were conducted to determine the Baseline Plus Project traffic volumes. Detailed traffic volumes of Baseline Plus Project are presented in Appendix D.2-2.

Analyze Proposed Project Activity

Upon opening of the proposed project, it is anticipated that UAL employee and delivery truck trips currently occurring to and from the existing West Maintenance Facility would be relocated to the new East Maintenance Facility. As described in Chapter 3, *Overview of Project Setting*, the proposed project is one of many past and present changes to aircraft and GSE maintenance facilities at LAX that have occurred since initiation of the LAX modernization program, which have resulted in a net decrease in square footage of facilities dedicated to aircraft and GSE maintenance at the airport. Following project implementation, it is reasonably foreseeable that UAL's West Maintenance Facility would continue to be used for aircraft and/or GSE maintenance by another airline currently conducting such activities at LAX in constrained or reduced facilities, and would not represent a new use or an increase in such activity.[283] Additional details on trip generation are provided below in Section 4.4.2.4. The resulting changes in traffic patterns were estimated and distributed throughout the traffic study area. These changes include the shift in UAL employee and delivery truck trips from the west side of LAX to the east side of LAX, as well as a shift in truck activity due to the closure of eastbound Avion East near Parking Garage F. Additional details on trip distribution are provided below in Section 4.4.2.3.3. Future operating conditions were developed for Opening Day (December 2020) and Plus Five Years (2025). The employee trip distribution patterns were based on regional patterns developed for the proposed project and previous LAWA traffic studies, specific truck route information, airline passenger survey information, and regional population distributions. Detailed information regarding traffic distribution patterns is also presented in Appendix D.2-4.

Estimate Baseline (2017) Plus Project Traffic Volumes

The Baseline Plus Project traffic volumes were estimated by adding the altered traffic volumes due to implementation of the proposed project to the baseline (2017) volumes. These traffic volumes were developed for both the Opening Day (December 2020) and Plus Five Years (2025) scenarios.

4.4.2.2.4 Determination of Future Cumulative Traffic Conditions

In addition to the Baseline Plus Project condition described above, future cumulative traffic conditions were analyzed. For this traffic analysis, cumulative traffic conditions were assessed for the periods of Opening Day (December 2020) and Plus Five Years (2025).

In accordance with State CEQA Guidelines Section 15130(b), there are essentially two options for determining cumulative development for evaluating cumulative impacts:

a. List past, present, and reasonably foreseeable probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or
b. Summarize projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or

283 Any proposed reuse of the West Maintenance Facility may be subject to its own environmental review and documentation, as appropriate.

> certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program.

For purposes of analyzing the proposed project's cumulative operational traffic impacts, a hybrid of the two approaches was used. Effects of cumulative projects, and how the traffic generation related to those projects would overlap with that of the proposed project under both Opening Day (December 2020) and Plus Five Years (2025) scenarios, were considered (cumulative projects are described in Chapter 3, *Overview of Project Setting*, and listed in Table 3-1). Also, using the "projection" approach, background traffic was increased to reflect additional growth from non-specific projects, which may include both airport- and/or non-airport related projects. To estimate future cumulative conditions, the operational traffic analysis assumed (1) airport-related traffic was grown proportionally in accordance with projected passenger levels, as described in greater detail below, and (2) a 2 percent annual growth in background traffic, which produces a conservative traffic volume scenario that accounts for growth in background traffic, as well as additional construction-related traffic in the event that additional construction projects are initiated during the timeframe evaluated for this study. This annual growth rate assumption is consistent with previous direction provided by LADOT for use in other LAX EIRs.

Cumulative conditions were determined based on two sets of future cumulative traffic volume conditions, as described below. Detailed traffic volumes related to the cumulative conditions are presented in Appendix D.2-2.

4.4.2.2.5 Cumulative Traffic (Opening Day – December 2020) Without Project

This scenario combines baseline traffic volumes with growth from all sources other than the proposed project to determine the anticipated traffic conditions upon opening of the proposed project (December 2020). The steps identified below were taken to develop the traffic volumes for this scenario.

Develop December 2020 Focused Traffic Study Area Roadway Network

Though it is possible additional improvements would be in place prior to the opening of the new East Maintenance Facility (December 2020), for purposes of this analysis, it has been conservatively assumed that no additional roadway improvements would be in place by Opening Day 2020. Therefore, the baseline 2017 traffic study area roadway network was held constant to 2020.[284]

Estimate Opening Day – December 2020 (Without Project) Traffic Volumes

Opening Day (December 2020) traffic volumes were estimated as follows. Baseline traffic volumes were grown to 2020 based on the assumption that passenger activity levels at LAX were approaching 85 million annual passengers (MAP) in 2017, and will continue to increase until they reach 96.6 MAP. This passenger level represents the upper limit of the Southern California Association of Governments (SCAG) aviation forecast for LAX[285] and was conservatively assumed to occur by 2025. Assuming passenger activity increases at a steady rate between the baseline year of 2017 and 2025, it was estimated for purposes of this analysis that MAP levels at LAX would reach approximately 89 MAP by 2020. Airport-related traffic

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[284] While additional cumulative projects, such as the LAX Landside Access Modernization Program (LAMP), are scheduled to occur upon opening of the new East Maintenance Facility (December 2020), the timing of potential temporary roadway closures, if any, is unknown at the time of the analysis. Any roadway network modifications would be included in the construction traffic management plan (CTMP) that would be developed in accordance with the CALM Review Procedures outlined in LAWA's Design & Construction Handbook (referred to as a Site Logistics Plan) and would be reviewed by LAWA prior to implementation. Due to the unknown timing of potential closures or improvements, it is reasonable to assume the roadway network would remain constant from 2017 to 2020.

[285] Southern California Association of Governments, *Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life*, Aviation & Airport Ground Access Appendix, adopted April 7, 2016. Available: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.

was grown proportionally in accordance with MAP levels while background traffic was grown at 2 percent per year to account for local background traffic growth through 2020. This annual growth rate is more conservative than what is projected for the South Bay/LAX area in the 2010 Congestion Management Program,[286] which estimates an annual growth of approximately 0.3 percent.

Employee and haul truck trips from other known LAX construction projects occurring during December 2020 were assumed to occur outside of the operational traffic analysis peak hours (8:00 a.m. to 9:00 a.m. and 5:00 p.m. to 6:00 p.m.) consistent with the environmental requirements outlined in LAWA's Design and Construction Handbook, which applies to all projects at LAX.[287]

4.4.2.2.6 Cumulative Traffic (Opening Day – December 2020) With Project

The project-related traffic volumes anticipated to occur as a result of the proposed project were added to the Cumulative Traffic (Opening Day – December 2020) "Without Project" traffic volumes described in the previous section. This is a traffic scenario that represents the estimated total peak hour traffic volumes (consisting of background traffic, traffic related to ambient growth, traffic related to other projects, and proposed project traffic) that would use the operational traffic study area intersections upon Opening day in December 2020.

4.4.2.2.7 Cumulative Traffic (Plus Five Years – 2025) Without Project

This scenario combines baseline traffic volumes with growth from all sources other than the proposed project to determine the anticipated traffic conditions five years after the opening of the proposed project (2025). The steps identified below were taken to develop the traffic volumes for this scenario.

Develop 2025 Focused Traffic Study Area Roadway Network

It was assumed that the Phase 1 roadway improvements identified in the LAX Landside Access Modernization Program EIR would be in place prior to 2024; therefore, these improvements were included in the 2025 traffic study area.[288] Please see Section 4.4.2.5 for additional details on these improvements.

Estimate 2025 (Without Project) Traffic Volumes

Future (2025) traffic volumes were estimated as follows. Traffic volumes developed as part of the LAX Landside Access Modernization Program EIR, specifically the 2024 traffic volumes, were used as a basis for estimating future traffic conditions in 2025. The volumes developed for the LAX Landside Access Modernization Program EIR were based on the assumption that passenger activity at LAX would reach 86 MAP in 2024. However, passenger activity has increased more rapidly than assumed in the LAX Landside Access Modernization Program EIR, and is nearing this level under the baseline conditions. Therefore, it was conservatively assumed for the operational traffic analysis that passenger activity would increase to 96.6 MAP by 2025. Airport-related traffic was grown proportionally in accordance with MAP levels while background traffic was grown at 2 percent per year. As stated above, the 2 percent per year

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286 Los Angeles County Metropolitan Transportation Authority, *2010 Congestion Management Program,* Appendix D – Guidelines for CMP Transportation Impact Analysis, Exhibit D-1, General Traffic Volume Growth Factors, adopted October 28, 2010. Available: http://media.metro.net/docs/cmp_final_2010.pdf.

287 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Design and Construction Handbook (January 2018),* Design Standards & Guide Specifications: Division 1 – General Requirements, July 2017. Available: https://www.lawa.org/-/media/lawa-web/tenants411/file/division-01-july-2017.ashx?la=en&hash=573DEC6E2A9501A7831B7D636A1BAB2F1D639AD3.

288 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program*, (SCH 2015021014), Chapter 2, Description of the Proposed Project, and Section 4.12.2, Off-Airport Transportation, as revised in the Final EIR, and Appendix O, Off-Airport Traffic Study, February 2017.

accounts for growth in background traffic, as well as additional construction-related traffic in the event that additional construction projects are initiated during the timeframe evaluated for this study.

Similar to Opening Day (December 2020) Without Project conditions, employee and haul truck trips from other known LAX construction projects were assumed to occur outside of the operational traffic analysis peak hours.

4.4.2.2.8 Cumulative Traffic (Plus Five Years – 2025) With Project

The project-related traffic volumes anticipated to occur as a result of the proposed project were added to the Cumulative Traffic (Plus Five Years – 2025) "Without Project" traffic volumes described in the previous section. This is a traffic scenario that represents the estimated total peak hour traffic volumes (consisting of background traffic, traffic related to ambient growth, traffic related to other projects, and proposed project traffic) that would use the operational traffic study area intersections in 2025.

4.4.2.2.9 Determination of Impacts and Mitigation Measures

The steps identified below were conducted to calculate intersection levels of service, identify impacts, and identify mitigation measures for significant impacts. Detailed intersection level of service (LOS) and volume-to-capacity ratio (v/c) outputs are presented in Appendix D.2-3.

Analyze Intersection Levels of Service

The levels of service of the operational traffic study area intersections were analyzed using TRAFFIX. Intersection LOS (v/c) was estimated using the CMA planning level methodology, as defined in Transportation Research Board Circular 212,[289] in accordance with LADOT's Transportation Impact Study Guidelines,[290] and the L.A. CEQA Thresholds Guide.[291] Intersection LOS (v/c) was analyzed for the following conditions:

- Baseline 2017;
- Baseline 2017 Plus Project Traffic (Opening Day 2020 and Plus Five Years 2025);
- Future Cumulative Traffic (Opening Day 2020 and Plus Five Years 2025) Without Project; and
- Future Cumulative Traffic (Opening Day 2020 and Plus Five Years 2025) With Project.

Identify Project Impacts

Project-related impacts associated with implementation of the proposed project were identified for intersections that would be significantly affected by project-related traffic, consistent with the approach established in the LADOT Transportation Impact Study Guidelines. The thresholds described in Section 4.4.2.6 were used to determine impact significance. Project-related impacts and cumulative impacts were determined by comparing the LOS (v/c) results for the following:

- **Baseline Plus Project Compared with Baseline:** This comparison is utilized to isolate the impacts of the proposed project.
- **Cumulative Impacts:** Cumulative impacts were determined using a two-step process. Initially, the "Cumulative Traffic (Opening Day 2020 and Plus Five Years 2025) With Project" conditions were compared to the baseline condition to determine if a significant cumulative impact would occur relative to baseline conditions. A cumulative impact was deemed significant if it would exceed the

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289 Transportation Research Board, Transportation Research Circular No. 212, *Interim Materials on Highway Capacity,* January 1980.

290 City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.

291 City of Los Angeles, *L.A. CEQA Thresholds Guide, Your Resource for Preparing CEQA Analyses in Los Angeles*, 2006.

threshold of significance. If a cumulative impact was determined to be significant, then a second comparison of the "With Project" vs. the "Without Project" LOS (v/c) conditions was made to determine if the project's contribution to the significant cumulative impact would be "cumulatively considerable" in accordance with the impact thresholds defined in Section 4.4.2.6 below.

Mitigation measures are identified, if feasible, for any intersections that are determined to be significantly affected by the opening of the proposed project under the existing conditions analysis, or “cumulatively considerable” under the cumulative analysis.

4.4.2.3 Existing Conditions

4.4.2.3.1 Regulatory Setting

The LADOT Transportation Impact Study Guidelines requires that a Traffic Study be prepared if the following operational criteria are met:

- A project is likely to add 500 or more daily operational trips; and
- A project is likely to add 43 or more a.m. or p.m. peak hour operational trips.

Based on LADOT criteria, the proposed project would not require a Traffic Study as neither condition mentioned above would be met. Implementation of the proposed project would only result in an alteration of existing traffic conditions and not generate any new traffic in the study area. However, LAWA has determined that the preparation of a traffic study is useful in order to provide a full assessment and documentation of the impacts generated by implementation of the proposed project.

In addition to the criteria listed above, the Los Angeles County *2010 Congestion Management Program for Los Angeles County*[292] provides Congestion Management Program (CMP) Guidelines to assist local agencies in evaluating regional highway and freeway impacts of land use projects on the CMP system through the preparation of a regional transportation impact analysis (TIA). A CMP TIA is necessary for all projects that include, at a minimum, the following operational trips:

- 50 or more trips added to a CMP arterial intersection during either the weekday a.m. or p.m. peak hours
- 150 or more trips added to the mainline freeway monitoring locations during either the weekday a.m. or p.m. peak hours

As stated above, the proposed project would not generate additional traffic during the a.m. or p.m. peak commute periods, and would only result in an alteration of existing traffic conditions. Therefore, the proposed project would not meet or exceed the criteria set forth by LADOT or Los Angeles County. However, as noted above, LAWA has determined that the preparation of a traffic study is useful in order to provide a full assessment and documentation of the impacts generated by implementation of the proposed project.

4.4.2.3.2 Baseline Conditions

As indicated above, baseline conditions relate to the facilities and general conditions that existed during a typical weekday for the hours of 8:00 a.m. to 9:00 a.m. and 5:00 p.m. to 6:00 p.m.

Operational Traffic Study Area

Traffic associated with implementation of the proposed project was identified for intersections that would be affected by project-related traffic, consistent with the approach established in the LADOT Transportation Impact Study Guidelines. Volume/capacity ratios at 31 area intersections were calculated

[292] Los Angeles County Metropolitan Transportation Authority, *2010 Congestion Management Program*, October 2010.

for both the baseline plus peak proposed project and for the future cumulative traffic conditions. The results were then analyzed to identify those intersections that were projected to have a 0.004 (0.4 percent) or greater increase in traffic volume/capacity with the project for detailed analysis. Those intersections with a 0.003 (0.3 percent) or less increase in traffic volume/capacity from operational traffic associated with the proposed project were determined to not have any potential for significant effect and were eliminated from further analysis. The operational traffic study area, and corresponding intersections, are depicted on Figure 4.4.2-1 and **Figure 4.4.2-2**, respectively.

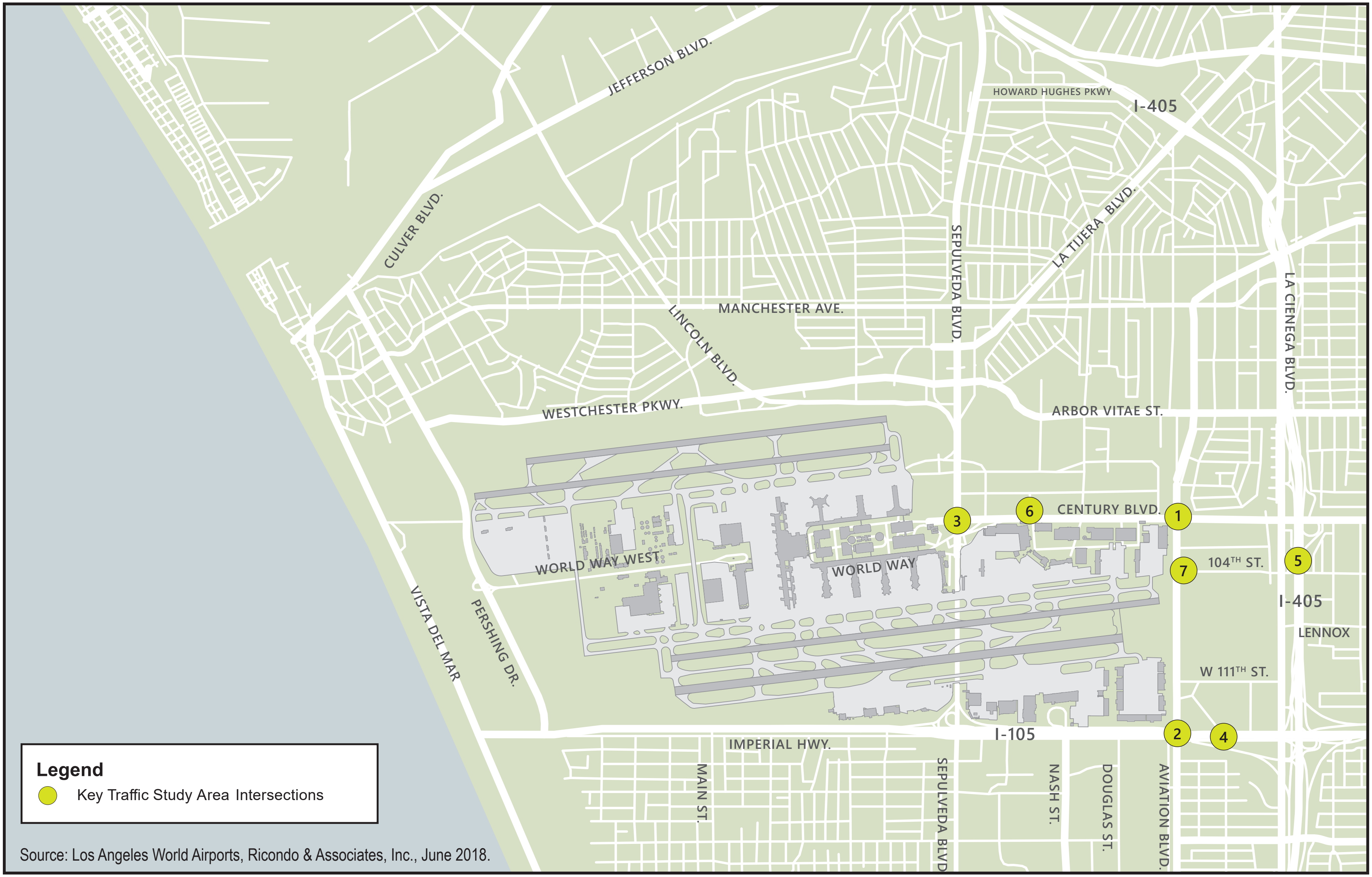
Traffic Study Area Roadways

The principal freeways and roadways serving as access routes within the operational traffic study area include the following:

- I-405 (San Diego Freeway) - This north-south freeway generally forms the eastern boundary of the construction traffic analysis traffic study area and provides regional access to the Airport and the surrounding area. Access to the traffic study area is provided via ramps at Century Boulevard, I-105, Imperial Highway, and three locations along La Cienega Boulevard.
- I-105 (Glenn M. Anderson or Century Freeway) - Along with Imperial Highway (described below), this east-west freeway forms the southern boundary of the construction traffic study area, and extends from the San Gabriel Freeway (I-605) on the east to Sepulveda Boulevard on the west. Access to the traffic study area is provided via ramps at Sepulveda Boulevard and along Imperial Highway. The westbound off-ramp from the I-105 Freeway to northbound Sepulveda Boulevard was widened to three lanes in March 2010.
- Aviation Boulevard - This north-south four-lane roadway bisects the traffic study area.
- Century Boulevard - This eight-lane divided roadway serves as the primary entry to the LAX CTA. This roadway also provides access to off-airport businesses and hotels and on-airport aviation-related facilities (e.g., maintenance and air cargo facilities) located between the CTA and I-405.
- Imperial Highway - This east-west roadway is located at-grade and beneath much of the elevated I-105 freeway. The number of lanes on this roadway varies from six-lanes east of the merge with I-105 to four-lanes west of the merge with I-105.
- La Cienega Boulevard - This north-south roadway parallels I-405 at the eastern boundary of the traffic study area. The roadway varies from four to six lanes.
- Sepulveda Boulevard (State Route 1 south of Lincoln Boulevard) - This major north-south six-lane arterial roadway provides direct access to the Airport via I-405 and Westchester Parkway on the north and via I-105 on the south. Sepulveda Boulevard between I-105 and Century Boulevard is located in a tunnel section beneath the south airfield runways.
- 104th Street - This east-west roadway has one lane in each direction separated by a continuous two-way left turn lane.

4.4.2.3.3 Existing Traffic Conditions

Traffic conditions at the operational traffic study area intersections and existing traffic activity (peak month, hourly, and annual) are discussed below.



Source: Los Angeles World Airports, Ricondo & Associates, Inc., June 2018.

UAL East Aircraft Maintanance and GSE Project	Operational Traffic Study Area Intersections	Figure 4.4.2-2

Traffic Study Area Intersections

As stated above, a total of 31 intersections were screened to identify those intersections that were projected to have a 0.004 (0.4 percent) or greater increase in traffic volume/capacity with the project for detailed analysis. The key intersections carried forward in the operational traffic analysis are listed below in **Table 4.4.2-1** and are depicted on Figure 4.4.2-2.

Table 4.4.2-1
Study Area Intersections

Intersection Number	Intersection Location
1.	Aviation Boulevard and Century Boulevard
2.	Imperial Highway and Aviation Boulevard
3.	Sepulveda Boulevard and Century Boulevard
4.	Imperial Highway and I-105 Ramp
5.	La Cienega Boulevard and I-405 Southbound Ramps South of Century Boulevard
6.	Avion Drive and Century Boulevard
7.	Aviation Boulevard and 104th Street

Source: Ricondo & Associates, Inc., June 2018.

Intersection Control and Geometry

All of the operational traffic study area intersections listed in Table 4.4.2-1 are signalized. In addition, all of the intersections are included in LADOT's Automated Traffic Surveillance and Control (ATSAC) system. The ATSAC system provides for monitoring of intersection traffic conditions and the flexibility to adjust traffic signal timing in response to current conditions. Study area intersection geometries are provided in Appendix D.2-1.

Peak Hours

The hours of analysis were chosen based on review of the intersection traffic counts during the commuter peak periods. Using this criterion, the hours analyzed for the proposed project were:

- **AM Peak Hour (8:00 a.m. to 9:00 a.m.)** - The operational traffic analysis a.m. peak hour represents a period for employees exiting the new East Maintenance Facility following the midnight shift (which has a scheduled end time of 7:30 a.m.). Additionally, relocated (from west to east) delivery truck trips were assumed to occur in the a.m. peak hour. Furthermore, as a result of implementation of the proposed project, the closure of the eastbound leg of Avion East would cause some vehicles that currently egress Parking Garage F and use the series of generally parallel roads south of Century Boulevard (i.e., Avion Drive, Airport Boulevard, Postal Road, International Road, and Century Boulevard Service Road) to be rerouted on to Century Boulevard.
- **PM Peak Hour (5:00 p.m. to 6:00 p.m.)** - The operational traffic analysis p.m. peak hour represents a period for employees exiting the new East Maintenance Facility following the day shift. Additionally, relocated (from west to east) delivery truck trips were assumed to occur in the p.m. peak hour. Furthermore, as a result of implementation of the proposed project, the closure of the eastbound leg of Avion East would cause some vehicles that currently egress Parking Garage F and use the series of parallel roads south of Century Boulevard to be rerouted on to Century Boulevard.

4.4.2.3.4 Baseline Intersection Analyses

Intersection LOS (v/c) was analyzed using the CMA methodology to assess the estimated operating conditions during baseline conditions for the a.m. and p.m. peak hours. This method, also known as the Circular 212 Planning Method, calculates the sum of the per-lane volumes for the critical movements and divides by an overall intersection capacity (volume-to-capacity ratio). LOS is a qualitative measure that describes traffic operating conditions (e.g., delay, queue lengths, congestion). Intersection LOS ranges from A (i.e., excellent conditions with little or no vehicle delay) to F (i.e., excessive vehicle delays and queue lengths). LOS definitions for the CMA methodology are presented in **Table 4.4.2-2**.

In accordance with LADOT analysis procedures, the volume/capacity (v/c) ratio was calculated using the CMA methodology is further reduced by 0.07 for those intersections included within the ATSAC system to account for the improved operation and increased efficiency from the ATSAC system that is not captured as part of the CMA methodology. Application of the ATSAC reduction is described in Attachment D of the LADOT Transportation Impact Study Guidelines.[293]

Table 4.4.2-2
Level of Service Definitions for Signalized Intersections

Level of Service (LOS)	Volume/Capacity Ratio Threshold	Definition
A	0.000 - 0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	VERY GOOD. An occasional approach phase is fully used; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 - 0.800	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 - 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 - 1.000	POOR. Represents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than - 1.000	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: Transportation Research Board, Transportation Research Circular No. 212, Interim Materials on Highway Capacity, January 1980.

The estimated intersection LOS (v/c) for baseline conditions is provided in **Table 4.4.2-3**. As shown in Table 4.4.2-3, 3 of the 7 intersections operated at LOS C or better during the baseline a.m. and p.m. peak periods analyzed for the proposed project. The following intersections were estimated to be operating at LOS D or worse during the baseline a.m. or p.m. peak periods:

- Aviation Boulevard and Century Boulevard (Intersection #1) – LOS D a.m. peak hour and LOS E p.m. peak hour
- Imperial Highway and Aviation Boulevard (Intersection #2) – LOS D p.m. peak hour
- Sepulveda Boulevard and Century Boulevard (Intersection #3) – LOS D a.m. peak hour and LOS D p.m. peak hour
- Imperial Highway and I-105 Ramp (Intersection #4) – LOS D a.m. peak hour

293 City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.

The LOS (v/c) results from the TRAFFIX program, including the volume, geometry and other inputs used to produce these results are provided in Appendix D.2-3.

Table 4.4.2-3
Baseline Intersection Analysis Results

	Intersection	Peak Hour[1]	V/C[2]	LOS[3]
1.	Aviation Blvd. & Century Blvd.	AM Peak Hour	0.850	D
		PM Peak Hour	0.918	E
2.	Imperial Hwy. & Aviation Blvd.	AM Peak Hour	0.662	B
		PM Peak Hour	0.891	D
3.	Sepulveda Blvd. and Century Blvd.	AM Peak Hour	0.875	D
		PM Peak Hour	0.855	D
4.	Imperial Hwy. & I-105 Ramp	AM Peak Hour	0.844	D
		PM Peak Hour	0.657	B
5.	La Cienega Blvd. & I-405 Southbound Ramps South of Century	AM Peak Hour	0.414	A
		PM Peak Hour	0.401	A
6.	Avion Dr. & Century Blvd.	AM Peak Hour	0.435	A
		PM Peak Hour	0.402	A
7.	Aviation Blvd. & 104th St.	AM Peak Hour	0.629	B
		PM Peak Hour	0.638	B

Source: Appendix D.2-3 of this EIR

Notes:

1. The hours of analysis include the a.m. peak (8:00 a.m. - 9:00 a.m.) and the p.m. peak (5:00 p.m. - 6:00 p.m.).
2. Volume to capacity ratio.
3. LOS range: A (excellent) to F (failure).

4.4.2.4 Project-Generated Traffic

Traffic conditions as a result of the opening of the proposed project are defined below for peak period traffic generation.

- Upon the opening of the proposed project, UAL employee and delivery truck traffic would be consolidated and relocated to the east. As described in Chapter 3, *Overview of Project Setting*, the proposed project is one of many past and present changes to aircraft and GSE maintenance facilities at LAX that have occurred since initiation of the LAX modernization program, which have resulted in a net decrease in square footage of facilities dedicated to aircraft and GSE maintenance at the airport. Following project implementation, it is reasonably foreseeable that UAL's West Maintenance Facility would continue to be used for aircraft and/or GSE maintenance by another airline currently conducting such activities at LAX in constrained or reduced facilities, and would not represent a new use or an increase in such activity.[294] Based upon existing UAL employee numbers and shift times, it was conservatively assumed that a total of 105 employees that would be relocated from the West Maintenance Facility to the new East Maintenance Facility would egress the new East Maintenance Facility during the a.m. peak hour (8:00 a.m. to 9:00 a.m.) following their midnight shift. Furthermore, it was assumed that a total of 11 employees would egress the new East Maintenance Facility during the p.m. peak hour (5:00 p.m. to 6:00 p.m.) following their day shift.[295] Additionally, based on information from UAL, it was estimated that a total of 5 delivery truck trips would be relocated from the West Maintenance Facility to the new

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294 Any proposed reuse of the West Maintenance Facility may be subject to its own environmental review and documentation, as appropriate.

295 The majority of daytime employees work during off-peak hours (i.e., 5:00 a.m. to 3:30 p.m. or 6:00 a.m. to 2:30 p.m.). These employees would not be traveling to or from the East Maintenance Facility during peak hours.

East Maintenance Facility during the a.m. peak hour (8:00 a.m. to 9:00 a.m.), and a total of 3 truck trips would be relocated during the p.m. peak hour (5:00 p.m. to 6:00 p.m.). For purposes of the operational traffic analysis, all delivery truck trips were converted to "passenger car equivalents" (PCEs) to account for the additional impact that large vehicles, such as trucks, would have on roadway traffic operations. As such, all truck trips were converted at a rate of 2.5, consistent with the construction traffic analysis presented above in Section 4.4.1. UAL employment levels and peak hour delivery truck activity were assumed to remain constant through 2025; therefore, the number of project specific employee vehicle trips and delivery truck trips was held constant under both the Opening Day (December 2020) and Plus Five Years (2025) conditions.

- Based on the site layout of the new East Maintenance Facility, the eastbound leg of Avion Drive South would be eliminated with implementation of the proposed project, causing a rerouting of vehicles that currently use the side roads that are generally parallel to and south of Century Boulevard as a cut-through. (These vehicles are background vehicles, not project-related vehicles; however, the re-routing of these vehicles would be a direct consequence of the proposed project.) Vehicles leaving Parking Garage F to go eastbound would be forced to go on Century Boulevard at the intersection of Avion Drive and Century Boulevard. However, it was assumed that these vehicles would return to the parallel roadway system as soon as possible to avoid congested traffic activity along eastbound Century Boulevard. Specifically, the operational analysis assumes these vehicles would turn eastbound onto Century Boulevard at Avion Drive after existing Parking Garage F and would travel along Century Boulevard to International Boulevard, where they would turn southbound to return to the parallel roadways. These vehicle were assumed to continue on the parallel roadway system to the intersection of Aviation Boulevard and 104th Street. The total number of vehicles using these parallel roadways was based on a review of traffic counts collected in 2018 as a supplement to the comprehensive traffic counts. It was determined that a total of 15 vehicles were completing this movement during the a.m. peak hour (8:00 a.m. to 9:00 a.m.), while 46 vehicles were doing so in the p.m. peak hour (5:00 p.m. to 6:00 p.m.). Applying an annual growth factor of 2 percent per year results in a total of 16 a.m. trips and 48 p.m. trips during the Opening Day (December 2020) scenario and 17 a.m. trips and 53 p.m. trips during the Plus Five Years (2025) scenario.

4.4.2.5 Planned Transportation Network Improvements

As stated previously, though it is possible additional improvements would be in place prior to the opening of the new East Maintenance Facility (December 2020), for purposes of this analysis, it has been conservatively assumed that no additional roadway improvements would be in place by Opening Day (December 2020). However, the approved LAX Landside Access Modernization Program EIR identifies a number of intersection improvements (Phase 1 roadways) throughout the traffic study area that are planned to be in place by 2024 and have been analyzed in the 2025 cumulative scenario.[296] These intersections include:

- Aviation Boulevard and Century Boulevard (Intersection #1)
  - Eastbound leg
    - Existing: 1 Left Turn Lane, 3 Through Lanes, 1 Through/Right Turn Lane
    - Improved: 1 Left Turn Lane, 4 Through Lanes, 1 Right Turn Lane

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296 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport (LAX) Landside Access Modernization Program, (SCH 2015021014),* Chapter 2, Description of the Proposed Project, and Section 4.12.2, Off-Airport Transportation, as revised in the Final EIR, and Appendix O, Off-Airport Traffic Study, February 2017.

- Sepulveda Boulevard and Century Boulevard (Intersection #3)
  - Westbound leg
    - Existing: 1 Left Turn Lane, 1 Through/Left Turn Lane, 2 Right Turn Lanes
    - Improved: 2 Left Turn Lanes, 2 Right Turn Lanes
- Imperial Highway and I-105 Ramp (Intersection #4)
  - Northbound leg
    - Existing: 2 Left Turn Lanes, 2 Right Turn Lanes
    - Improved: 2 Left Turn Lanes, 1 Through Lane, 1 Right Turn Lane
  - Southbound leg
    - Existing: N/A
    - Improved: 2 Left Turn Lanes, 1 Through Lane, 1 Through/Right Turn Lane
  - Eastbound leg
    - Existing: 3 Through Lanes, 1 Right Turn Lane
    - Improved: 2 Left Turn Lanes, 3 Through Lanes, 1 Right Turn Lane
  - Westbound leg
    - Existing: 2 Left Turn Lanes, 2 Through Lanes
    - Improved: 2 Left Turn Lanes, 2 Through Lanes, 1 Right Turn Lane
- La Cienega Boulevard and I-405 Southbound Ramps South of Century Boulevard (Intersection #5)
  - Northbound leg
    - Existing: 1 Through Lane, 1 Through/Right Turn Lane
    - Improved: 2 Through Lanes, 1 Through/Right Turn Lane
- Avion Drive and Century Boulevard (Intersection #6)
  - Eastbound leg
    - Existing: 2 Left Turn Lanes, 4 Through Lanes, 1 Right Turn Lane
    - Improved: 2 Left Turn Lanes, 4 Through Lanes, 2 Through/Right Turn Lane

4.4.2.6 Thresholds of Significance

The operational traffic study area intersections either fall entirely within the City of Los Angeles or share a boundary with the City of El Segundo or the City of Inglewood. The intersections which fall entirely within the City of Los Angeles were evaluated for traffic impacts using the LADOT traffic impact significance criteria. Intersections lying on the boundary of multiple jurisdictions were evaluated using the more conservative threshold of significance criteria; in all of these cases the LADOT criteria were shown to have the most conservative thresholds, as the allowable project-related increase in v/c by LADOT is smaller than that of other jurisdictions.

4.4.2.6.1 City of El Segundo Impact Criteria

In the City of El Segundo, an impact is considered significant if the following threshold is exceeded:[297]

- The LOS is E or F, its final volume/capacity (v/c) ratio is 0.901 or greater, and the project-related increase in v/c is 0.020 or greater.

[297] City of El Segundo, Planning and Building Safety Department, *City of El Segundo, Circulation Element of the General Plan*, Policy C3-1.2, September 2004.

4.4.2.6.2 City of Inglewood Impact Criteria

In the City of Inglewood, an impact is considered significant if the following threshold is exceeded:[298]

- The LOS is F, its final v/c ratio is 1.001 or greater, and the project-related increase in v/c is 0.020 or greater.

4.4.2.6.3 City of Los Angeles Impact Criteria

In accordance with LADOT criteria defined in its Transportation Impact Study Guidelines,[299] an impact is considered to be significant if one of the following thresholds is exceeded:

- The LOS is C, its final v/c ratio is 0.701 to 0.80, and the project-related increase in v/c is 0.040 or greater; or
- The LOS is D, its final v/c ratio is 0.801 to 0.90, and the project-related increase in v/c is 0.020 or greater; or
- The LOS is E or F, its final v/c ratio is 0.901 or greater, and the project-related increase in v/c is 0.010 or greater.

The "final v/c ratio" as defined by LADOT consists of the future v/c ratio at an intersection that includes volume from the project, baseline, ambient background growth, and other cumulative development projects, but without proposed intersection traffic mitigation.

The "project-related increase" is defined as the change in the unmitigated LOS (v/c) condition between the (a) future v/c "with" the project, baseline, ambient background growth (for the cumulative impact analysis), and other cumulative development project growth, and (b) the future v/c "without" the project, but with baseline, ambient background growth, and other cumulative development project growth.

4.4.2.7 Impacts Analysis

4.4.2.7.1 Impact Comparison 1: Baseline plus Project Measured Against Baseline

This comparison provides the basis for determining project-related impacts. The comparison is based on project-specific traffic generation for Opening Day (December 2020) and Plus Five Years (2025) added to baseline traffic volumes. The resulting levels of service were compared to the levels of service associated with the baseline condition. A significant impact would be realized if the thresholds of significance are met or exceeded. **Table 4.4.2-4** and **Table 4.4.2-5** compare LOS under baseline and baseline plus project conditions for Opening Day (December 2020) and Plus Five Years (2025), respectively. As shown, no intersections are estimated to be significantly impacted under the Baseline plus Project condition.

4.4.2.7.2 Impact Comparison 2: Future Cumulative With Project Measured Against Baseline

This comparison was conducted in two steps, which is consistent with State CEQA Guidelines Section 15130. An initial comparison was conducted by comparing the LOS (v/c) associated with future cumulative traffic volumes with the baseline levels of service. This initial comparison was conducted to determine if there would be a significant cumulative impact. If a significant cumulative impact was determined, then an additional comparison was conducted to determine if operation of the proposed project would make a cumulatively considerable contribution to the significant cumulative impact. This second comparison was conducted by comparing cumulative conditions with and without the proposed project. Cumulatively considerable contributions are realized when the thresholds of significance defined

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298 Raju Associates, Inc., *Traffic Study Assumptions and Methodology Memorandum to City of Inglewood*, October 27, 2015.

299 City of Los Angeles Department of Transportation, *Transportation Impact Study Guidelines*, December 2016. Available: http://ladot.lacity.org/sites/g/files/wph266/f/COLA-TISGuidelines-010517.pdf.

above are met or exceeded. If the project's contribution to a significant cumulative impact is not determined to be cumulatively considerable, then the project's impact under cumulative conditions is considered less than significant.

The impact comparisons for the Opening Day (December 2020) cumulative condition are depicted in **Table 4.4.2-6**. As shown in the table, significant cumulative impacts would occur at 5 intersections upon implementation of the proposed project (December 2020). However, it was determined that the proposed project's contribution to such significant cumulative impacts would not be cumulatively considerable at any of the significantly cumulatively impacted intersections.

Of the significantly cumulatively impacted intersections under the Opening Day (December 2020) condition, the proposed project would only minimally contribute (change in v/c between 0.001 and 0.038) to the significantly impacted intersections during Opening Day conditions (December 2020).

The impact comparisons for the Plus Five Years (2025) cumulative condition are depicted in **Table 4.4.2-7**. As shown in the table, significant cumulative impacts would occur at 5 intersections under the Plus Five Year scenario (2025). Similar to the Opening Day scenario, it was determined that the proposed project's contribution to such significant cumulative impacts would not be cumulatively considerable at any of the significantly cumulatively impacted intersections.

Of the significantly cumulatively impacted intersections under the Plus Five Year (2025) condition, the proposed project would only minimally contribute (change in v/c between 0.001 and 0.048) to the significantly impacted intersection during Plus Five Year conditions (2025).

4.4.2.8 Mitigation Measures

As indicated in Section 4.4.2.7, operational traffic impacts associated with the proposed project would be less than significant and would not be cumulatively considerable; therefore, no mitigation measures are required.

4.4.2.9 Level of Significance After Mitigation

Operational traffic impacts associated with the proposed project would be less than significant.

Table 4.4.2-4
Proposed Project - Level of Service Analysis Results - Impact Comparison 1 Baseline Compared to Baseline Plus Project 2020

Intersection		Peak Hour[1]	Baseline		Project Plus Baseline		Change in V/C	Significant Impact
			V/C[2]	LOS[3]	V/C[2]	LOS[3]		
1.	Aviation Boulevard and Century Boulevard	AM Peak Hour	0.850	D	0.854	D	0.004	No
		PM Peak Hour	0.918	E	0.923	E	0.005	No
2.	Imperial Highway and Aviation Boulevard	AM Peak Hour	0.662	B	0.667	B	0.005	No
		PM Peak Hour	0.891	D	0.891	D	0.000	No
3.	Sepulveda Blvd. and Century Blvd.	AM Peak Hour	0.875	D	0.883	D	0.008	No
		PM Peak Hour	0.855	D	0.856	D	0.001	No
4.	Imperial Highway and I-105 Ramp	AM Peak Hour	0.844	D	0.848	D	0.004	No
		PM Peak Hour	0.657	B	0.659	B	0.002	No
5.	La Cienega Blvd. & I-405 Southbound Ramps South of Century	AM Peak Hour	0.414	A	0.424	A	0.010	No
		PM Peak Hour	0.401	A	0.402	A	0.001	No
6.	Avion Drive and Century Boulevard	AM Peak Hour	0.435	A	0.465	A	0.030	No
		PM Peak Hour	0.402	A	0.404	A	0.002	No
7.	Aviation Boulevard and 104th Street	AM Peak Hour	0.629	B	0.631	B	0.002	No
		PM Peak Hour	0.638	B	0.642	B	0.004	No

Source: Appendix D.2-3 of this EIR.

Notes:

1. The hours of analysis include the a.m. peak (8:00 a.m. - 9:00 a.m.), and the p.m. peak (5:00 p.m. - 6:00 p.m.).
2. Volume to capacity ratio. Includes an LADOT ATSAC benefit applied at each intersection.
3. Level of Service range: A (excellent) to F (failure).

Table 4.4.2-5
Proposed Project - Level of Service Analysis Results - Impact Comparison 1 Baseline Compared to Baseline Plus Project 2025

	Intersection	Peak Hour[1]	Baseline		Project Plus Baseline		Change in V/C	Significant Impact
			V/C[2]	LOS[3]	V/C[2]	LOS[3]		
1.	Aviation Boulevard and Century Boulevard	AM Peak Hour	0.850	D	0.854	D	0.004	No
		PM Peak Hour	0.918	E	0.923	E	0.005	No
2.	Imperial Highway and Aviation Boulevard	AM Peak Hour	0.662	B	0.667	B	0.005	No
		PM Peak Hour	0.891	D	0.891	D	0.000	No
3.	Sepulveda Blvd. and Century Blvd.	AM Peak Hour	0.875	D	0.883	D	0.008	No
		PM Peak Hour	0.855	D	0.856	D	0.001	No
4.	Imperial Highway and I-105 Ramp	AM Peak Hour	0.844	D	0.848	D	0.004	No
		PM Peak Hour	0.657	B	0.659	B	0.002	No
5.	La Cienega Blvd. & I-405 Southbound Ramps South of Century	AM Peak Hour	0.414	A	0.424	A	0.010	No
		PM Peak Hour	0.401	A	0.402	A	0.001	No
6.	Avion Drive and Century Boulevard	AM Peak Hour	0.435	A	0.466	A	0.031	No
		PM Peak Hour	0.402	A	0.404	A	0.002	No
7.	Aviation Boulevard and 104th Street	AM Peak Hour	0.629	B	0.632	B	0.003	No
		PM Peak Hour	0.638	B	0.649	B	0.011	No

Source: Appendix D.2-3 of this EIR.

Notes:

1. The hours of analysis include the a.m. peak (8:00 a.m. - 9:00 a.m.), and the p.m. peak (5:00 p.m. - 6:00 p.m.).
2. Volume to capacity ratio. Includes an LADOT ATSAC benefit applied at each intersection.
3. Level of Service range: A (excellent) to F (failure).

Table 4.4.2-6
Proposed Project - Level of Service Analysis Results - Impact Comparison 2 Cumulative Traffic Opening Day (December 2020)

	Intersection	Peak Hour[1]	Baseline [A] V/C[2]	Baseline [A] LOS[3]	Opening Day (December 2020) Without Project [B] V/C[2]	Opening Day (December 2020) Without Project [B] LOS[3]	Opening Day (December 2020) With Project [C] V/C[2]	Opening Day (December 2020) With Project [C] LOS[3]	Cumulative Impact Determination [C]-[A] Change in V/C Compared to Baseline	Cumulative Impact Determination [C]-[A] Significant Cumulative Impact?	Cumulatively Considerable Determination [C]-[B] Change in V/C Compared to 2020 Without Project	Cumulatively Considerable Determination [C]-[B] Cumulatively Considerable Contribution?
1.	Aviation Boulevard and Century Boulevard	AM Peak Hour	0.850	D	0.902	E	0.907	E	0.057	Yes	0.005	No
		PM Peak Hour	0.918	E	0.973	E	0.978	E	0.060	Yes	0.005	No
2.	Imperial Highway and Aviation Boulevard	AM Peak Hour	0.662	B	0.703	C	0.707	C	0.045	Yes	0.004	No
		PM Peak Hour	0.891	D	0.945	E	0.945	E	0.054	Yes	0.000	No
3.	Sepulveda Blvd. and Century Blvd.	AM Peak Hour	0.875	D	0.927	E	0.936	E	0.061	Yes	0.009	No
		PM Peak Hour	0.855	D	0.907	E	0.908	E	0.053	Yes	0.001	No
4.	Imperial Highway and I-105 Ramp	AM Peak Hour	0.844	D	0.895	D	0.900	D	0.056	Yes	0.005	No
		PM Peak Hour	0.657	B	0.698	B	0.700	B	0.043	No	0.002	No
5.	La Cienega Blvd. & I-405 Southbound Ramps South of Century	AM Peak Hour	0.414	A	0.442	A	0.451	A	0.037	No	0.009	No
		PM Peak Hour	0.401	A	0.427	A	0.428	A	0.027	No	0.001	No
6.	Avion Drive and Century Boulevard	AM Peak Hour	0.435	A	0.463	A	0.491	A	0.056	No	0.028	No
		PM Peak Hour	0.402	A	0.428	A	0.431	A	0.029	No	0.003	No
7.	Aviation Boulevard and 104th Street	AM Peak Hour	0.629	B	0.669	B	0.671	B	0.042	No	0.002	No
		PM Peak Hour	0.638	B	0.677	B	0.715	C	0.077	Yes	0.038	No

Source: Appendix D.2-3 of this EIR.

Notes:

1. The hours of analysis include the a.m. peak (8:00 a.m. - 9:00 a.m.), and the p.m. peak (5:00 p.m. - 6:00 p.m.).
2. Volume to capacity ratio. Includes an LADOT ATSAC benefit applied at each intersection.
3. Level of Service range: A (excellent) to F (failure).

Table 4.4.2-7
Proposed Project - Level of Service Analysis Results - Impact Comparison 2 Cumulative Traffic Plus Five Years (2025)

			Cumulative Peak (2025)							Cumulative Impact Determination		Cumulatively Considerable Determination
			Baseline		Without Project		With Project					
			[A]		[B]		[C]			[C]-[A]		[C]-[B]
	Intersection	Peak Hour[1]	V/C[2]	LOS[3]	V/C[2]	LOS[3]	V/C[2]	LOS[3]	Change in V/C Compared to Baseline	Significant Cumulative Impact?	Change in V/C Compared to 2025 Without Project	Cumulatively Considerable Contribution?
1.	Aviation Boulevard and Century Boulevard	AM Peak Hour	0.850	D	0.837	D	0.842	D	-0.008	No	0.005	No
		PM Peak Hour	0.918	E	0.991	E	0.996	E	0.078	**Yes**	0.005	No
2.	Imperial Highway and Aviation Boulevard	AM Peak Hour	0.662	B	0.676	B	0.676	B	0.014	No	0.000	No
		PM Peak Hour	0.891	D	0.969	E	0.969	E	0.078	**Yes**	0.000	No
3.	Sepulveda Blvd. and Century Blvd.	AM Peak Hour	0.875	D	0.822	D	0.824	D	-0.051	No	0.002	No
		PM Peak Hour	0.855	D	0.883	D	0.884	D	0.029	**Yes**	0.001	No
4.	Imperial Highway and I-105 Ramp	AM Peak Hour	0.844	D	0.929	E	0.932	E	0.088	**Yes**	0.003	No
		PM Peak Hour	0.657	B	0.885	D	0.886	D	0.229	**Yes**	0.001	No
5.	La Cienega Blvd. & I-405 Southbound Ramps South of Century	AM Peak Hour	0.414	A	0.372	A	0.381	A	-0.033	No	0.009	No
		PM Peak Hour	0.401	A	0.652	B	0.652	B	0.251	No	0.000	No
6.	Avion Drive and Century Boulevard	AM Peak Hour	0.435	A	0.537	A	0.558	A	0.123	No	0.021	No
		PM Peak Hour	0.402	A	0.585	A	0.633	B	0.231	No	0.048	No
7.	Aviation Boulevard and 104th Street	AM Peak Hour	0.629	B	0.622	B	0.626	B	-0.003	No	0.004	No
		PM Peak Hour	0.638	B	0.742	C	0.750	C	0.112	**Yes**	0.008	No

Source: Appendix D.2-3 of this EIR.

Notes:

1. The hours of analysis include the a.m. peak (8:00 a.m. - 9:00 a.m.), and the p.m. peak (5:00 p.m. - 6:00 p.m.).
2. Volume to capacity ratio. Includes an LADOT ATSAC benefit applied at each intersection.
3. Level of Service range: A (excellent) to F (failure).

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5. ALTERNATIVES

5.1 Introduction

Section 15126.6 of the State CEQA Guidelines requires that an EIR include a discussion of a reasonable range of project alternatives that would "feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." Within that context, this chapter discusses alternatives to the proposed project.

The following sections discuss the significant impacts of the proposed project as identified in Chapter 4, *Environmental Impact Analysis*, the objectives of the proposed project, alternatives considered but rejected, and alternatives carried forward for further consideration in this EIR, and environmental impacts of such alternatives, including discussion as to whether such alternatives would avoid or substantially lessen any of the significant environmental impacts associated with the proposed project. Also included in this chapter is identification of the environmentally superior alternative.

5.2 Significant Impacts of the Project

The alternatives in this chapter have been selected to evaluate means for avoiding or substantially lessening the significant impacts of the proposed project identified in Chapter 4, *Environmental Impact Analysis*, with a focus on impacts that would be significant and unavoidable. As summarized in Chapter 1, impacts related to air quality and cultural (historic) resources would be significant and unavoidable. As described in Section 4.1, *Air Quality and Human Health Risk*, construction of the proposed project would result in a significant temporary impact to air quality. Specifically, construction of the proposed project would result in a net increase in temporary regional emissions of nitrogen oxides (NO_X), as well as temporary localized construction impacts for NO_X, particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}), and fine particulate matter, or particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$). With the exception of temporary localized construction impacts for NO_X, which would be less than significant after mitigation, these temporary emissions would result in significant and unavoidable air quality impacts after implementation of mitigation measures (identified in Section 4.1.1.7), as well as cumulatively considerable impacts; no other feasible mitigation measures were identified. As described in Section 4.2, *Cultural Resources*, the proposed project would result in the demolition of two intact, surviving Intermediate Terminal Facility buildings at 6000–6016 and 6020–6024 Avion Drive (on the project site), which together represent a single historical resource. This historical resource is individually eligible for listing in the California Register of Historical Resources and for designation as a Los Angeles Historic-Cultural Monument (LAHCM). The demolition of the two intact, surviving Intermediate Terminal Facility buildings would be a significant and unavoidable impact after implementation of mitigation measures (identified in Section 4.2.7) and no other feasible mitigation measures were identified.

5.3 Project Objectives

As identified in the State CEQA Guidelines, the achievement of project objectives was considered in determining potentially feasible alternatives that would avoid or substantially lessen any significant effects of the proposed project.

The objectives of the proposed project are to:

- Consolidate/relocate United Airlines' (UAL's) existing aircraft and ground support equipment (GSE) maintenance facilities at Los Angeles International Airport (LAX) in a single location to provide for more efficient and effective maintenance of UAL aircraft and equipment at the airport that eliminates duplicate facilities;
- Locate UAL's aircraft and GSE maintenance facilities closer to UAL's gates to increase efficiency by reducing the distance between the gates and maintenance area, consistent with the mission of LAX Airfield Operations of providing a safe and efficient airport operating environment;
- Modernize UAL's maintenance facilities, which were constructed between the mid-1940s and early 1970s when aircraft and GSE equipment were much smaller than they are today, in a manner that is consistent with LAWA's Sustainable Design and Construction Policy and that fulfills LAWA's strategic goal of innovating to enhance efficiency and effectiveness;
- Provide sufficient enclosed aircraft maintenance space and remain over night/remain all day (RON/RAD) aircraft parking spaces on UAL's leasehold to support routine servicing and maintenance of aircraft and meet overnight parking requirements;
- Provide facilities to support the maintenance requirements of UAL's operations at LAX; and
- Fulfill LAWA's strategic goal of sustaining a strong business that recognizes the fiscal impact the airport makes on the regional economy.

5.4 Alternatives Considered and Rejected

5.4.1 New West Maintenance Facility

One alternative considered was the consolidation of the East Maintenance Facility and West Maintenance Facility into a new facility to be constructed on the west side of the airport on a site that would include the West Maintenance Facility as well as the area between the existing northerly UAL lease boundary and World Way West, and between Maintenance Road on the west and the easterly edge of the former Continental Airlines (CAL) Training Center Building on the east. This would require modifications to UAL's leasehold. **Figure 5-1** illustrates the conceptual boundaries considered for this alternative. The existing facilities within this alternative site boundary would be demolished, including the UAL West Maintenance Facility and the former CAL Training Center Building. A new aircraft and GSE maintenance facility would be constructed, including hangars, stores, GSE bays, a GSE yard, aircraft parking spaces, and vehicle parking. The project site would be large enough to add additional RON/RAD spaces, but the total number of spaces would be lower than the 22 spaces associated with the proposed project.

As noted above, development of this new facility would require demolition of the CAL Training Center Building, which is eligible for listing in the National Register and the California Register, and for designation as an LAHCM. This would constitute a significant impact to historical resources that would be greater than the impact of the proposed project from the demolition of the two hangars associated with the Intermediate Terminal Facility, which are not National Register-eligible structures.

The scale of demolition and construction activities under this alternative would be similar to the proposed project, although construction workers and haul trucks would travel farther to reach the alternative project site. As a result, it is expected that this alternative would result in a significant unavoidable impact to air quality associated with temporary regional emissions of NO_X that would be similar to, but likely greater than, the impact associated with the proposed project. This alternative would also result in significant unavoidable localized air quality impacts for PM_{10} and $PM_{2.5}$ during construction that would be similar to the proposed project.

LAX UAL East Aircraft Maintenance and GSE Project	New West Maintenance Facility Conceptual Site	Figure **5-1**

The proposed project would result in a cumulatively considerable contribution to significant impacts to three intersections from haul truck traffic during peak hours on a temporary basis during project construction: Aviation Boulevard and Century Boulevard, Imperial Highway and Aviation Boulevard, and Imperial Highway and I-105 Ramp. The proposed project's contribution to these cumulatively significant impacts would be less than significant with implementation of the proposed mitigation measure. Construction of the New West Maintenance Facility Alternative would avoid the proposed project's cumulatively considerable, but mitigable, contribution to significant cumulative traffic impacts to these intersections. It is possible that construction of this alternative would have impacts to intersections not studied for the proposed project (including Imperial Highway and Sepulveda Boulevard, Imperial Highway and Main Street, or Imperial Highway and Pershing Drive). Such impacts can only be determined by performing a detailed traffic study, which was not done for this alternative.

In summary, as compared to the proposed project, this alternative would increase the severity of the significant unavoidable impacts to historical resources and to air quality emissions during construction, and would have the same significant unavoidable localized air quality impacts during construction. This alternative would avoid the proposed project's cumulatively considerable contribution to significant traffic impacts to three intersections during construction that would be fully mitigated under the proposed project.

According to the State CEQA Guidelines Section 15126.6(b), "the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project." This alternative would not reduce or avoid the significant unavoidable effects of the proposed project and, in fact, would increase the severity of these significant unavoidable effects.

Moreover, this alternative would not meet many of the project objectives. Although this alternative would result in the consolidation of UAL's existing aircraft and GSE maintenance facilities in a single location, this would not meet the first project objective of providing a facility that would be more efficient and effective or the second project objective of reducing the distance between the maintenance facilities and UAL's passenger gates (which are located in Terminals 7 and 8). On the contrary, aircraft and GSE that currently undergo maintenance at the East Maintenance Facility would now be maintained at a New West Maintenance Facility. This would increase the distance that aircraft and GSE would have to travel to reach the maintenance facility, which would increase fuel consumption and related emissions of criteria pollutants, toxic air contaminants, and greenhouse gases (GHG). The increased distance would also increase the time required to transport aircraft and GSE to the maintenance facility, which would not be efficient from an operations perspective. It would also increase the number of aircraft on already-congested taxiways at LAX, which would not be consistent with the mission of LAX Airfield Operations of providing an efficient airport operating environment. The New West Maintenance Facility alternative site is smaller than the proposed project site and would hinder the project objective of providing sufficient RON/RAD aircraft parking spaces to support routine servicing and maintenance of aircraft and to provide overnight parking.

Because this alternative would not meet many of the key project objectives and would not fulfill the requirement of CEQA to focus on alternatives that would avoid or substantially lessen the project's significant and unavoidable impacts, the New West Maintenance Facility Alternative was not carried forward for further analysis.

5.4.2 West Remote Pads/Gates Site

One alternative considered focused on development of the proposed project on the site of the current West Remote Pads/Gates. This site is located in the western portion of the airport and is bounded to the south by World Way West, to the north by Taxiway D, to the west by Pershing Drive, and to the east by

Taxiway AA. The approximately 71-acre West Remote Pads/Gates site is currently utilized as an apron/gate area for on-loading and off-loading of international and domestic flights that cannot be handled in the Central Terminal Area (CTA). Passengers are ferried to and from the site by buses. The apron area is also utilized for RON and RAD parking of aircraft when the gates are not in use.

The West Remote Pads/Gates site has 9 apron gates with jet loading bridges and another 17 hardstand (pads) without loading bridges, for a total of 26 aircraft positions. Due to the high demand for these gates and parking positions, aircraft are double- and sometimes triple-parked at some of these positions during overnight and early morning hours. A large maneuvering area is located in the southwest quadrant of this alternative site. This maneuvering area is large enough to serve as an operational readiness area for "super-jumbo" aircraft (i.e., Aircraft Design Group VI), such as the Airbus A380, Boeing 747-8, Antonov AN-124, and Lockheed C-5 with limited capabilities. Additionally, this space is utilized for RON/RAD for highly secure visits by public and government officials that at times require staging of military cargo and other large aircraft.

Although the West Remote Pads/Gates site was investigated as an alternative location for the proposed project, it was not carried forward for further analysis because, as demonstrated above, the site is highly utilized and would not be available for use during the time-frame required for development of the proposed project.

5.4.3 Other Alternative Locations

In addition to the sites identified above, other alternative locations at LAX were considered for the new UAL aircraft and GSE maintenance facilities. However, due to space constraints at the airport, no suitable locations are available, other than the former CAL complex and its environs, which is discussed in Section 5.4.1 above and a portion of which is carried forward as an alternative, as described in Section 5.5 below. All of the areas that have access to the airfield are currently occupied by existing uses that require airfield access, many of which are themselves space-constrained. Location of the proposed project at an alternative location would displace an existing use for which no relocation sites are available at the airport. Reasons why alternative locations within specific areas of LAX were rejected as infeasible are addressed below.

- **Area South of Century Boulevard:** The area situated north of the south airfield, east of Sepulveda Boulevard, and south of Century Boulevard is occupied primarily by cargo facilities and aircraft and GSE maintenance facilities. This area includes UAL's East Maintenance Facility (i.e., the proposed project site), which would be redeveloped under the proposed project. In addition to the UAL East Maintenance Facility, primary land uses in this portion of the airport include the American Eagle Commuter Facility, Delta Air Lines aircraft maintenance facility (which will be removed with implementation of the LAX Landside Access Modernization Program), Delta Air Lines GSE maintenance facility, Mercury Air Group cargo facility, U.S. Postal Service Regional Post Office, American Airlines GSE and Cargo, and the Century Cargo Complex. Other than the proposed project site, there are no undeveloped parcels or underutilized facilities in this portion of the airport of a sufficient size to accommodate the proposed maintenance facility.
- **Area North of Imperial Boulevard:** The area situated south of the south airfield and north of Imperial Boulevard includes cargo and ancillary uses. Primary land uses in this portion of the airport include the Imperial Cargo Complex, South Cargo Area – East, and South Cargo Area – West; fixed-base operators (Signature Flight Support and Atlantic Aviation); and ancillary facilities including the Flight Path Museum and Learning Center, flight kitchens, and miscellaneous LAWA uses, such as the LAWA Inspector's Office, and similar LAWA administrative functions. There are no undeveloped parcels or underutilized facilities in this portion of the airport of a sufficient size to accommodate the proposed maintenance facility.

- **Area North and South of World Way West:** The area situated between the north and south airfields on either side of World Way West is occupied by a variety of airport uses, including maintenance facilities, LAWA administration functions, and ancillary facilities. The former CAL complex of hangars, shops, and storage facilities, which currently houses the UAL West Maintenance Facility, Compass Airlines maintenance operation, American Airlines Operations Support Facility, and other tenants, is proposed as a project alternative (see Section 5.5.2 below). Other key land uses in the area south of World Way West include the West Aircraft Maintenance Area, portions of which are currently under construction, following which it will be completely built out; employee parking; and American Airlines aircraft maintenance facility (Super Bay Hangar). Primary land uses north of World Way West include the West Remote Pads/Gates (discussed in Section 5.4.2 above), LAWA Maintenance Facility and administrative buildings, FedEx aircraft maintenance facility, LAX Fuel Farm, and the future Midfield Satellite Concourse (MSC), currently under construction. Other facilities to be constructed in this part of the airport include aprons, taxiways, taxilanes, and other components associated with the MSC, as well as a new Secured Area Access Post located south of World Way West and west of Coast Guard Road. Other than the former CAL complex, there are no underutilized facilities, or parcels that are undeveloped or not already planned for future development, in this portion of the airport of a sufficient size to accommodate the proposed maintenance facility.

For the reasons identified above, with the exceptions noted above, these alternative locations at LAX were determined to be infeasible and were not carried forward for further analysis.

5.4.4 Construction Phasing Alternative

In order to reduce construction-related air pollutant emissions to a level that is less than significant (i.e., reduce the proposed project's 260.4 pounds per day of peak daily construction-related regional NO_X emissions, shown in Table 4.1.1-6, to less than the significance threshold of 100 pounds per day), the phasing of the proposed project would be extended from the currently-proposed 22 months to 57 months by reducing the daily construction activity levels by a factor of 2.6 (i.e., reduce the typical 8-hour daily construction work shifts to approximately 3-hour daily work shifts) (calculations provided in Appendix B.5). The extended schedule would also reduce construction-related localized air quality impacts for NO_X, PM_{10}, and $PM_{2.5}$ to levels that would be less than their respective significance thresholds. Although this alternative would reduce daily emissions, it would increase the overall duration of air pollutant emissions as well as the costs associated with construction. Additionally, this alternative would delay achievement of the project objectives, most notably the objective of consolidating UAL's maintenance activities. Therefore, this alternative was determined to be infeasible and was not carried forward for further analysis.

5.5 Alternatives Carried Forward for Further Consideration

The alternatives to the proposed project were formulated in an attempt to avoid or substantially lessen the site-specific significant impacts of the project, primarily significant unavoidable impacts to historical resources from the demolition of the hangar buildings and significant unavoidable impacts to air quality during construction. The potentially feasible alternatives carried forward for evaluation include consolidating UAL's maintenance activities on the west side of the airport at UAL's West Maintenance Facility (Alternative 2: West Maintenance Facility Consolidation) and a Reduced Development Alternative (Alternative 3). In addition, as required by CEQA, a "no project" alternative is also addressed in this section (Alternative 1).

The alternatives carried forward are described below. The environmental impacts of the alternatives are evaluated in Section 5.6, *Evaluation of Project Alternatives*.

5.5.1 Alternative 1 - No Project

Under the No Project Alternative, development of a consolidated aircraft and GSE maintenance facility for UAL would not occur. In accordance with Section 15126.6(e)(3)(B) of the State CEQA Guidelines, both the West Maintenance Facility and the East Maintenance Facility would remain in their existing state; that is, both facilities would continue to be used for aircraft and GSE maintenance and the physical conditions associated with the two sites and their activities would remain essentially the same as under baseline conditions. This would require modification and extension of UAL's current lease on the West Maintenance Facility. Without the proposed project, current inefficiencies associated with operation of two separate maintenance facilities would continue, and UAL aircraft would continue to travel long distances to reach the West Maintenance Facility from the gates at Terminals 7 and 8. Moreover, the existing maintenance facilities, which were constructed between the mid-1940sand the 1970s, would not be modernized. Existing deficiencies in the buildings, such as aging infrastructure and inaptly sized and located facilities, would be unimproved. All UAL aircraft at the East Maintenance Facility would continue to be serviced out-of-doors (i.e., at RON spaces on the apron) due to the lack of a hangar of sufficient size to accommodate the aircraft.

5.5.2 Alternative 2 - West Maintenance Facility Consolidation

Under Alternative 2, UAL would consolidate all aircraft and GSE maintenance activities at the current West Maintenance Facility. This would require modification and extension of UAL's current lease on the West Maintenance Facility. The leasehold would be extended north and east to encompass a portion of the current surface parking lots located south of the former CAL Training Center Building. **Figure 5-2** illustrates the conceptual boundaries considered for this alternative. In order to accommodate the consolidated activities, the existing buildings would be substantially refurbished or altered to provide additional GSE bays, paint booths, and office space, to the extent possible. The narrow-body aircraft hangars would be modified to include doors to accommodate maintenance functions that are required to be conducted in an enclosed space. Under this alternative, the number of RON/RAD spaces available to UAL would decrease from the 34 total spaces under baseline conditions (including the west and east facilities) to 15 or fewer positions. This site does not have any space to accommodate any additional RON/RAD spaces. It is possible that UAL could use RON/RAD spaces at LAWA's West Aircraft Maintenance Area or at the West Remote Pads/Gates; however, as noted in Section 5.4.2, there are already substantial demands on existing RON/RAD areas at LAX and these spaces may not be available for use by UAL aircraft. Moreover, even if spaces at the West Remote Pads/Gates were available for aircraft parking, aircraft maintenance is not permitted at these pads (with the exception of interior cabin maintenance). If no additional RON/RAD spaces were available, some aircraft undergoing servicing and light maintenance, or waiting to take off, would need to remain at UAL's gates in Terminals 7 and 8. Additionally, double-parking of aircraft at the maintenance facility RON/RAD areas may be required, space permitting, which would hinder the efficient management and movement of aircraft. As with the No Project Alternative, this alternative would not replace UAL's outdated maintenance facilities with a modern facility.

LAX UAL East Aircraft Maintenance and GSE Project

Alternative 2: West Maintenance Facility Consolidation Conceptual Site

Figure 5-2

5.5.3 Alternative 3 - Reduced Development

Under Alternative 3, UAL would consolidate all aircraft and GSE maintenance activities at the East Maintenance Facility. However, instead of demolishing both hangars, only Hangar 2 (the easternmost hangar) would be demolished. A new GSE facility and yard would be constructed north of the existing hangars and a new, single-bay aircraft maintenance hangar would be constructed to replace Hangar 2. Hangar 1 (the westernmost hangar) would be used for aircraft maintenance-related support uses, such as stores. In order to provide for aircraft movement, the six proposed RON/RAD spaces on the southern portion of the leasehold would not be able to be accommodated. Under this alternative, the total number of RON/RAD spaces would be 13, including 10 on the western portion of the leasehold and 3 in the new hangar. A conceptual site plan for this alternative is provided in **Figure 5-3**. This alternative would not provide sufficient space for aircraft maintenance activities. The single bay would provide room for three narrow-body aircraft or one large-body aircraft. This is less hangar space than under existing conditions and would be less aircraft space than provided by the proposed project or by Alternative 2. In addition, the project site would accommodate 10 outdoor parking positions. As with Alternative 2, it is possible that UAL could use RON/RAD spaces at LAWA's West Aircraft Maintenance Area or at the West Remote Pads/Gates; however, as noted in Section 5.4.2, there are already substantial demands on existing RON/RAD areas at LAX and these spaces may not be available for use by UAL aircraft. Moreover, even if spaces at the West Remote Pads/Gates were available for aircraft parking, aircraft maintenance is not permitted at these pads (with the exception of interior cabin maintenance). If no additional RON/RAD spaces were available, with the limited number of aircraft maintenance bays and parking positions, some aircraft undergoing servicing and light maintenance, or waiting to take off, would need to remain at UAL's gates in Terminals 7 and 8. Additionally, double-parking of aircraft at the maintenance facility RON/RAD areas may be required, space permitting. As with the No Project Alternative, this alternative would not replace the outdated Hangar 1 with a modern facility.

5.6 Evaluation of Project Alternatives

5.6.1 Alternative 1 - No Project

5.6.1.1 Air Quality

As discussed in Section 4.1.1, *Air Quality,* the proposed project would have significant, unavoidable, temporary construction-related impacts to air quality consisting of regional emissions of NO_X and localized construction impacts for PM_{10} and $PM_{2.5}$. Alternative 1 would not involve any construction and, therefore, would not result in any construction-related impacts to air quality. Alternative 1 would avoid the significant unavoidable construction-related air quality impacts associated with the proposed project.

As discussed in Section 4.1.1, *Air Quality,* during operations of the proposed project, regional emissions would be lower than baseline conditions (i.e., a beneficial impact) and localized impacts would be less than significant. Under Alternative 1, no physical changes would occur at the project site and the current operation of UAL's east and west maintenance facilities would continue. With respect to operational air quality, under this alternative, UAL's maintenance facilities would not be consolidated in a single location, and activities that currently occur at the West Maintenance Facility would not be relocated closer to UAL's passenger gates at Terminals 7 and 8. As a result, UAL aircraft and GSE that would continue to undergo maintenance at the West Maintenance Facility would travel longer distances to be serviced than they would under the proposed project.

Source: FSB Architects & Engineers, 2018.
Prepared by: CDM Smith, June 2018.

LAX UAL East Aircraft Maintenance and GSE Project	Alternative 3: Reduced Development Alternative	Figure **5-3**

The operational emissions associated with aircraft taxiing/towing between the hangars and terminals for Alternative 1, compared to the proposed project, are shown in **Table 5-1**. As shown in the table, the operational emissions for Alternative 1 would be greater than the proposed project for all criteria air pollutants analyzed. Note that these operational emissions are also assumed to be the same as the baseline emissions shown in Section 4.1.1, Table 4.1.1-8.

Table 5-1
Alternative 1 Maximum Peak Daily Operational Emissions (lbs/day)

Pollutant	Alternative 1 Peak Daily Emissions	Proposed Project Peak Daily Emissions	Alternative 1 Emissions Increase Compared to Proposed Project
CO	75.37	44.59	30.79
VOC	6.72	3.98	2.74
NO_X	23.38	15.83	7.55
SO_2	4.70	2.71	1.99
PM_{10}	0.45	0.34	0.11
$PM_{2.5}$	0.45	0.34	0.11

Source: Appendix B.2 of this EIR.

Prepared By: CDM Smith, May 2018.

The reduction in average operational vehicle miles traveled (VMT) by current West Maintenance Facility employees from their residences to their work site that would occur under the proposed project would not occur under this alternative. Moreover, under Alternative 1, older, less energy efficient buildings, fixtures, and equipment would not be replaced with modern facilities that are more energy efficient. Therefore, it is expected that operational air quality emissions from building-related energy use would be higher than the proposed project. Overall, operational air pollutant emissions under Alternative 1 would be greater than operational air pollutant emissions under the proposed project.

In summary, Alternative 1 would avoid the significant unavoidable impacts associated with construction air quality that would occur under the proposed project; however, long-term, operational air quality regional and localized emissions associated with this alternative would be greater than those associated with the proposed project.

5.6.1.2 Human Health Risk

As discussed in Section 4.1.2 *Human Health Risk Assessment,* the combined construction and operational impacts of the proposed project on potential cancer risks, as well as chronic and acute non-cancer health hazards, to residents and workers near the proposed project site would be less than significant. Alternative 1 would not involve any construction and, therefore, would not contribute any construction-related impacts to these risks or hazards.

Under Alternative 1, no physical changes would occur at the project site and the current operation of UAL's east and west maintenance Facilities would continue. With respect to operational health risks and hazards under this alternative, UAL's maintenance facilities would not be consolidated in a single location at the East Maintenance Facility, and activities that currently occur at the West Maintenance Facility would not be relocated closer to UAL's passenger gates at Terminals 7 and 8. As a result, UAL aircraft and GSE that would continue to undergo maintenance at the West Maintenance Facility would travel longer distances to be serviced than they would under the proposed project. However, a portion of the maintenance activities that would be relocated to the East Maintenance Facility under the proposed project would remain at the West Maintenance Facility under Alternative 1; these maintenance activities and related aircraft movements would occur farther from the nearest residential and worker locations as compared to the proposed project. Being farther from these locations would allow for more dilution of the toxic air contaminant emissions and would lower the exposure concentrations used in estimating risks and hazards. Because exposure to construction-related toxic air contaminants is a substantial contributor to human health risks and hazards, operational impacts associated with human health risks would be lower than under the proposed project.

In summary, Alternative 1 would have no incremental impact to human health risk and hazards from construction or operations. Therefore, impacts to human health risk under Alternative 1 would be lower than those associated with the proposed project.

5.6.1.3 Cultural Resources

As discussed in Section 4.2, *Cultural Resources,* the proposed project would have a significant unavoidable adverse impact on historical resources due to the demolition of the historical structures located at 6000-6016 and 6020-6024 Avion Drive. Under Alternative 1, these structures would not be demolished. Therefore, this alternative would not have an impact on historical resources. In comparison to the proposed project, Alternative 1 would avoid the significant unavoidable impact on historical resources associated with the proposed project.

5.6.1.4 Greenhouse Gas Emissions

As discussed in Section 4.3, *Greenhouse Gas Emissions,* the impacts of the proposed project with respect to GHG from construction and operational activities would be less than significant. Alternative 1 would avoid the construction-related emissions associated with the proposed project.

As discussed in Section 4.3, *Greenhouse Gas Emissions,* during operations of the proposed project, GHG emissions would be lower than baseline conditions (i.e., a beneficial impact) even with the addition of amortized construction emissions. Under Alternative 1, no physical changes would occur at the project site and the current operation of UAL's east and west maintenance facilities would continue. With respect to operational GHG under this alternative, UAL's maintenance facilities would not be consolidated in a single location, and activities that currently occur at the West Maintenance Facility would not be relocated closer to UAL's passenger gates at Terminals 7 and 8. As a result, UAL aircraft and GSE that would continue to undergo maintenance at the West Maintenance Facility would travel longer distances to be serviced than they would under the proposed project, which would result in increased GHG emissions compared to the proposed project.

The reduction in average operational VMT by current West Maintenance Facility employees from their residences to their work site that would occur under the proposed project would not occur under this alternative. Moreover, under Alternative 1, older, less energy efficient buildings, fixtures, and equipment would not be replaced with modern facilities that are more energy efficient. Therefore, it is expected that operational GHG emissions from building-related energy use would be higher than the proposed project. Overall, operational GHG emissions under Alternative 1 would be greater than operational GHG emissions under the proposed project.

In summary, Alternative 1 would avoid the construction-related contribution to GHG emissions associated with the proposed project. However, long-term, overall GHG emissions associated with this alternative would be greater than those associated with the proposed project.

5.6.1.5 Transportation/Traffic

As discussed in Section 4.4, *Transportation/Traffic*, construction of the proposed project would result in a cumulatively considerable contribution to significant cumulative impacts at three intersections, including Aviation Boulevard and Century Boulevard (Intersection #1), Imperial Highway and Aviation Boulevard (Intersection #2), and Imperial Highway and I-105 Ramp (Intersection #4). Recommended mitigation would reduce the project's contribution to these significant cumulative impacts to a level that is less than cumulatively considerable. Alternative 1 would not involve any of the construction activities associated with the development of the proposed project. Construction traffic associated with demolition, construction of new facilities, delivery of materials and hauling, and worker employee trips that would be required for the construction of the proposed project would not occur. Therefore, Alternative 1 would have no construction-related transportation/traffic impacts and would avoid the construction-related transportation/traffic impacts associated with the proposed project.

As discussed in Section 4.4, *Transportation/Traffic,* transportation/traffic impacts associated with operation of the proposed project would be less than significant. Alternative 1 would maintain current operational employee and delivery vehicle traffic patterns. Employees of the West Maintenance Facility would continue to drive to the west side of the airport and employees of the East Maintenance Facility would continue to drive to the east side of the airport. Under Alternative 1, traffic on roadways leading to the East Maintenance Facility would not increase due to project-related traffic. Alternative 1 would avoid operational traffic increases on certain local roadways that would occur under the proposed project.

5.6.1.6 Energy

As discussed in Section 6.5, *Energy Impacts and Conservation,* construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary energy use; would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; would not increase reliance on fossil fuels; and would incorporate renewable energy and energy efficiency measures. The proposed project would not result in any significant adverse impacts with respect to energy consumption or energy conservation.

Alternative 1 would not involve any construction; therefore, no energy impacts from construction would occur and Alternative 1 would avoid the construction-related energy use associated with the proposed project.

As discussed in Section 6.5, *Energy Impacts and Conservation*, during operation of the proposed project, use of fossil fuels would be lower than baseline conditions (i.e., a beneficial impact) even with the addition of amortized construction-related energy use. Under Alternative 1, no physical changes would occur at the project site and the current operation of UAL's east and west maintenance facilities would continue. With respect to operational energy use under this alternative, UAL's maintenance facilities would not be consolidated in a single location, and activities that currently occur at the West Maintenance Facility would not be relocated closer to UAL's passenger gates at Terminals 7 and 8. As a result, UAL aircraft and GSE that would continue to undergo maintenance at the West Maintenance Facility would travel longer distances to be serviced than they would under the proposed project, which would increase fossil fuel consumption as compared to the proposed project.

The reduction in average operational VMT by current West Maintenance Facility employees from their residences to their work site that would occur under the proposed project would not occur under this alternative, nor would the elimination of vehicle trips between the east and west maintenance facilities. As a result, vehicle-related fossil fuel consumption would increase compared to the proposed project. Moreover, under Alternative 1, older, less energy efficient buildings, fixtures, and equipment would not be replaced with modern facilities that are more energy efficient. Therefore, building-related energy consumption during operations would be higher than the proposed project. Overall, operational energy use under Alternative 1 would be greater than under the proposed project. The increase in operational energy use associated with Alternative 1 would offset the reduction in energy use (as compared to the proposed project) associated with avoiding the construction that would occur under the proposed project.

In summary, Alternative 1 would result in less efficient consumption of energy resources as compared to the proposed project. Although it would not increase reliance on fossil fuels as compared to baseline conditions, Alternative 1 would not have the beneficial impact with respect to energy use that would be associated with the proposed project. Alternative 1 would not incorporate energy efficiency measures. This alternative would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency, but nor would it promote these plans. For these reasons, the combined impact of Alternative 1 on energy and conservation during construction and operations would be greater than that associated with the proposed project. Nevertheless, energy use associated with Alternative 1 would not be wasteful, inefficient, or unnecessary.

5.6.2 Alternative 2 - West Maintenance Facility Consolidation

5.6.2.1 Air Quality

As discussed in Section 4.1.1, *Air Quality,* the proposed project would have significant, unavoidable, temporary construction-related impacts to air quality consisting of regional emissions of NO_X and localized construction impacts for PM_{10} and $PM_{2.5}$. Under Alternative 2, construction would be limited to refurbishment or interior alteration of the CAL hangar facility and extension of the UAL lease area to encompass additional surface parking. These modifications would result in limited air pollutant emissions; it is anticipated that construction-related air quality impacts would be less than significant. Alternative 2 would avoid the significant unavoidable construction-related air quality impacts associated with the proposed project.

As discussed in Section 4.1.1, *Air Quality,* during operations of the proposed project, regional emissions would be lower than baseline conditions (i.e., a beneficial impact) and localized impacts would be less than significant. With respect to operational air quality, under Alternative 2, all of UAL's aircraft and GSE would undergo maintenance at the West Maintenance Facility. This would involve relocation of maintenance activities and RON/RAD aircraft that currently occur at the East Maintenance Facility to the West Maintenance Facility. This would increase the distance that aircraft and GSE would have to travel to reach the maintenance facility, which would increase fuel consumption and related emissions of criteria pollutants compared to the proposed project.

The operational emissions associated with aircraft taxiing/towing between the hangars and terminals for Alternative 2, compared to the proposed project, are shown in **Table 5-2**. As shown in the table, operational emissions under Alternative 2 would be less than significant, but would be greater than the proposed project emissions for all criteria air pollutants analyzed. Alternative 2 would not have the beneficial impact with respect to operational air quality emissions that would be associated with the proposed project.

The reduction in average operational VMT by current West Maintenance Facility employees from their residences to their work site that would occur under the proposed project would not occur under this alternative. Moreover, current East Maintenance Facility employees would be relocated to the west under this alternative, which would increase the average VMT traveled by these employees from their residences to their work site. This would represent an increase in emissions compared to baseline conditions. Under Alternative 2, UAL would continue to conduct aircraft and GSE maintenance in an old facility (the West Maintenance Facility was constructed in the 1960s and 1970s). The older, less energy efficient buildings, fixtures, and equipment would not be replaced with modern facilities that are more energy efficient. Therefore, it is expected that operational air quality emissions from building-related energy use would be higher than the proposed project. Overall, operational air pollutant emissions under Alternative 2 would be greater than operational air pollutant emissions under the proposed project.

Table 5-2 Alternative 2 Maximum Peak Daily Operational Emissions (lbs/day)					
Pollutant	Baseline Peak Daily Emissions	Alternative 2 Peak Daily Emissions	Increment in Peak Daily Emissions	Threshold	Significant?
CO	75.37	114.96	39.58	550	No
VOC	6.72	10.24	3.52	55	No
NO_X	23.38	33.08	9.70	55	No
SO_2	4.70	7.26	2.56	150	No
PM_{10}	0.45	0.58	0.14	150	No
$PM_{2.5}$	0.45	0.58	0.14	55	No
Source: Appendix B.2 of this EIR. Prepared By: CDM Smith, May 2018.					

In summary, it is anticipated that Alternative 2 would avoid the significant unavoidable impacts associated with construction air quality that would occur under the proposed project; however, long-term, operational air quality impacts associated with this alternative would be greater than those associated with the proposed project.

5.6.2.2 Human Health Risk

As discussed in Section 4.1.2 *Human Health Risk Assessment,* the combined construction and operational impacts of the proposed project on potential cancer risks, as well as chronic and acute non-cancer health hazards, to residents and workers near the proposed project site would be less than significant. The intensity of construction activity under Alternative 2 would be lower than that under the proposed project and would occur farther from the nearest residential and worker locations; therefore, Alternative 2 would result in lower construction-related impacts to health risks or hazards than the proposed project.

Under Alternative 2, all of UAL's aircraft and GSE would undergo maintenance at the West Maintenance Facility. This would involve relocation of maintenance activities and RON/RAD aircraft that currently occur at the East Maintenance Facility to the West Maintenance Facility. This would increase the distance that aircraft and GSE would have to travel to reach the maintenance facility, which would increase fuel consumption and related emissions of toxic air contaminants compared to the proposed project. However, much of this activity would occur farther from the nearest residential and worker locations than under the proposed project. Being farther from these locations would allow for more dilution of the toxic air contaminant emissions and would lower the exposure concentrations used in estimating risks and hazards. Because exposure to construction-related toxic air contaminants is a substantial contributor to human health risks and hazards, operational impacts associated with human health risks under Alternative 2 would likely be lower than under the proposed project.

In summary, construction-related impacts to human health risks and hazards associated with Alternative 2 would be lower than those associated with the proposed project. Moreover, it is likely that operational impacts to human health risk under Alternative 2 would be lower than those associated with the proposed project.

5.6.2.3 Cultural Resources

As discussed in Section 4.2, *Cultural Resources,* the proposed project would have a significant unavoidable adverse impact on historical resources located at the East Maintenance Facility. Under this alternative, UAL's aircraft and GSE maintenance activities would be consolidated at the West Maintenance Facility. In order to accommodate the consolidated activities, the existing buildings would be substantially refurbished or altered. The West Maintenance Facility is located in a portion of the former CAL hangars, shops, and storage facilities. The CAL hangars, shops, and storage facilities are not historic individually; however, the facilities together are a contributor to a California Register-eligible historic district that includes the attached CAL General Office (GO) Building (7270 World Way West) and the nearby CAL Training Center Building at 7320 World Way West. This district, referred to as the CAL Airlines Complex, is also eligible for designation as an LAHCM. LAWA recently approved the Secured Area Access Post Project, under which the CAL GO Building will be demolished. Without the CAL GO building, the district will no longer be eligible for listing in the California Register or for designation as an LAHCM.[300] Therefore, the building alterations and refurbishment associated with this alternative would not have any impact on historical resources. Alternative 2 would avoid the significant and unavoidable adverse impact to historical resources associated with the proposed project.

5.6.2.4 Greenhouse Gas Emissions

As discussed in Section 4.3, *Greenhouse Gas Emissions,* the impacts of the proposed project with respect to GHG emissions from construction and operational activities would be less than significant. Alternative 2 would result in lower construction-related emissions than those under the proposed project due to the reduced level of construction associated with refurbishing existing facilities instead of demolishing and rebuilding maintenance facilities.

As discussed in Section 4.3, *Greenhouse Gas Emissions,* during operations of the proposed project, GHG emissions would be lower than baseline conditions (i.e., a beneficial impact) even with the addition of amortized construction emissions. Under Alternative 2, all of UAL's aircraft and GSE would undergo maintenance at the West Maintenance Facility. This would involve relocation of maintenance activities and RON/RAD aircraft that currently occur at the East Maintenance Facility to the West Maintenance Facility. This would increase the distance that aircraft and GSE would have to travel to reach the maintenance facility, which would increase fuel consumption and related GHG emissions compared to the proposed project.

The reduction in average operational VMT by current West Maintenance Facility employees from their residences to their work site that would occur under the proposed project would not occur under this alternative. Moreover, current East Maintenance Facility employees would be relocated to the west under this alternative, which would increase the average VMT traveled by these employees from their residences to their work site. This would represent an increase in GHG emissions compared to baseline conditions. Under Alternative 2, older, less energy efficient buildings, fixtures, and equipment would not be replaced with modern facilities that are more energy efficient. Therefore, it is expected that operational air pollutant emissions from building-related energy use would be higher than the proposed project. Overall, operational GHG emissions under Alternative 2 would be greater than operational GHG emissions under the proposed project.

Overall, operational GHG emissions under Alternative 2 would be greater than operational emissions under the proposed project. Alternative 2 would not have the beneficial impact with respect to GHG emissions that would be associated with the proposed project.

In summary, Alternative 2 would reduce the construction-related contribution to GHG emissions associated with the proposed project. However, long-term, overall GHG emissions associated with this alternative would be greater than those associated with the proposed project.

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300 City of Los Angeles, Los Angeles World Airports, *Final Environmental Impact Report for Los Angeles International Airport Secured Area Access Post Project* January 2018. Available: https://www.lawa.org/-/media/lawa-web/lawa-our-lax/documents-underway/lax-saap-final-eir.ashx?la=en&hash=D5F4D3753E0F712E69AA094632211A4F48C0196D.

5.6.2.5 Transportation/Traffic

As discussed in Section 4.4, *Transportation/Traffic,* construction of the proposed project would result in a cumulatively considerable contribution to significant cumulative impacts at three intersections, including Aviation Boulevard and Century Boulevard (Intersection #1), Imperial Highway and Aviation Boulevard (Intersection #2), and Imperial Highway and I-105 Ramp (Intersection #4). Recommended mitigation would reduce the project's contribution to these significant cumulative impacts to a level that is less than cumulatively considerable. Due to the location of Alternative 2 on the west side of the airport, this alternative would avoid the cumulatively considerable contributions to these intersections that would occur under the proposed project. Moreover, as the level of construction associated with Alternative 2 would be relatively low, it is not expected that this alternative would result in impacts to intersections not studied for the proposed project (including Imperial Highway and Sepulveda Boulevard, Imperial Highway and Main Street, and Imperial Highway and Pershing Drive). Overall, the construction-related impacts of Alternative 2 on transportation/traffic would be less than those associated with the proposed project.

As discussed in Section 4.4, *Transportation/Traffic,* transportation/traffic impacts associated with operation of the proposed project would be less than significant. Under Alternative 2, employees of the East Maintenance Facility would be relocated to the West Maintenance Facility. As a result, vehicle trips by employees and delivery vehicles would occur on different roads than under baseline conditions or the proposed project. However, given that almost all operational employee trips would occur outside of the peak traffic hours, it is expected that operational impacts to transportation/traffic under Alternative 2 would be less than significant. Although traffic would shift to different roads, the impacts of Alternative 2 on operational transportation/traffic would be comparable to those associated with the proposed project.

5.6.2.6 Energy

As discussed in Section 6.5, *Energy Impacts and Conservation,* construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary energy use; would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; would not increase reliance on fossil fuels; and would incorporate renewable energy and energy efficiency measures. The proposed project would not result in any significant adverse impacts with respect to energy consumption or energy conservation.

Under Alternative 2, construction would be limited to refurbishment or interior alteration of the existing CAL hangar facility and extension of the lease area to encompass additional surface parking. These building modifications would result in less construction-related energy use than the proposed project.

As discussed in Section 6.5, *Energy Impacts and Conservation*, during operation of the proposed project, use of fossil fuels would be lower than baseline conditions (i.e., a beneficial impact) even with the addition of amortized construction-related energy use. With respect to operational energy use, under Alternative 2, all of UAL's aircraft and GSE would undergo maintenance at the West Maintenance Facility. This would involve relocation of maintenance activities and RON/RAD aircraft that currently occur at the East Maintenance Facility to the West Maintenance Facility. This would increase the distance that aircraft and GSE would have to travel to reach the maintenance facility, which would increase fossil fuel consumption compared to the proposed project.

The reduction in average operational VMT by current West Maintenance Facility employees from their residences to their work site that would occur under the proposed project would not occur under this alternative. Moreover, current East Maintenance Facility employees would be relocated to the west under this alternative, which would increase the average VMT traveled by these employees from their residences to their work site. As a result, vehicle-related fossil fuel consumption would increase compared to the proposed project. Moreover, under Alternative 2, UAL would continue to conduct aircraft and GSE maintenance in an old facility (the West Maintenance Facility was constructed in the 1960s and 1970s). The older, less energy efficient buildings, fixtures, and equipment would not be replaced with modern facilities that are more energy efficient. Therefore, building-related energy consumption during operations would be higher than the proposed project. Overall, operational energy use under Alternative 2 would be greater than under the proposed project. The increase in operational energy use associated with Alternative 2 would offset the reduction in energy use associated with lower construction-related energy use as compared to the proposed project.

In summary, Alternative 2 would result in less efficient consumption of energy resources as compared to the proposed project, and would not have the beneficial impact with respect to energy use that would be associated with the proposed project. This alternative would result in an increased reliance on fossil fuels as compared to baseline conditions. Alternative 2 would not incorporate energy efficiency measures. This alternative would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency, but nor would it promote these plans. For these reasons, the combined impact of Alternative 2 on energy and conservation during construction and operations would be greater than that associated with the proposed project. Nevertheless, energy use associated with Alternative 2 would not be wasteful, inefficient, or unnecessary.

5.6.3 Alternative 3 - Reduced Development

5.6.3.1 Air Quality

As discussed in Section 4.1.1, *Air Quality,* the proposed project would have significant, unavoidable, temporary construction-related impacts to air quality consisting of regional emissions of NO_X and localized construction impacts for PM_{10} and $PM_{2.5}$. Under Alternative 3, total construction air pollutant emissions and the duration of impacts associated with these emissions would be less than the proposed project given the reduced amount of demolition and construction that would occur. However, although implementation of Alternative 3 would result in less development, it is likely that this alternative would still result in similar maximum daily emissions given that the intensity of construction activity would likely remain the same (i.e., the reduced development could reduce the overall duration of development, but daily activity levels would likely be similar to those of the proposed project). As stated in Section 4.1.1, *Air Quality*, the construction thresholds of significance for emissions and local impacts are based on maximum daily emissions. As Alternative 3 would have a similar intensity of construction activity on the peak construction day, this alternative would result in similar significant, unavoidable impacts with respect to maximum daily regional NO_X emissions and localized impacts relative to PM_{10} and $PM_{2.5}$ as compared to the proposed project. Construction air pollutant emissions from this alternative would still exceed the regional daily emissions significance threshold for NO_X and the localized impacts to PM_{10} and $PM_{2.5}$ following implementation of the same mitigation measures that would implemented under the proposed project (see Section 4.1.1, *Air Quality*). Alternative 3 would have the same significant, unavoidable, temporary impact on construction-related air quality as would the proposed project.

As discussed in Section 4.1.1, *Air Quality,* during operations of the proposed project, regional emissions would be lower than baseline conditions (i.e., a beneficial impact) and localized impacts would be less than significant. Alternative 3 would have substantially fewer RON/RAD spaces than the proposed project. As discussed in Section 5.5.3, it is possible that aircraft could use RON/RAD spaces at LAWA's West Aircraft Maintenance Area or at the West Remote Pads/Gates. As these facilities are located on the west side of the airport, this would increase the travel distance for aircraft associated with this alternative as they move back and forth between the East Maintenance Facility and the RON/RAD spaces, which would increase operational emissions associated with taxiing and towing. Due to uncertainties related to RON/RAD areas that would be used under this alternative, the increased emissions could not be calculated.

Under Alternative 3, Hangar 2 would be replaced by a new, modern facility. However, Hangar 1, which was constructed in the 1940s, would not be replaced. Therefore, it is expected that operational air pollutant emissions from building-related energy use would be higher than the proposed project. Overall, it is expected that Alternative 3 would have greater operational air quality impacts than the proposed project.

In summary, Alternative 3 would have the same significant unavoidable impact associated with construction emissions and localized construction impacts as the proposed project. Long-term operational-related air quality impacts under Alternative 3 would be greater than the proposed project, although it is likely that they would be less than significant.

5.6.3.2 Human Health Risk

As discussed in Section 4.1.2 *Human Health Risk Assessment,* the combined construction and operational impacts of the proposed project on potential cancer risks, as well as chronic and acute non-cancer health hazards, to residents and workers near the proposed project site would be less than significant. Under Alternative 3, the reduced amount of demolition and construction that would occur relative to the proposed project would result in a shorter construction duration and lower associated total construction toxic air contaminant emissions. The cancer risks, and possibly the chronic non-cancer health hazards, would be lower under Alternative 3 than under the proposed project. However, although implementation of Alternative 3 would result in less development, it is likely that this alternative would still result in similar maximum daily emissions given that the intensity of construction activity would likely remain the same. Therefore, acute non-cancer health hazards due to construction of Alternative 3 would be the same as those for the proposed project.

Alternative 3 would have substantially fewer RON/RAD spaces than the proposed project. As discussed in Section 5.5.3, it is possible that aircraft could use RON/RAD spaces at LAWA's West Aircraft Maintenance Area or at the West Remote Pads/Gates. As these facilities are located on the west side of the airport, this would increase the travel distance for aircraft associated with this alternative as they move back and forth between the East Maintenance Facility and the RON/RAD spaces, which would increase operational toxic air contaminant emissions associated with taxiing and towing. Due to uncertainties related to RON/RAD areas that would be used under this alternative, the increased emissions could not be calculated. Overall, it is expected that Alternative 3 would have greater operational contributions to cancer risks and non-cancer health hazards than the proposed project.

In summary, Alternative 3 construction-related impacts to cancer risks and chronic non-cancer hazards on human health would be lower than those associated with the proposed project, while construction-related acute non-cancer health hazards would be similar to those for the proposed project. Alternative 3 operational impacts to cancer risks and chronic non-cancer health hazards would be greater than those associated with the proposed project, while acute non-cancer health hazards would be similar. Because exposure to construction-related toxic air contaminants is a substantial contributor to cancer risks and chronic non-cancer health hazards, the combined construction and operational impacts to health risks and hazards under Alternative 3 would likely be lower than those associated with the proposed project. The Alternative 3 combined construction and operational acute non-cancer health hazard impacts would be the same as those for the proposed project.

5.6.3.3 Cultural Resources

As discussed in Section 4.2, *Cultural Resources,* the proposed project would have a significant unavoidable adverse impact on historical resources due to the demolition of the historical structures located at 6000-6016 and 6020-6024 Avion Drive (Hangar 2 and Hangar 1, respectively). Under Alternative 3, UAL would consolidate all aircraft and GSE maintenance activities at the East Maintenance Facility. However, instead of demolishing both hangars, only Hangar 2 (the easternmost hangar) would be demolished. As discussed in Section 4.2, *Cultural Resources,* Hangar 1 and Hangar 2 together are eligible for listing in the California Register and for designation as an LAHCM. Because it is eligible for listing at the state and local levels as part of a grouping of buildings, demolition of Hangar 2 would result in a significant unavoidable impact to an historical resource. However, Alternative 3 would retain Hangar 1. By itself, Hangar 1 retains most of its original massing, cladding, fenestration, and entrance openings. Moreover, even with demolition of Hangar 2, Hangar 1 would continue to be significant for its association with the Intermediate Terminal Facility period at LAX and would continue to remain eligible for listing in the California Register and for designation as an LAHCM. Therefore, even though Alternative 3 would have a significant unavoidable impact on historical resources, the severity of this impact would be less than the impact associated with the proposed project, which would result in the demolition of both hangars.

5.6.3.4 Greenhouse Gas Emissions

As discussed in Section 4.3, *Greenhouse Gas Emissions,* the impacts of the proposed project with respect to GHG emissions from construction and operational activities would be less than significant. Alternative 3 would result in lower overall construction-related GHG emissions than those under the proposed project due to the reduced duration of construction.

As discussed in Section 4.3, *Greenhouse Gas Emissions,* during operations of the proposed project, GHG emissions would be lower than baseline conditions (i.e., a beneficial impact) even with the addition of amortized construction emissions. Under Alternative 3, all of UAL's aircraft and GSE would undergo maintenance at the East Maintenance Facility. However, Alternative 3 would have substantially fewer RON/RAD spaces than the proposed project. As discussed in Section 5.5.3, it is possible that aircraft could use RON/RAD spaces at LAWA's West Aircraft Maintenance Area or at the West Remote Pads/Gates. As these facilities are located on the west side of the airport, this would increase the travel distance for aircraft associated with this alternative as they move back and forth between the East Maintenance Facility and the RON/RAD spaces, which would increase operational emissions associated with taxiing and towing. Due to uncertainties related to RON/RAD areas that would be used under this alternative, the increased emissions could not be calculated.

Under Alternative 3, Hangar 2 would be replaced by a new, modern facility. However, Hangar 1, which was constructed in the 1940s, would not be replaced. Therefore, it is expected that operational GHG emissions from building-related energy use would be higher than the proposed project. Overall, it is expected that Alternative 3 would have greater operational contributions to GHG emissions than the proposed project.

In summary, Alternative 3 would reduce the construction-related contribution to GHG emissions. However, long-term, overall GHG emissions associated with this alternative would likely be greater than those associated with the proposed project.

5.6.3.5 Transportation/Traffic

As discussed in Section 4.4, *Transportation/Traffic,* construction of the proposed project would result in a cumulatively considerable contribution to significant cumulative impacts at three intersections, including Aviation Boulevard and Century Boulevard (Intersection #1), Imperial Highway and Aviation Boulevard (Intersection #2), and Imperial Highway and I-105 Ramp (Intersection #4). Recommended mitigation would reduce the project's contribution to these significant cumulative impacts to a level that is less than cumulatively considerable. Alternative 3 would result in a reduced amount of demolition and construction and a shorter construction schedule. However, it is expected that the daily construction activity level would be similar to the proposed project. As stated in Section 4.4, *Transportation/Traffic,* the thresholds of significance are based on the level of service at an intersection during the a.m. or p.m. peak hour. As

Alternative 3 would have a similar intensity of daily construction activity, this alternative would result in similar impacts to Intersections #1, #2, and #4 as the proposed project. As with the proposed project, following implementation of mitigation, these impacts would be less than significant.

As discussed in Section 4.4, *Transportation/Traffic,* transportation/traffic impacts associated with operation of the proposed project would be less than significant. As with the proposed project, under Alternative 3, all operations would be consolidated at the East Maintenance Facility. Therefore, operational trips to the project site would be the same under the two alternatives. Under Alternative 3, some aircraft maintenance may have to be conducted at RON/RAD aircraft parking spaces located on other portions of the airport. It is expected that employees would travel to the aircraft locations from the East Maintenance Facility using on-airport roads. Therefore, Alternative 3 would not change traffic on off-airport roadways as compared to the proposed project and operational traffic impacts associated with Alternative 3 would be the same as the proposed project.

5.6.3.6 Energy

As discussed in Section 6.5, *Energy Impacts and Conservation,* construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary energy use; would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; would not increase reliance on fossil fuels; and would incorporate renewable energy and energy efficiency measures. The proposed project would not result in any significant adverse impacts with respect to energy consumption or energy conservation.

Under Alternative 3, total construction-related energy use would be less than the proposed project given the reduced amount of demolition and construction that would occur.

As discussed in Section 6.5, *Energy Impacts and Conservation*, during operation of the proposed project, use of fossil fuels would be lower than baseline conditions (i.e., a beneficial impact) even with the addition of amortized construction-related energy use. Alternative 3 would have substantially fewer RON/RAD spaces than the proposed project. As discussed in Section 5.5.3, it is possible that aircraft could use RON/RAD spaces at LAWA's West Aircraft Maintenance Area or at the West Remote Pads/Gates. As these facilities are located on the west side of the airport, this would increase the travel distance for aircraft associated with this alternative as they move back and forth between the East Maintenance Facility and the RON/RAD spaces, which would increase operational fossil fuel consumption associated with taxiing and towing as compared to the proposed project.

As with the proposed project, the consolidation of maintenance activities on the east side of the airport under Alternative 3 would reduce VMT by maintenance employees from their places of residence to the worksite as compared to baseline conditions and vehicle trips between the east and west maintenance facilities would be eliminated. Under Alternative 3, Hangar 2 would be replaced by a new, modern facility. However, Hangar 1, which was constructed in the 1940s and is a less energy efficient facility than new construction, would not be replaced. Therefore, building-related energy use would be higher than the proposed project. Overall, operational energy use under Alternative 3 would be greater than under the proposed project. It is expected that the increase in operational energy use associated with Alternative 3 would offset the reduction in energy use associated with lower construction-related energy use as compared to the proposed project.

In summary, Alternative 3 would result in less efficient consumption of energy resources as compared to the proposed project, and would not have the beneficial impact with respect to energy use that would be associated with the proposed project. This alternative would result in an increased reliance on fossil fuels as compared to the proposed project, would have reduced opportunities to incorporate energy efficiency measures into the new facility, and would have less opportunity to promote state or local plans pertaining to energy efficiency. For these reasons, the combined impact of Alternative 3 on energy and conservation during construction and operations would be greater than that associated with the proposed project. Nevertheless, energy use associated with Alternative 3 would not be wasteful, inefficient, or unnecessary.

5.7 Environmentally Superior Alternative

Section 15126.6(e)(2) of the State CEQA Guidelines indicates that an analysis of alternatives to a proposed project shall identify an environmentally superior alternative among the alternatives evaluated in an EIR. The State CEQA Guidelines also state that should it be determined that the No Project Alternative is the environmentally superior alternative, the EIR shall identify another environmentally superior alternative among the remaining alternatives. With respect to identifying an environmentally superior alternative among those analyzed in this EIR, the range of alternatives includes Alternative 1: No Project, Alternative 2: West Maintenance Facility Consolidation, and Alternative 3: Reduced Development.

A comparative summary of the environmental impacts associated with each alternative and the environmental impacts associated with the proposed project is provided in **Table 5-3**. A more detailed description of the potential impacts associated with each alternative is provided above. Pursuant to Section 15126.6(c) of the State CEQA Guidelines, the analysis below addresses the ability of the alternatives to “avoid or substantially lessen one or more of the significant effects” of the project.

As discussed above, and as shown in Table 5-3, Alternative 1 (No Project) is considered to be the environmentally superior alternative because it would avoid all construction impacts of the proposed project, including significant unavoidable temporary construction-related air quality impacts, and it would avoid the significant unavoidable impact to historical resources that would occur under the proposed project. It should be noted that Alternative 1 would have greater operational air pollutant and GHG emissions than the proposed project and would result in a less efficient consumption of energy resources as compared to the proposed project.

In accordance with the State CEQA Guidelines requirement to identify an environmentally superior alternative other than the No Project Alternative, a comparative evaluation of the remaining alternatives indicates that Alternative 2, West Maintenance Facility Consolidation, would be the environmentally superior alternative relative to the other build alternative. Alternative 2 would avoid the significant unavoidable impact to historical resources associated with the proposed project. Because it would not involve demolition of any structures and would involve less construction overall, Alternative 2 would also avoid the significant unavoidable temporary construction-related air quality impacts associated with the proposed project and would have lower construction-related impacts associated with GHG and energy consumption than the proposed project. Alternative 2 would also have fewer construction-related air quality and GHG impacts than Alternative 3; this is because Alternative 3 would result in demolition of one of the two hangars located on the proposed project site and construction of new facilities, whereas Alternative 2 would only involve refurbishment of the existing West Maintenance Facility. Construction-related impacts of Alternative 2 on transportation/traffic would be less than those of the proposed project, although these impacts would be less than significant under both Alternative 2 and the proposed project (with implementation of mitigation measures). With respect to operations, Alternative 2 would increase operations-related impacts to air quality, GHG, and energy and conservation as compared to the proposed project.

Table 5-3
Comparison of Impacts Associated with the Alternatives and Impacts of the Proposed Project

Environmental Resource	Proposed Project	Alternative 1: No Project	Alternative 2: West Maintenance Facility Consolidation	Alternative 3: Reduced Development
Air Quality				
Regional Construction Emissions	Significant and Unavoidable	No Impact	Less Than Significant	Significant and Unavoidable
Localized Construction Emissions	Significant and Unavoidable	No Impact	Less Than Significant	Significant and Unavoidable
Operational Emissions	Less Than Significant (Beneficial Impact)	No Impact[1]	Less Than Significant	Less Than Significant
Operational Concentrations	Less Than Significant	No Impact	Less Than Significant	Less Than Significant
Human Health Risk				
Cancer Risk, Chronic-Non-Cancer and Acute Non-Cancer Health Hazards, and Occupational Effects	Less Than Significant	No Impact	Less Than Significant	Less Than Significant
Cultural Resources				
Historical Resources	Significant and Unavoidable	No Impact	No Impact	Significant and Unavoidable
Greenhouse Gas Emissions				
GHG Emissions	Less Than Significant (Beneficial Impact)	No Impact[1]	Less Than Significant	Less Than Significant
Consistency with GHG Reduction Plans	Less Than Significant	No Impact	Less Than Significant	Less Than Significant
Transportation/Traffic				
Construction Traffic	Less Than Significant with Mitigation	No Impact	Less Than Significant	Less Than Significant with Mitigation
Operational Traffic	Less Than Significant	No Impact	Less Than Significant	Less Than Significant
Energy Impacts and Conservation				
Wasteful, Inefficient or Unnecessary Consumption	Less Than Significant	Less Than Significant	Less Than Significant	Less Than Significant
Reliance on Fossil Fuels	Less Than Significant	Less Than Significant	Less Than Significant	Less Than Significant
Consistency with Energy Efficiency Plans	Less Than Significant	Less Than Significant	Less Than Significant	Less Than Significant

Source: CDM Smith, 2018.

Notes:

1. Under Alternative 1, emissions would not change from baseline conditions. Emissions under this alternative would be greater than under the proposed project.

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6. OTHER ENVIRONMENTAL CONSIDERATIONS

6.1 Significant Unavoidable Impacts

Section 15126.2(b) of the State CEQA Guidelines requires that an EIR describe significant environmental impacts that cannot be avoided, including impacts that can be mitigated but not reduced to a level that is less than significant. Chapter 4 of this EIR provides detailed analyses of the environmental topics identified in the Initial Study, prepared in December 2017, as having the potential to result in significant impacts with the implementation of the proposed project. The following identifies the impacts that cannot be mitigated to a level that is less significant.

- Air Quality
  - Construction-related regional emissions of nitrogen oxides (NO_X).
  - Construction-related localized emissions of respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$).
  - Cumulatively considerable contribution to significant cumulative construction-related air quality impacts, based on significant construction-related project impacts summarized above.
- Cultural Resources
  - Demolition of the two intact, surviving Intermediate Terminal Facility buildings at 6000–6016 and 6020–6024 Avion Drive (on the project site), which are two component parts of a single historical resource that is eligible for listing in the California Register of Historical Resources and for designation as a Los Angeles Historic-Cultural Monument.

Sections 4.1 identifies mitigation measures that would address impacts to air quality; these measures would not reduce air quality impacts to a level that is less than significant. No additional feasible mitigation measures are available that would avoid temporary construction-related impacts to air quality or reduce them to a level that is less than significant. As identified in Section 4.2, no feasible mitigation measures are available to reduce or avoid significant impacts to historical resources.

In addition to identifying the significant unavoidable impacts of the proposed project, Section 15126.2(b) of the State CEQA Guidelines also recommends that an EIR describe the reasons why the project is being proposed, notwithstanding the significant unavoidable impacts associated with the project. As discussed in Chapter 2, *Project Description*, the specific objectives of the proposed project are to:

- Consolidate/relocate UAL's existing aircraft and GSE maintenance facilities at LAX in a single location to provide for more efficient and effective maintenance of UAL aircraft and equipment at the airport that eliminates duplicate facilities;
- Locate UAL's aircraft and GSE maintenance facilities closer to UAL's gates to increase efficiency by reducing the distance between the gates and maintenance area, consistent with the mission of LAX Airfield Operations of providing a safe and efficient airport operating environment;
- Modernize UAL's maintenance facilities, which were constructed between the mid-1940s and early 1970s when aircraft and GSE equipment were much smaller than they are today, in a manner that is consistent with LAWA's Sustainable Design and Construction Policy and that fulfills LAWA's strategic goal of innovating to enhance efficiency and effectiveness;
- Provide sufficient enclosed aircraft maintenance space and remain over night/remain all day (RON/RAD) aircraft parking spaces on UAL's leasehold to support routine servicing and maintenance of aircraft and meet overnight parking requirements;
- Provide facilities to support the maintenance requirements of UAL's operations; and

- Fulfill LAWA's strategic goal of sustaining a strong business that recognizes the fiscal impact the airport makes on the regional economy.

6.2 Significant Irreversible Environmental Changes

According to the State CEQA Guidelines, an EIR is required to evaluate significant irreversible environmental changes that would be caused by implementation of the proposed project. Specifically, as stated in Section 15126.2(c) of the State CEQA Guidelines:

> "Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified."

The project site is already dedicated to airport uses. However, construction of the proposed project would involve the consumption of building materials during construction, such as aggregate (sand and gravel), metals (e.g., steel, copper, lead), petrochemical construction materials (e.g., plastics), and water. This would represent the loss of non-renewable resources, which are generally not retrievable. Aggregate resources are locally constrained, but regionally available. Their use would not have a project-specific adverse effect upon the availability of these resources.

Construction of the proposed project would also result in the consumption of energy resources, including electricity, diesel, and various transportation-related fuels. This would represent the loss of non-renewable resources, which are generally not retrievable. Long-term project-related energy demand that would result from operation of the proposed project would be less than the operational energy demand under either existing conditions or future without project conditions; therefore, operation of the proposed project would not result in an increase in the consumption of nonrenewable resources. (See Section 6.5 below for a detailed discussion of energy impacts and conservation.)

As described in Chapter 2, *Project Description*, the proposed project would be designed and constructed in accordance with LAWA's Sustainable Design and Construction Policy, which requires that the proposed facility be designed to achieve the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Silver certification. LEED® Silver certification requires a project to be designed in a manner to save energy, water, and other resources, and to generate less waste. In addition, the proposed project would comply with current state water and energy efficiency standards and regulations pursuant to the California Building Code (CBC), California Green Building Standards Code (CALGreen), and Los Angeles Green Building Code (LAGBC) that would reduce long-term energy demand. Compliance with these requirements would reduce wasteful, inefficient, and unnecessary consumption of energy. Therefore, the use of non-renewable resources from construction of the proposed project would not result in significant irreversible changes to the environment.

6.3 Growth Inducing Impacts

Section 15126.2(d) of the State CEQA Guidelines requires an EIR to "[d]iscuss the ways the proposed project could foster economic or population growth or the construction of additional housing, directly or indirectly, in the surrounding environment." The section further states that growth-inducing impacts include the removal of obstacles to population growth and the development and construction of new service facilities that could significantly affect the environment individually or cumulatively.

6.3.1 Project Characteristics

The proposed project would consolidate and modernize existing UAL aircraft maintenance and GSE facilities at LAX, which would allow for more efficient and effective maintenance of existing aircraft and GSE at the airport. Although the portion of UAL's current aircraft and GSE maintenance operations that occurs at the West Maintenance Facility would be consolidated with operations located on the east side of the airport, the volume and basic nature of UAL's existing maintenance operations at LAX would not change or increase. Implementation of the proposed project would simply combine/consolidate existing maintenance operations from two areas into one. The resulting reduction in the total building square footage and leasehold acreage associated with the proposed project would not alter the nature and type of aircraft maintenance, or the number of aircraft undergoing maintenance, at LAX. Rather, the consolidation would increase operational efficiency and would "right-size" the space to match the business operations. The proposed project would not increase flights and/or aircraft operations at LAX compared to existing airfield conditions and would not affect terminals, the number of gates at LAX, gate frontage, taxiways, or runways.

As described in Chapter 3, *Overview of Project Setting*, the proposed project is one of many past and present changes to aircraft and GSE maintenance facilities at LAX that have occurred since initiation of the LAX modernization program, which have resulted in a net decrease in square footage of facilities dedicated to aircraft and GSE maintenance at the airport. Following project implementation, it is reasonably foreseeable that UAL's West Maintenance Facility would continue to be used for aircraft and/or GSE maintenance by another airline currently conducting such activities at LAX in constrained or reduced facilities, and would not represent a new use or an increase in such activity.[301]

6.3.2 Economic Growth

Construction of the proposed project would not include any permanent or temporary residential structures that would induce population growth directly through the construction of housing. Although the proposed project does not include any residential development, there exists the potential for indirect population growth as a result of project-related construction and operational employment. This potential is discussed below.

Construction activity associated with the proposed project would directly and indirectly foster economic growth over the approximately 22-month (one year and ten months) construction period in terms of spending by workers and the provision of goods and services in support of construction. As stated in Chapter 2, *Project Description*, it is estimated that the proposed project would require a maximum of 278 construction employees during the peak month of construction. However, the construction employment would be temporary and transitory in nature, drawing from an existing local labor pool (i.e., construction workers already living in the greater Los Angeles area transitioning from one construction project to another). As such, construction workers would not relocate to the region as a consequence of the construction job opportunities generated by the proposed project.

The proposed project would not increase flights and/or aircraft operations at LAX compared to existing airfield conditions and would not affect terminals, the number of gates at LAX, gate frontage, taxiways, or runways. Operation of the proposed project would not increase the number of employees associated with UAL aircraft and GSE maintenance or the long-term employment opportunities at LAX associated with UAL's operations. As described above, vacation of the West Maintenance Facility by UAL would not represent an increase in the area at LAX available to another entity for aircraft and/or GSE maintenance over historical levels; rather, as discussed in Chapter 3, *Overview of Project Setting*, the overall square

301 Any proposed reuse of the West Maintenance Facility may be subject to its own environmental review and documentation, as appropriate.

footage of facilities dedicated to aircraft and GSE maintenance at the airport has declined since initiation of the LAX modernization program.

For these reasons, the proposed project would not induce economic growth beyond that projected to occur with natural growth in activity levels at LAX that will occur irrespective of the proposed project.

6.3.3 Removal of an Obstacle to Growth

As described in Chapter 2, *Project Description*, the proposed project would not increase flights and/or aircraft operations at LAX compared to existing airfield conditions and would not affect terminals, the number of gates at LAX, gate frontage, taxiways, or runways. In addition, the proposed project would not provide new access to an area that is undeveloped since the proposed project would be located on an on-airport site that is in active use. Existing adjacent uses include the LAWA Records Building and American Eagle commuter facility to the west; air cargo facilities and Delta Air Lines aircraft maintenance facility[302] to the northwest; a shared-ride vehicle holding lot used by Super Shuttle[303] and an employee parking structure (referred to as Parking Garage F) to the north; the UAL Cargo building to the northeast; American Airlines Cargo and GSE facility to the east; and the LAX south airfield to the south, specifically Taxiway C, followed by Taxiway B, Runway 7L-25R, Taxiway H (centerline taxiway), Runway 7R-25L, and Taxiway A. Moreover, as discussed above, vacation of the West Maintenance Facility by UAL would not represent an increase in the area at LAX available to another entity for aircraft and/or GSE maintenance over historical levels. As such, the proposed project would not remove an obstacle to growth in maintenance or other activities at LAX.

6.4 Less Than Significant Effects

Section 15128 of the State CEQA Guidelines requires than an EIR briefly indicate the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR. Table 1-1 in Chapter 1, *Introduction and Executive Summary*, identifies the effects of the proposed project that were determined to be less than significant, based on the analysis in this EIR. Specifically, this EIR concludes that impacts from implementation of the proposed project on operational air quality, human health risk, greenhouse gas emissions, and transportation/traffic would be less than significant.

In addition, the Initial Study included in the December 2017 Notice of Preparation, included as Appendix A of this EIR, determined, for the reasons explained therein and clarified in the introduction to Chapter 4, *Environmental Impact Analysis*, that additional effects, including effects on the following resource areas, would result in no impact, or in impacts that would be less than significant:

- Aesthetics;
- Agriculture and Forestry Resources;
- Biological Resources;
- Cultural Resources (Archaeological and Paleontological Resources)
- Geology and Soils;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;

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302 The Delta Air Lines aircraft maintenance facility will be demolished as part of the LAX Landside Access Modernization Program. A new aircraft maintenance facility is currently under construction on the west side of the airport on the West Aircraft Maintenance Area site.

303 Super Shuttle plans to relocate its vehicles in the fourth quarter of 2018. This relocation is occurring independently of the proposed project.

- Land Use and Planning;
- Mineral Resources;
- Noise;
- Population and Housing;
- Public Services;
- Recreation;
- Tribal Cultural Resources; and
- Utilities and Service Systems.

6.5 Energy Impacts and Conservation

6.5.1 Introduction

CEQA Guidelines Appendix F requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing wasteful, inefficient, and unnecessary consumption of energy. The Appendix provides lists of energy impacts and conservation measures that may be applicable and relevant to particular projects.

In addition, Public Resources Code Section 21100(b)(3) states that an EIR shall include "mitigation measures proposed to minimize significant effects on the environment, including, but not limited to, measures to reduce the wasteful, inefficient, and unnecessary consumption of energy." Similarly, CEQA Guidelines Section 15126.4(a)(1)(C) states that "[e]nergy conservation measures, as well as other appropriate mitigation measures, shall be discussed when relevant."

The following additional information is provided about the proposed project's energy consumption and energy efficiency measures.

6.5.2 Energy Demand

Short-term energy demand would result from construction of the proposed project. This would include energy demand from worker, vendor, and haul vehicle trips as well as construction equipment usage. As described in Section 4.1, *Air Quality and Human Health Risk*, during construction, some of the employees that currently work at the East Maintenance Facility would work at the West Maintenance Facility. These employees would park in existing UAL parking lots at the West Maintenance Facility during construction. Energy usage associated with the additional vehicle miles traveled (VMT) associated with these employee trips was included in the analysis. In addition, some of the aircraft parking positions at the East Maintenance Facility that currently have access to a source of electricity would be unavailable during construction. As a result, the use of diesel ground power units (GPUs)[304] to provide power to aircraft during maintenance activities would increase during construction.

Long-term project-related energy demand that would result from operation of the proposed project would be less than the operational energy demand under either (1) existing conditions or (2) future without project conditions. This is because (1) the proposed project structures would have a smaller total building size (square feet) than the existing UAL hangar buildings at LAX; (2) the proposed project structures would incorporate energy efficient features as required to achieve Leadership in Energy and Environmental Design (LEED®) Silver certification and to comply with the Los Angeles Green Building Code (LAGBC) (as described in Chapter 2, *Project Description*); (3) the average distance traveled by aircraft

304 A ground power unit, or GPU, is a piece of equipment that provides electricity to an aircraft while it is on the ground and eliminates the need for the aircraft to rely on engine power. A ground power unit can be diesel-operated or can plug into an electricity source.

between the gates and the proposed maintenance facility would be less than under existing conditions and would involve a more energy-efficient form of travel; and (4) the consolidation of maintenance activities on the east side of the airport would reduce VMT by maintenance employees from their places of residence to the worksite. The reduction in operational energy demand would include energy demand from electricity, jet fuel, diesel fuel, and gasoline, as well as energy demand related to the consumption of water. The proposed project would include the installation of natural gas-fueled boilers, water heaters, and other similar equipment in the new maintenance facility, which would replace the existing natural gas-fueled equipment. The new equipment is expected to be at least as efficient as existing equipment and, therefore, it is expected that use of natural gas would stay the same or even be reduced as a result of the proposed project.

Energy demand associated with each of these components of the proposed project is discussed below.

6.5.2.1 Construction Activities

6.5.2.1.1 Worker, Vendor, and Haul Vehicle Trips

Construction worker, vendor, and haul trips were estimated based on the construction schedule assumptions used in the preparation of the proposed project air quality and greenhouse gas (GHG) impacts analyses. Demolition and construction of the proposed project is estimated to take approximately 22 months. Vendor and haul trip information was estimated based on the volume of demolition or construction as well as CalEEMod default values for trip lengths.[305]

Consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines used by the California Air Resources Board (CARB) for its own greenhouse gas and fuel inventories, fuel consumption from worker, haul, and vendor trips was estimated by converting the total carbon dioxide (CO_2) emissions from each phase of construction to gallons using established conversion factors for CO_2 to gallons of gasoline or diesel.[306] The conversion factor for gasoline is 8.89 kilograms (kg) CO_2 per gallon (kg CO_2/gal) and the conversion factor for diesel is 10.16 kg CO_2/gal.[307] Worker vehicles were assumed to be fueled by gasoline and vendor/hauling vehicles were assumed to be diesel. The emission calculations for these sources are provided in Appendix B.1 of this EIR.

Calculations for total construction worker, vendor, and haul trip fuel consumption are provided in **Table 6-1** and **Table 6-2**. Total gasoline consumption from construction worker trips is estimated to be 222,335 gallons and total diesel consumption from construction-related truck deliveries and hauling combined is estimated at 159,332 gallons.

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305 California Air Resources Board, *California Emissions Estimator Model*, *Version 2016.3.2*. Available: http://www.caleemod.com/.

306 Intergovernmental Panel on Climate Change, *2006 IPCC Guidelines for National Greenhouse Gas Inventories,* Volume 2 – Energy, Chapter 3 – Mobile Combustion, 2006. Available: https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf.

307 U.S. Energy Information Administration, *Carbon Dioxide Emissions Coefficients,* release date February 2, 2016. Available: https://www.eia.gov/environment/emissions/co2_vol_mass.php.

Table 6-1
Construction Worker Gasoline Demand

Phase	Trips	Trip Length (miles)	CO_2 Worker Trips (MT)	kg CO_2/Gal	Gasoline Demand (Gal)
Parking Area & Apron Demolition	9,685	40	239.24	8.89	26,911
Hangar Demolition	2,312	40	57.66	8.89	6,486
Hangar Construction	16,449	40	401.18	8.89	45,127
Apron Construction	50,175	40	1,213.91	8.89	136,548
Road/Access & GSE Yard Construction	2,701	40	64.57	8.89	7,263
Total			**1,976.56**	**8.89**	**222,335**

Source: CDM Smith, June 2018.

Notes:
Trips are round trips.
Abbreviations:
kg – kilogram
CO_2 – carbon dioxide
MT – metric tons
Gal – gallons

Table 6-2
Construction On-Road Vehicle Delivery and Hauling Diesel Demand

Phase	CO_2 On-Road Delivery & Hauling (MT)	kg CO_2/Gal	Diesel Demand (Gal)
Parking Area & Apron Demolition	495.05	10.16	48,725
Hangar Demolition	268.72	10.16	26,449
Hangar Construction	217.89	10.16	21,446
Apron Construction	603.97	10.16	59,446
Road/Access & GSE Yard Construction	33.18	10.16	3,266
Total	**1,618.81**	**10.16**	**159,332**

Source: CDM Smith, June 2018.

Abbreviations:
kg – kilogram
CO2 – carbon dioxide
MT – metric tons
Gal – gallons

6.5.2.1.2 Construction Equipment Usage

Diesel fuel consumption by construction equipment was estimated based on the construction schedule and equipment usage assumptions used in the preparation of the proposed project air quality and GHG analyses. Fuel usage was estimated by converting the total CO_2 emissions from each construction phase using the conversion factor for CO_2 to gallons of diesel. The conversion factor for diesel is 10.16 kg/MT

CO_2/gal.[308] Construction equipment was assumed to be diesel. Calculations for energy consumption from construction equipment are provided in **Table 6-3**. The emission calculations for these sources are provided in Appendix B.1 of this EIR.

Table 6-3
Construction Equipment Diesel Demand

Phase	CO_2 Off-Road Equipment (MT)	kg CO_2/Gal	Diesel Demand (Gal)
Parking Area & Apron Demolition	507.33	10.16	49,934
Hangar Demolition	60.21	10.16	5,926
Hangar Construction	267.48	10.16	26,327
Apron Construction	1,140.65	10.16	112,269
Road/Access & GSE Yard Construction	38.88	10.16	3,827
Total	**2,014.56**	**10.16**	**198,283**

Source: CDM Smith, June 2018.

Abbreviations:
kg – kilogram
CO_2 – carbon dioxide
MT – metric tons
Gal – gallons

6.5.2.1.3 Operational Fuel Demand During Construction

As noted in Section 6.5.2, during construction, some employees who currently work at the East Maintenance Facility would instead work at the West Maintenance Facility during construction. As discussed in Section 4.1, *Air Quality and Human Health Risk*, the majority of employees at LAX live in areas that are located east of the airport.[309] Therefore, the relocation of some maintenance activities to the west side of the airport would increase VMT by certain maintenance employees from their places of residence to the worksite during construction. In addition, aircraft diesel-fueled GPU usage would increase during construction. GPU fuel consumption was calculated based on daily equipment usage estimates. Fuel usage was estimated by converting the total CO_2 emissions from each operational equipment source using the conversion factor for CO_2 to gallons of diesel. The conversion factor for diesel is 10.16 kg/MT CO_2/gal.[310] Operational GPUs used during construction was assumed to be diesel. Calculations for energy consumption from operational equipment during construction are provided in **Table 6-4**. The emission calculations for these sources are provided in Appendix B.1 of this EIR.

Total diesel consumption from all sources during construction, including both on-road deliveries and hauling demand shown in Table 6-2, off-road equipment demand shown in Table 6-3, and operational fuel demand during construction shown in Table 6-4, is estimated to be 375,319 gallons across all construction phases. Total gasoline consumption from all sources during construction, including construction worker

308 U.S. Energy Information Administration, *Carbon Dioxide Emissions Coefficients,* release date February 2, 2016. Available: https://www.eia.gov/environment/emissions/co2_vol_mass.php.

309 Los Angeles World Airports Security Badge Office, 2015.

310 U.S. Energy Information Administration, *Carbon Dioxide Emissions Coefficients,* release date February 2, 2016. Available: https://www.eia.gov/environment/emissions/co2_vol_mass.php.

gasoline demand shown in Table 6-1 and operational worker gasoline demand during construction shown in Table 6-4, is estimated to be 234,472 gallons across all construction phases.

Table 6-4
Operational Fuel Demand During Construction

Source	CO_2 Operational Equipment (MT)	kg CO_2/Gal	Fuel Demand (Gal)
Aircraft GPU (Diesel)	179.87	10.16	17,704
Operational Worker Vehicles (Gasoline)	107.90	8.89	12,137

Source: CDM Smith, June 2018.

Note: Totals may not add due to rounding.

Abbreviations:
kg – kilogram
CO_2 – carbon dioxide
MT – metric tons
Gal – gallons

6.5.2.2 Operational Activities

As discussed in Chapter 2, *Project Description*, the proposed project would not increase existing passenger capacity, increase long-term employment opportunities at LAX, or increase aircraft operations. The proposed project would affect the location of UAL's maintenance activity at LAX but would not result in an increase in the level of maintenance activity, number of workers, or maintenance equipment. Changes in energy demand associated with aircraft movements and with operation of the proposed maintenance buildings are evaluated below. During project operations, all employees would be located at the East Maintenance Facility. This would involve relocation of employees who currently work at the West Maintenance Facility. As described above, the majority of employees at LAX live in areas that are located east of the airport. Therefore, the consolidation of maintenance activities on the east side of the airport would reduce VMT by maintenance employees from their places of residence to the worksite during operations, resulting in a corresponding decrease in vehicle-related fuel consumption. In addition, consolidation of UAL's maintenance activities into a single facility would eliminate vehicle trips between the two maintenance facilities that occur under baseline conditions. Because vehicle-related fuel consumption would be reduced as a result of the proposed project, the impacts of the proposed project associated with vehicle-related energy demand would be beneficial.[311]

As described in Section 4.1, *Air Quality and Human Health Risk,* the average daily travel distance for both taxiing and towing of aircraft would be reduced as a result of the proposed project due to the closer proximity of the East Maintenance Facility to UAL's gates (which are located in Terminals 7 and 8). In addition to the decreased travel distance, with implementation of the proposed project, more aircraft would be towed between the gates and the maintenance facility than under baseline conditions, although the total number of daily aircraft movements would be the same. Those aircraft not being towed would taxi using the main aircraft engines to move to and from the maintenance facility. Under baseline conditions, due to the relatively short distance between UAL's gates and the East Maintenance Facility, aircraft traveling to the East Maintenance Facility are typically towed whereas aircraft traveling to the West Maintenance Facility, which is located much farther from the gates, often travel under power

311 The reduction in energy demand associated with the reduced VMT from worker trips and trips between the two existing maintenance facilities was not quantified in the analysis; no credit is taken for this reduction.

(i.e., taxi). With implementation of the proposed project, all UAL aircraft would travel to the East Maintenance Facility; the majority of these aircraft would be towed. Based on information from UAL regarding baseline operations and the proposed project location and design, it was estimated that the number of aircraft being towed under the proposed project would increase from 11 or 12 daily to 16 daily, with a corresponding decrease in taxiing aircraft.

Operational GHG emissions associated with aircraft movements between the gates and hangars would be reduced as a result of the proposed project by a total of 888.2 MT CO_2e per year (see Table 4.3-4 in Section 4.3, *Greenhouse Gas Emissions*). This includes a reduction of jet fuel GHG emissions of 893.6 MT CO_2 per year (due to decreased distance and taxiing percentage) and an increase of diesel GHG emissions of 5.4 MT CO_2 per year (due to an increase in towing percentage that would out-weigh the decrease in towing distance). Applying conversion factors of 9.57 kg CO_2 per gallon of jet fuel and 10.16 kg CO_2 per gallon of diesel[312] to these values results in the aircraft movement fuel consumption increments provided in **Table 6-5.**

Table 6-5
Annual Increased Energy Demand by Source for Construction and Operations

Source	Gasoline (gal/yr)	Diesel (gal/yr)	Jet Fuel (gal/yr)
Construction Energy Demand (Total / Amortized over 30 Years)			
Construction Worker Vehicles	222,335 / 7,411	–	–
On-Road Delivery and Hauling Vehicles	–	159,332 / 5,311	–
Off-Road Heavy-Duty Construction Equipment	–	198,283 / 6,609	–
Operational Fuel Use During Construction	12,137 / 405	17,704 / 590	–
Operational Energy Demand			
Aircraft Towing	–	532	–
Aircraft Taxiing	–	–	-93,375
Amortized Construction Plus Operational Energy Demand			
Total	7,816	13,042	-93,375

Source: CDM Smith, June 2018.

Note:
Fuel use associated with construction impacts of the proposed project was amortized over the lifetime of the proposed project, which is assumed to be 30 years. This results in an effective yearly energy demand from construction equal to the total construction energy demand divided by 30.

Abbreviations:
gal/yr– gallons per year

Operation of the proposed project would result in a negligible decrease in energy demand associated with the proposed project buildings. Electricity would be required for indoor and outdoor lighting, building

312 U.S. Energy Information Administration, *Carbon Dioxide Emissions Coefficients,* release date February 2, 2016. Available: https://www.eia.gov/environment/emissions/co2_vol_mass.php.

cooling and heating, building appliances, security-related equipment, and water heating. As described in Chapter 2, *Project Description*, compared with existing conditions, the consolidation of UAL's maintenance facilities would result in an overall reduction in project-related building square footage requiring heating, cooling, or lighting. Additionally, per LAWA's Sustainable Design and Construction Policy, the proposed facility would be required to achieve LEED® Silver certification, which would further improve building-related energy efficiency. Because overall building-related energy use would be reduced as a result of the proposed project, the impacts of the proposed project associated with building-related energy use would be beneficial.[313]

As mentioned previously, the proposed project would include the installation of natural gas-fueled boilers, water heaters, and other similar equipment in the new hangar facility, which would replace the existing natural gas-fueled equipment. The new equipment is expected to be at least as efficient as existing equipment and, therefore, it is expected that use of natural gas would stay the same or even be reduced as a result of the proposed project.[314]

Increases in short- and long-term energy demand under the proposed project are summarized in Table 6-5. In the same manner in which construction-related GHG emissions were amortized over the proposed project lifetime (i.e., 30 years) and then added to annual operational emissions (see Section 4.3, *Greenhouse Gas Emissions*), the energy demand associated with project construction was amortized over a 30-year period so as to integrate construction-related energy demand with the annual operational energy demand.

6.5.3 Energy Conservation

The proposed maintenance facility would comply with current state water and energy efficiency standards and regulations pursuant to the California Building Code (CBC), California Green Building Standards Code (CALGreen), and LAGBC that would reduce long-term energy demand. In addition, as noted previously, per LAWA's Sustainable Design and Construction Policy, the proposed facility would be required to achieve LEED® Silver certification. Compliance with these requirements would reduce wasteful, inefficient, and unnecessary consumption of energy over the long-term.

The following presents various regulations and programs applicable to the proposed project that would reduce energy demand associated with project construction and operation. The calculations for future energy demand with implementation of the proposed project, presented in Section 6.5.2.2 above, take into account many of the requirements listed below.

6.5.3.1 General Regulations, Plans, and Policies

6.5.3.1.1 State Regulations, Plans, and Policies

California Green Buildings Standards Code

The 2016 CALGreen is found in Title 24, Part 11 of the California Code of Regulations (CCR).[315] The purpose of CALGreen is to "improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices."[316] CALGreen

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313 The reduction in building-related energy demand was not quantified in the analysis; no credit is taken for this reduction.

314 The potential reduction in natural gas usage associated with operational stationary sources was not quantified in the analysis; no credit is taken for this reduction.

315 24 California Code of Regulations, Part 11, California Building Standards Commission, *2016 California Green Building Standards Code (CALGreen)*.

316 24 California Code of Regulations, Part 11, California Building Standards Commission, *2016 California Green Building Standards Code (CALGreen)*, Section 101.2.

identifies mandatory building measures and voluntary measures that may be incorporated into the design of buildings.

6.5.3.1.2 Local Regulations, Plans, and Policies

Green LA

In May 2007, the City of Los Angeles introduced *Green LA – An Action Plan to Lead the Nation in Fighting Global Warming* (Green LA).[317] Aimed at reducing the City's GHG emissions by 35 percent below 1990 levels by 2030, the plan calls for an increase in the City's use of renewable energy to 35 percent by 2020 in combination with other initiatives. Green LA identifies objectives and actions in various focus areas, including airports. The goal for Los Angeles' airports is to "green the airports," and the following actions related to energy consumption are identified: (1) fully implement the Sustainability Performance Improvement Management System (discussed below); (2) develop and implement policies to meet U.S. Green Building Council's LEED® green building program rating standards in future construction; and (3) increase use of alternative fuel sources, increase water conservation, and reduce energy needs.[318]

ClimateLA

In 2008, the City of Los Angeles followed up Green LA with an implementation plan called *ClimateLA – Municipal Program Implementing the Green LA Climate Action Plan* (ClimateLA).[319] A Departmental Action Plan for LAWA is included in ClimateLA, which identifies goals to reduce CO_2 emissions 35 percent below 1990 levels by 2030 at LAX and Van Nuys Airport (also owned and operated by LAWA) and implement sustainability practices. Actions are specified in a number of areas, including buildings and facilities, and construction.

Executive Directive No. 10

In July 2007, Mayor Antonio Villaraigosa issued Executive Directive No. 10 regarding environmental stewardship practices.[320] Consistent with the goal specified in Green LA to make the City of Los Angeles a worldwide leader in green buildings, Executive Directive No. 10 requires that City departments, including LAWA, create and adopt a "Statement of Sustainable Building Policies." ClimateLA, which was adopted subsequent to Executive Directive No. 10, also includes goals supportive of green building and energy efficiency through building design and retrofits.

City of Los Angeles Green Building Code

In December 2013, the Los Angeles City Council approved Ordinance No. 182,849, which updated Chapter IX of the Los Angeles Municipal Code (LAMC) to incorporate portions of the 2013 CALGreen Code and add other conservation-related measures to the LAGBC for residential and non-residential development. The requirements of the adopted LAGBC, as updated (2017), apply to new building construction, building renovations, and building additions within the City of Los Angeles.[321] Key measures in the LAGBC related to energy use that apply to nonresidential buildings include a requirement that

317 City of Los Angeles, *Green LA - An Action Plan to Lead the Nation in Fighting Global Warming*, May 2007. Available: http://environmentla.org/pdf/GreenLA_CAP_2007.pdf.

318 City of Los Angeles, *Green LA - An Action Plan to Lead the Nation in Fighting Global Warming*, May 2007. Available: http://environmentla.org/pdf/GreenLA_CAP_2007.pdf.

319 City of Los Angeles, *ClimateLA - Municipal Program Implementing the Green LA Climate Action Plan*, 2008.

320 City of Los Angeles, Office of the Mayor, Mayor Antonio R. Villaraigosa, *Executive Directive No. 10, Subject: Sustainable* Practices *in the City of Los Angeles*, July 18, 2007. Available: https://www.lacity.org/sites/g/files/wph1101/f/villaraigosa_ed10.pdf.

321 City of Los Angeles, Los Angeles Municipal Code, Chapter IX, Article 9, *Green Building Code*, as amended.

energy conservation for new buildings must meet or exceed California Energy Commission (CEC) requirements set forth in the California Building Energy Efficiency Standards.

Sustainable City pLAn

In 2014, Mayor Eric Garcetti launched LA's first-ever Sustainable City Plan ("pLAn"). The pLAn is a comprehensive and actionable policy roadmap that prepares the City for an environmentally healthy, economically prosperous, and equitable future for all.[322] Mayor Garcetti released the pLAn in April 2015, along with corresponding Executive Directive No. 7 that incorporates the pLAn into city-wide management.[323] Through the pLAn, Mayor Garcetti committed the City to becoming a national leader in carbon reduction and climate action by prioritizing energy efficiency, among other actions.

Resilient Los Angeles

In March 2018, Mayor Eric Garcetti released *Resilient Los Angeles*, a comprehensive, strategically coordinated approach to urban resilience.[324] This plan addresses a range of challenges facing Los Angeles, including preparing for climate adaptation. One of the actions in *Resilient Los Angeles* is to leverage the modernization at LAX to incorporate sustainability and resilience measures.

LAWA Sustainability Plans and Guidelines

LAWA adopted the Sustainability Performance Improvement Management System (SPIMS) in August 2007 as a tool for identifying sustainability objectives, implementing actions to achieve the objectives, establishing targets, and continually monitoring progress. This was followed by LAWA's Sustainability Plan, developed in April 2008, which described LAWA's sustainability practices and set goals and actions that LAWA would undertake to implement its long-term objectives and targets.[325]

In 2008, LAWA developed Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects, which were subsequently updated in 2009 and 2010.[326] These guidelines were developed to provide a comprehensive set of performance standards focusing on sustainability specifically for airport projects on a project-level basis. Based on these guidelines, LAWA implemented numerous steps to increase its sustainability practices related to daily airport operations. Subsequently, LAWA consolidated its design standards into the LAWA Design and Construction Handbook (DCH), which includes sustainable guidelines for all construction projects.

On September 7, 2017, LAWA adopted the Sustainable Design and Construction Policy.[327] Under this policy, new buildings and major building renovation projects are required to achieve a minimum of LEED® Silver certification, unless an exemption is provided. Projects that cannot meet USGBC's or LAWA's LEED® Eligibility Criteria or LAGBC Tier 1 requirements, or are exempted by LAWA's Sustainability Review Committee, must adhere to LAWA's Sustainable Design and Construction Requirements, which

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322 City of Los Angeles, Office of the Mayor, Mayor Eric Garcetti, *Sustainable City pLAn, Transforming Los Angeles, Environment - Economy - Equity*, April 2015. Available: http://plan.lamayor.org/wp-content/uploads/2017/03/the-plan.

323 City of Los Angeles, Office of the Mayor, Mayor Eric Garcetti, *Executive Directive No. 7, Subject: Sustainable City pLAn*, April 8, 2015. Available:https://www.lacity.org/sites/g/files/wph281/f/Executive_Directive_No._7_Sustainable_City_pLAn.pdf.

324 Mayor Eric Garcetti, *Resilient Los Angeles*, March 2018. Available: https://www.lamayor.org/sites/g/files/wph446/f/page/file/Resilient%20Los%20Angeles.pdf.

325 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports Sustainability Plan*, April 2008. Available: https://www.lawa.org/-/media/sustainability/resources/final_sustainability_plan.ashx.

326 City of Los Angeles, Los Angeles World Airports, *Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects*, *Version 5.0*, February 2010. Available: http://losangelesairport.net/uploadedFiles/LAWA/pdf/LSAG%20Version%205.0%20021510.pdf.

327 City of Los Angeles, Los Angeles World Airports, *LAWA Sustainability Design and Construction Policy*, adopted September 7, 2017.

incorporate sustainability concepts from the LEED® system as well as the LAGBC, Envision, and other airport sustainability guidelines.[328] The requirements will ensure that all projects at LAWA facilities are environmentally responsible and resource-efficient throughout the structure's life-cycle, from siting to design, construction, operation, maintenance, and renovation, reflecting LAWA's commitment to sustainability.

6.5.3.2 Electricity Efficiency

6.5.3.2.1 Electricity-Related Regulations, Plans, and Policies

State Regulations, Plans, and Policies

Title 24 Energy Standards

California's Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6), often referred to as Title 24 energy standards, were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. The latest amendments were made in June 2015 and went into effect on January 1, 2017. The premise for the standards is that energy efficient buildings require less electricity, natural gas, and other fuels. The standards include provisions applicable to all buildings and include mandatory requirements for efficiency and design of systems, equipment, and appliances. The standards include requirements for space conditioning (cooling and heating), water heating, and indoor and outdoor lighting systems and equipment. In addition, the standards call for further energy efficiency measures that can be provided through a choice between performance and prescriptive compliance approaches.

Local Regulations, Plans, and Policies

Los Angeles Department of Water and Power Plans

LADWP provides electricity to the City of Los Angeles. In 2016, LADWP adopted a new Power Integrated Resource Plan (Power IRP), a 20-year energy resource planning document.[329] This plan provides a framework for LADWP to meet the future energy needs of the City in a cost-effective, reliable, and environmentally sensitive manner. Within the Power IRP, LADWP outlines adequate electricity supply and transmission capability to meet the needs of its customers within the Los Angeles area, including LAX, through 2035. In 2017, LADWP expanded the Power IRP into the Power Strategic Long-Term Resource Plan (SLTRP), which is a 20-year roadmap to guide implementation of the City's power system requirements. The current SLTRP provides updates that include a 65 percent Renewable Portfolio Standard. Future updates will identify a roadmap for achieving a 100 percent clean energy future.[330]

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328 City of Los Angeles, Los Angeles World Airports, *Los Angeles International Airport Sustainable Design & Construction Requirements*, August 4, 2017., Available: https://www.lawa.org/-/media/lawa-web/tenants411/file/sustainable-design-construction-requirements.ashx?la=en&hash=99061EBEF6E8ECD7D3D5961ABA5E062E2F8C4147.

329 City of Los Angeles, Department of Water and Power, *2016 Power Integrated Resource Plan*, December 2016. Available: https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=a45al0fj4_17&_afrLoop=428720973103184.

330 City of Los Angeles, Department of Water and Power, *2017 Power Strategic Long-Term Resource Plan*, December 2017. Available: https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=i1j5108k7_4&_afrLoop=648691316891822.

6.5.3.2.2 Electricity Supply and Infrastructure in the Project Area

Electrical power within the City of Los Angeles, including LAX, is supplied by LADWP, which serves approximately 3.8 million people. LADWP obtains electricity from various generating sources that utilize coal, nuclear, natural gas, hydroelectric, and renewable resources to generate power. Its current system capacity is 7,880 megawatts (MW). LADWP does not forecast that peak demand will reach capacity through 2040. LADWP has committed to increasing the share of renewable energy and promoting increased energy efficiency and conservation by its customers. Diversification of LADWP's energy portfolio, increasing electricity from renewable energy, and new customer energy efficiency measures will help meet all of the City's needs through LADWP's Power IRP planning horizon of 2036.

Electricity is primarily used at LAX for lighting, cooling, and equipment operation in buildings, and for airfield lighting and operations. Electricity is also used indirectly in the delivery, treatment, and distribution of water used at the airport and the treatment of wastewater. Total electricity consumption for LAX was approximately 167,222 MWh for 2016.[331] This represents a 12.2 percent decrease compared to 2015.

6.5.3.2.3 Applicability to the Proposed Project

As demonstrated in Section 6.5.3.1.2, LAWA has an ongoing commitment to increasing energy efficiency and implementing energy conservation measures to reduce wasteful, inefficient, and unnecessary consumption of energy at its airports, including electricity. The proposed project would be required to implement the applicable measures set forth in the regulations, plans, and policies described in Sections 6.5.3.1 and 6.5.3.2.1 above to reduce electricity usage. Specifically, the proposed project would be required to achieve LEED® Silver certification through incorporation of environmentally-sensitive features. Therefore, the proposed project would not result in wasteful, inefficient, or unnecessary consumption of electricity, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

6.5.3.3 Water Efficiency

6.5.3.3.1 Water-Related Regulations, Plans, and Policies

Water Supply Planning

The State of California's Urban Water Management Planning Act of 1984 requires all public water suppliers that provide municipal and industrial water to more than 3,000 customers, or supply more than 3,000 acre-feet per year (AF/Y) of water, to prepare and adopt an Urban Water Management Plan (UWMP). LADWP adopted a new UWMP in June 2016, which serves as a master plan for water supply and resources management consistent with the City's goals and policy objectives.[332] The UWMP promotes investment in conservation, recycling, and local source development, and calls for a 25 percent reduction in per capita water use by 2035.[333] The UWMP discusses conservation strategies to help achieve this goal. The UWMP concludes that LADWP has available supplies to meet all projected demands under three hydrologic scenarios analyzed in the UWMP.

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331 City of Los Angeles, Los Angeles World Airports, *Los Angeles World Airports 2016 Sustainability Report*. Available: https://lawamediastorage.blob.core.windows.net/lawa-media-files/media-files/sustainability/resources/sustainability_report_2016.pdf.

332 City of Los Angeles, Department of Water and Power, *Urban Water Management Plan 2015*, adopted June 7, 2016.

333 City of Los Angeles, Department of Water and Power, *Urban Water Management Plan 2015*, adopted June 7, 2016.

Los Angeles Municipal Code

The LAMC includes several ordinances to reduce water consumption that are applicable to the proposed project. Ordinance No. 172,075 (Chapter XII, Article II, of the LAMC), adopted in 1998, requires all building owners to install low-flow water closets (with a maximum flow of 3.5 gpm) and urinals (with a maximum 1.5 gallons per flush) prior to obtaining building permits.[334] The City adopted the Water Efficiency Requirements Ordinance (Ordinance No. 180,822) in 2009 and the Green Building Ordinance (Ordinance No. 182,849) in 2013, which established more stringent requirements for water conservation including use of high efficiency fixtures whenever new fixtures are installed in new and existing buildings.[335,336] On June 6, 2016, the City adopted Ordinance No. 184,248, which establishes citywide water efficiency standards and requires implementation of water-saving systems and technologies in buildings and landscapes.[337]

6.5.3.3.2 Water Supply and Infrastructure in the Project Area

LADWP is responsible for supplying, treating, and distributing water for domestic, industrial, agricultural, and firefighting purposes within the City. The LADWP obtains its water supplies from three major sources: (1) the Owens Valley and Mono Basin via the Los Angeles Aqueduct (LAA); (2) northern California and Colorado River imports purchased from the Metropolitan Water District of Southern California (MWD); and (3) local groundwater basins. In addition, some wastewater within the LADWP service area is recycled for reuse as irrigation or industrial water, or for use in seawater intrusion barriers used to protect groundwater supplies. The average distribution of sources during 2010–2015 was 57 percent purchased from MWD, 29 percent from the LAA, 12 percent from local groundwater, and 2 percent from recycled water.[338] As described above, the latest LADWP UWMP concludes that LADWP has available water supplies to meet projected demands through a 25-year planning period.

6.5.3.3.3 Applicability to the Proposed Project

As discussed in *Section XVIII, Utilities and Service Systems*, of the Initial Study (included in Appendix A of this EIR), the proposed project would not result in an increase in water use. The proposed project would be required to comply with applicable measures set forth in the regulations and plans described in Sections 6.5.3.1 and 6.5.3.3.1 above to reduce water consumption. Therefore, the proposed project would not result in wasteful, inefficient, or unnecessary energy use associated with increases in water demand and wastewater generation, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

6.5.3.4 Transportation and Construction Equipment Fuel Efficiency

6.5.3.4.1 Fuel Efficiency-Related Regulations, Plans, and Policies

Federal Regulations, Plans, and Policies

Fuel Efficiency Standards for Passenger Cars and Light-Duty Trucks

In April 2010, USEPA and the National Highway Traffic Safety Administration (NHTSA) finalized standards for new (model year 2012 through 2016) passenger cars, light-duty trucks, and medium-duty passenger vehicles to reduce GHG emissions and improve fuel economy. Subsequently, the agencies issued a joint Final Rule for a coordinated National Program for model years 2017 to 2025 light-duty vehicles on

334 City of Los Angeles, Ordinance No. 172,075, Chapter XII, Article II, 1998.

335 City of Los Angeles, Ordinance No. 180,822, Chapter XII, Article V, *Water Efficiency Requirements*, 2009.

336 City of Los Angeles, Ordinance No. 182,849, Chapter IX, Article 9, *California Green Building Standards Code*, 2013.

337 City of Los Angeles, Ordinance No. 184,248, Chapter IX, Articles 4 and 9, *Water Efficiency Standards*, June 6, 2016.

338 City of Los Angeles, Department of Water and Power, *Urban Water Management Plan 2015*, adopted June 7, 2016.

August 28, 2012 that would correspond to a combined fuel economy of 36.6 mpg in 2017 and 54.5 mpg in 2025.[339,340]

Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles

In October 2010, the USEPA and NHTSA announced a program to reduce GHG emissions and to improve fuel efficiency for medium- and heavy-duty vehicles (model years 2014 through 2018). It was estimated that the standards would reduce oil consumption by 530 million barrels over the life of the affected vehicles.[341] In October 2016, USEPA and NHTSA finalized Phase 2 standards for medium- and heavy-duty vehicles through model year 2027, based on advanced cost-effective technologies. This program is expected to reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program.[342]

Fuel Efficiency Standards for Construction Equipment

The federal government sets fuel efficiency standards for nonroad diesel engines that are used in construction equipment. The regulations, contained in 40 CFR Parts 1039, 1065, and 1068, include multiple tiers of emission standards. Most recently, USEPA adopted a comprehensive national program to reduce emissions from nonroad diesel engines by integrating engine and fuel controls as a system to gain the greatest emission reductions. To meet these Tier 4 emission standards, engine manufacturers will produce new engines with advanced emission control technologies.[343]

State Regulations, Plans, and Policies

California Assembly Bill 1493

Enacted on July 22, 2002, Assembly Bill 1493 required CARB to develop and adopt regulations that will lead to a reduction in GHGs emitted by passenger vehicles and light-duty trucks. Subsequent regulations adopted by CARB apply to 2009 through 2016 vehicles. In 2011, the U.S. Department of Transportation, USEPA, and California announced a single timeframe for proposing fuel and economy standards for model year 2017 through 2025, thereby aligning these standards with the federal standards for passenger cars and light-duty trucks.[344]

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339 U.S. Environmental Protection Agency, *Regulatory Announcement: EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017-2025 Cars and Trucks*, August 2012. Available: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZ7C.PDF?Dockey=P100EZ7C.PDF.

340 The 2012 standards are currently under review by USDOT and USEPA. See U.S. Environmental Protection Agency, *EPA to* Reexamine *Emission Standards for Cars and Light Duty Trucks – Model Years 2022-2025*, March 15, 2017. Available: https://www.epa.gov/newsreleases/epa-reexamine-emission-standards-cars-and-light-duty-trucks-model-years-2022-2025.

341 U.S. Environmental Protection Agency, *Regulatory Announcement: EPA and NHTSA Adopt First-Ever Program to Reduce* Greenhouse *Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles*, August 2011. Available: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100BOT1.PDF?Dockey=P100BOT1.PDF.

342 U.S. Environmental Protection Agency, *Regulatory Announcement: EPA and NHTSA Adopt Standards to Reduce Greenhouse* Gas *Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles for Model Year 2018 and Beyond*, August 2016. Available: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100P7NL.PDF?Dockey=P100P7NL.PDF.

343 U.S. Environmental Protection Agency, *Regulations for Emissions from Vehicles and Engines-Regulations for* Emissions *from Heavy Equipment with Compression-Ignition (Diesel) Engines*. Available: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-heavy-equipment-compression, accessed April 18, 2018.

344 U.S. Department of Transportation, *EPA, DOT and California Align Timeframe for Proposing Standards for Next Generation of Clean Cars*, January 21, 2011. Available: https://www.transportation.gov/briefing-room/epa-dot-and-california-align-timeframe-proposing-standards-next-generation-clean-cars.

California Advanced Clean Cars Program

In January 2012, CARB approved a new emissions-control program for vehicles of model years 2017 through 2025 called the Advanced Clean Cars Program (13 CCR Sections 1962.1 and 1962.2). The Advanced Clean Cars requirements include new GHG standards for model year 2017 to 2025 vehicles. These standards will decrease consumption of fossil fuels.

6.5.3.4.2 Applicability to the Proposed Project

Construction

Estimated construction-related fuel consumption is provided in Tables 6-1 through 6-4. Federal and state regulations and programs aimed at increasing vehicle fuel efficiency would apply to construction vehicles associated with the proposed project. Moreover, as discussed in Section 6.5.3.1.2, LAWA has an ongoing commitment to increase energy efficiency and implement energy conservation measures to reduce wasteful, inefficient, and unnecessary consumption of energy at its airports, including during construction. Construction equipment used for the proposed project would be required to comply with federal and state fuel efficiency standards. In addition, Mitigation Measure MM-AQ (UAL)-1 (Construction-Related Air Quality Mitigation Measures), which are intended to reduce construction-related air quality impacts, would also result in reduced fuel consumption. Therefore, the proposed project would not result in wasteful, inefficient, or unnecessary energy use associated with construction activities, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Operation

As discussed in Chapter 2, *Project Description*, the proposed project would not increase the number of passengers or aircraft operations at LAX, and would not increase long-term employment opportunities. Moreover, as described in Section 4.1, *Air Quality and Human Health Risk*, consolidation of maintenance activities on the east side of the airport would reduce operational VMT, which would reduce fuel consumption associated with operations. As a result, federal and state regulations and programs pertaining to increased vehicle fuel efficiency do not apply to the proposed project's operations (although they apply to project-related construction, as described above).

6.5.3.5 Summary

As described above, the proposed project would be located within an area that has existing energy and water infrastructure available to serve the proposed project. It would comply with federal, state, and local regulations and policies reducing energy demand associated with building energy use, water demand, wastewater generation, vehicle fuels, and construction equipment. In addition, electricity supplied to the proposed project would be required to comply with California's aggressive renewable portfolio standard. Therefore, the proposed project's construction and operation would not result in wasteful, inefficient, or unnecessary energy use; would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; would not increase reliance on fossil fuels; and would incorporate energy efficiency measures. The proposed project would not result in any significant adverse impacts with respect to energy consumption or energy conservation, therefore, no mitigation measures (e.g., additional energy conservation measures) are required. It should be noted, however, that Mitigation Measure MM-AQ (UAL)-1 (Construction-Related Air Quality Mitigation Measures) would reduce energy consumption associated with the proposed project, and thereby would reduce the proposed project's reliance on fossil fuels.

6.5.4 Cumulative Impacts

As discussed in Chapter 4, *Environmental Impact Analysis*, cumulative impacts can be analyzed using either a “list” or “plan” approach. Using a “list” approach, in Chapter 3, *Overview of Project Setting*, Table 3-1 identifies other past, present, and reasonably foreseeable probable future projects at and adjacent to LAX. As with the proposed project, these other development projects would be required to comply with the energy conservation and renewable energy programs described earlier in this section. For example, new buildings would be required to meet energy consumption standards prescribed for new structures in Title 24, and all LAX development projects would comply with LAWA's Sustainability Plan and Sustainable Design and Construction Policy. Moreover, as discussed in Chapter 3, *Overview of Project Setting*, although the proposed project would increase the building area of the East Maintenance Facility, the proposed project would not result in an overall net increase in cumulative maintenance facilities at LAX, or a resulting increase in cumulative energy usage attributable to maintenance activities at LAX. Therefore, there would be no significant cumulative impacts related to wasteful, inefficient, or unnecessary energy use, or increased reliance on fossil fuels.

Cumulative impacts on energy supply and distribution facilities caused by regional growth are best assessed using a “plan” approach. LADWP has forecasted future utility demand in the Power IRP and concluded that excess capacity exists over the planning horizon through 2040.[345] Based on the demand growth forecast, significant cumulative utility impacts on supply and distribution capabilities or on new supply facilities and distribution infrastructure are unlikely; thus, cumulative impacts on energy supply and distribution facilities caused by increased energy demand would be less than significant.

[345] City of Los Angeles, Department of Water and Power, *2015 Power Integrated Resource Plan*, December 2015. Available: https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=a45al0fj4_17&_afrLoop=428720973103184.

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7. LIST OF PREPARERS, PARTIES TO WHOM SENT, LIST OF REFERENCES, NOP COMMENTS, AND LIST OF ACRONYMS

This chapter contains the following information:

- List of Preparers
- Parties to Whom Sent
- List of References
- Notice of Preparation Comments
- List of Acronyms

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7.3 List of References

All documents listed below are available for public inspection at the following location:

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7.4 Notice of Preparation Comments

A Notice of Preparation (NOP) and Initial Study (IS) were circulated for public review from December 7, 2017 to January 8, 2018. During the public review period, LAWA held a public Scoping Meeting on December 19, 2017 at the Flight Path Museum & Learning Center at 6661 West Imperial Highway, Los Angeles, California. Comment letters received from public review of the NOP/IS are listed below. Copies of the December 7, 2017 NOP/IS and the comment letters are included in Appendix A of this Draft EIR.

Comments on NOP and Initial Study

Commentor	Date of Correspondence
California Native American Heritage Commission (NAHC) – GayleTotton	January 3, 2018
California Department of Transportation (Caltrans) – Miya Edmonson	January 8, 2018
South Coast Air Quality Management District (SCAQMD) – Lijin Sun	January 5, 2018
Shute Mihaly & Weinberger LLP on behalf of the City of El Segundo – Joseph “Seph” Petta	January 8, 2018
Mercury Air Cargo, Inc. – John E. Peery	January 8, 2018
Alliance for a Regional Solution to Airport Congestion (ARSAC) – Denny Schneider/Robert Acherman	January 8, 2018
AMPCO Contracting, Inc. – Allison Clay	January 8, 2018

7.5 List of Acronyms

AAM	Annual Arithmetic Mean
AB	Assembly Bill
ACA	Airport Carbon Accreditation
ACI	Airports Council International
ACM	asbestos-containing materials
ADG	Aircraft Design Group
AEDT	Aviation Environmental Design Tool
AEP	Association of Environmental Professionals
AERMOD	American Meteorological Society/USEPA Regulatory Model
AF/Y	acre-feet per year
AFV	Alternative Fuel Vehicle Requirement
ALP	Airport Layout Plan
AOA	Airport Operations Area
AP-42	U.S. Environmental Protection Agency’s Compilation of Air Pollutant Factors
APM	Automated People Mover
AQ	Air Quality
AQMP	Air Quality Management Plan
ATCT	Airport Traffic Control Tower
ATSAC	Automated Traffic Surveillance and Control
ATSDR	Agency for Toxic Substance and Disease Registry

AvGas	aviation gasoline
BACT	Best Available Control Technology
C	Celsius
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAL	Continental Airlines
CAL GO	Continental Airlines General Office Building
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen	California Green Building Code
California Register	California Register of Historical Resources
CALM	Coordination and Logistics Management
CalOSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CEC	California Energy Commission
CEIDARS	California Emission Inventory and Reporting System
CEQA	California Environmental Quality Act
CF_4	Perfluromethane
C_2F_6	Perfluroethane
CFC	chlorofluorocarbons
CFR	Code of Federal Regulations
CFTP	Crossfield Taxiway Project
CH_4	methane
CHRIS	California Historical Resources Information System
Climate LA	City of Los Angeles Climate LA – Municipal Program Implementing the Green LA Climate Action Plan
CMA	Critical Movement Analysis
CMP	Congestion Management Program
CNG	compressed natural gas
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CONRAC	Consolidated Rental Car Facility
CPHI	California Points of Historical Interest
CR	California Register of Historical Resources
CTA	Central Terminal Area
CTMP	Construction Traffic Management Plan
CUP	Central Utility Plant
CUP-RP	Central Utilities Plant Replacement Project
DCH	Design and Construction Handbook
DECS	Diesel Emission Control Strategies
DOA	Los Angeles Department of Airports

DOT	Department of Transportation
DPM	Diesel Particulate Matter
eGSE	electric Ground Support Equipment
EIR	Environmental Impact Report
EVPP	Electric Vehicle Purchasing Policy
F	Fahrenheit
FAA	U.S. Department of Transportation Federal Aviation Administration
FR	Federal Register
g/bhp-hr	grams per horsepower-hour of hydrocarbons plus nitrogen oxides
gal	gallons
GCC	global climate change
GEO TIFF	geographic tiff files
GHG	greenhouse gas
GPU	ground power units
Green LA	City of Los Angeles Green LA – An Action Plan to Lead the Nation in Fighting Global Warming
GRP	General Reporting Protocol
GSE	Ground Support Equipment
GWP	global warming potential
HARP2	Hot Spots Analysis and Reporting Program Version 2
HFC	hydrofluorocarbons
HHRA	Human Health Risk Assessment
HI	hazard index
HP	horsepower
HPOZ	Historic Preservation Overlay Zone
HQ	hazard quotient
HRG	Historic Resources Group
HRI	California State Historic Resources Inventory
HVAC	heating, ventilation, and air conditioning
Hz	hertz
I-105	Interstate 105
I-405	Interstate 405
I-605	San Gabriel Freeway
ICLEI	International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
IS	Initial Study
ITF	Intermodal Transportation Facility
kg	kilogram
kWh	kilowatt-hour
LAA	Los Angeles Aqueduct
LADOT	Los Angeles Department of Transportation
LADWP	Los Angeles Department of Water and Power
LAGBC	Los Angeles Green Building Code
LAHCM	City of Los Angeles Historic-Cultural Monument
LAMC	Los Angeles Municipal Code
LAMP	Landside Access Modernization Program
LAWA	Los Angeles World Airports
LAX	Los Angeles International Airport

lbs	pounds
LCFS	Low Carbon Fuel Standard
LCS	lead-containing surfaces
LED	light-emitting diode
LEED®	Leadership in Energy and Environmental Design
LEV	low emission vehicle
LGOP	Local Government Operations Protocol
LNG	liquefied natural gas
LOS	level of service
LRT	light rail transit
LS	Less than Significant Impact
LST	localized significance threshold
MAP	million annual passengers
MATES	Multiple Air Toxics Exposure Study
MEI	maximally exposed individuals
Metro	Los Angeles County Metropolitan Transportation Authority
mg/m^3	milligrams per cubic meter
MM	Mitigation Measure
MMRP	Mitigation Monitoring and Reporting Program
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
MOC	Maintenance Operations Center
mpg	miles per gallon
mph	miles per hour
MPO	metropolitan planning organization
m/s	meters per second
MSC	Midfield Satellite Concourse
MT	metric tons
$MTCO_2e$	metric tons of carbon dioxide equivalent
MW	megawatts
MWD	Metropolitan Water District of Southern California
N/A	not applicable
NA	not applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NATA	National-Scale Air Toxics Assessment
National Register	National Register of Historic Places
NED	U.S. Geological Survey National Elevation Data
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NOP	Notice of Preparation
NR	National Register of Historic Places
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
OFFROAD	Inventory Model database for In-Use Off-Road Construction, Industrial, Ground Support and Oil Drilling equipment

OHP	Office of Historic Preservation
OHR	City of Los Angeles Department of City Planning's Office of Historic Resources
OLM	Ozone Limiting Method
OPR	Governor's Office of Planning and Research
OSHA	Occupational Safety and Health Act
Pb	Lead
PCA	pre-conditioned air
PCE	passenger car equivalent
PEL-TWAs	Permissible Exposure Limit Time Weighted-Average
PFCs	perfluorocarbons
pLAn	City of Los Angeles Sustainable City Plan
PM	particulate matter
PM_{10}	particulate matter up to 10 micrometers in size
$PM_{2.5}$	particulate matter up to 2.5 micrometers in size, also known as fine particulate matter
Power IRP	Power Integrated Resource Plan
ppb	parts per billion
ppm	parts per million
PRC	Public Resources Code
PVMRM	Plume Volume Molar Ratio Method
RAD	Remain All Day
REL	reference exposure level
ROG	reactive organic gases
RON	Remain Over Night
RPS	Renewable Portfolio Standard
RSA	Runway Safety Area
RSA North	Runways 6L-24R and 6R-24L RSA
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SAAP	Secured Area Access Post
SAIP	South Airfield Improvement Project
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCH	State Clearinghouse
sf	square feet
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SLTRP	Power Strategic Long-Term Resource Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
SPIMS	Sustainability Performance Improvement Management System
ST	Surface Transportation
SU	Significant and Unavoidable Impact
T2/T3	Terminals 2 and 3
TAC	toxic air contaminants
TBIT	Tom Bradley International Terminal
TIA	transportation impact analysis

TRAFFIX	traffic analysis software program for developing traffic forecasts and analyzing intersection and roadway capacities
TWA	Trans World Airlines
UAL	United Airlines
$\mu g/m^3$	microgram per cubic meter
um or µm	microns
UMIP	Utility Monitoring Infrastructure Project
UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States
USEPA	U.S. Environmental Protection Agency
USGBC	U.S. Green Building Council
UWMP	Urban Water Management Plan
v/c	volume to capacity
VDECS	CARB-verified retrofits for off-road diesel vehicles
VMT	vehicle miles traveled
VOC	volatile organic compounds
WAMA	West Aircraft Maintenance Area
yr	year
ZEV	zero emission vehicle

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