CHAPTER 3.0
AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter provides a description of the existing human, physical, and natural environment conditions in the study area that would potentially be affected by the Runway Safety Area (RSA) Improvement Project alternatives (Proposed Action and Project Alternative A) identified in **Chapter 2** of this Environmental Assessment (EA). The environmental resource categories are included as identified in the Federal Aviation Administration (FAA) Order 1050.1E, *Environmental Impacts: Policies and Procedures* (FAA, 2006a) and FAA Order 5050.4B, National Environmental Policy Act (NEPA) *Implementing Instructions for Airport Actions* (FAA, 2006b).

The RSA Improvement Project alternatives would not impact farmlands, wild and scenic rivers, or coastal barriers. There are no farmlands in the vicinity of the Airport (CDOC, 2008; USDA, 2004). The American (Lower) River in Sacramento, approximately 50 miles northeast of the Airport, is the closest wild and scenic river segment (NPS, 2011). There are no coastal barrier islands in the vicinity of San Francisco Bay. Therefore, in accordance with guidance provided in FAA Orders 1050.1E and 5050.4B, no further documentation with respect to these resources is provided in this EA.

For the purposes of describing the existing conditions in the vicinity of the Airport, two study areas were developed for this EA: a Generalized Study Area (GSA), and a Detailed Study Area (DSA). These study areas are shown on **Figure 3.1-1**.

3.1.1 GENERALIZED STUDY AREA

The GSA presented on **Figure 3.1-1** includes a geographic area that was established to quantify impacts that may affect the surrounding community, such as noise, air quality, land use, and socioeconomic characteristics. The GSA is defined by the existing geographic boundaries with the San Francisco Bay from the southwest, west, and northwest. Interstate 880 (I-880) defines the GSA boundaries from the northeast, and Fairway Drive in San Leandro defines the southeast boundaries.

3.1.2 DETAILED STUDY AREA

The DSA was established for environmental considerations that deal with possible construction-related issues such as fish, wildlife, and plants; noise; and historic architectural, archaeological, and cultural resources. It denotes the limits of the detailed description for the affected environment. Areas that would have direct impacts from the Proposed Action or Project Alternative A fall within the DSA shown on **Figure 3.1-1** (see also runway-specific RSA Alternatives in **Chapter 2**).

3.1.3 STUDY YEARS

The year 2010 was used to identify existing conditions in **Chapter 3** of this EA.

3.2 NOISE

3.2.1 INTRODUCTION

This section describes the methodology used to determine existing aircraft noise exposure, and addresses the existing (2010) aircraft noise environment in the area surrounding Oakland International Airport (OAK or Airport). The terms and metrics associated with aircraft noise used in the noise analysis are described in detail in **Appendix B** in the discussion of Fundamentals of Aircraft Noise.

3.2.2 AIRCRAFT NOISE DESCRIPTION

FAA requires the analysis of noise exposure when development actions may change the cumulative noise exposure of individuals to aircraft noise in areas surrounding an airport. Common development actions that may change the cumulative noise environment include: change in runway configuration, aircraft operations and/or movements, aircraft types using the airport, or aircraft flight characteristics that may affect existing and future noise levels. Potential noise impacts associated with the RSA Improvement Project alternatives are analyzed using the methodologies developed by the FAA and published in FAA Order 1050.1E, *Environmental Impacts, Policies and Procedures*. In accordance with FAA Order 1050.1E, Appendix A, Sections 14.3 and 14.4c, a proposed action would be considered to have a significant impact with regard to aviation noise, when compared to the No Action Alternative for the same time frame, if it would:

- Cause noise-sensitive areas located at or above day/night average sound level (DNL) 65 decibel (dB) to experience a noise increase of at least DNL 1.5 dB; or
- Cause an increase of DNL 1.5 dB that introduces new noise-sensitive areas to exposure levels of DNL 65 dB or more.

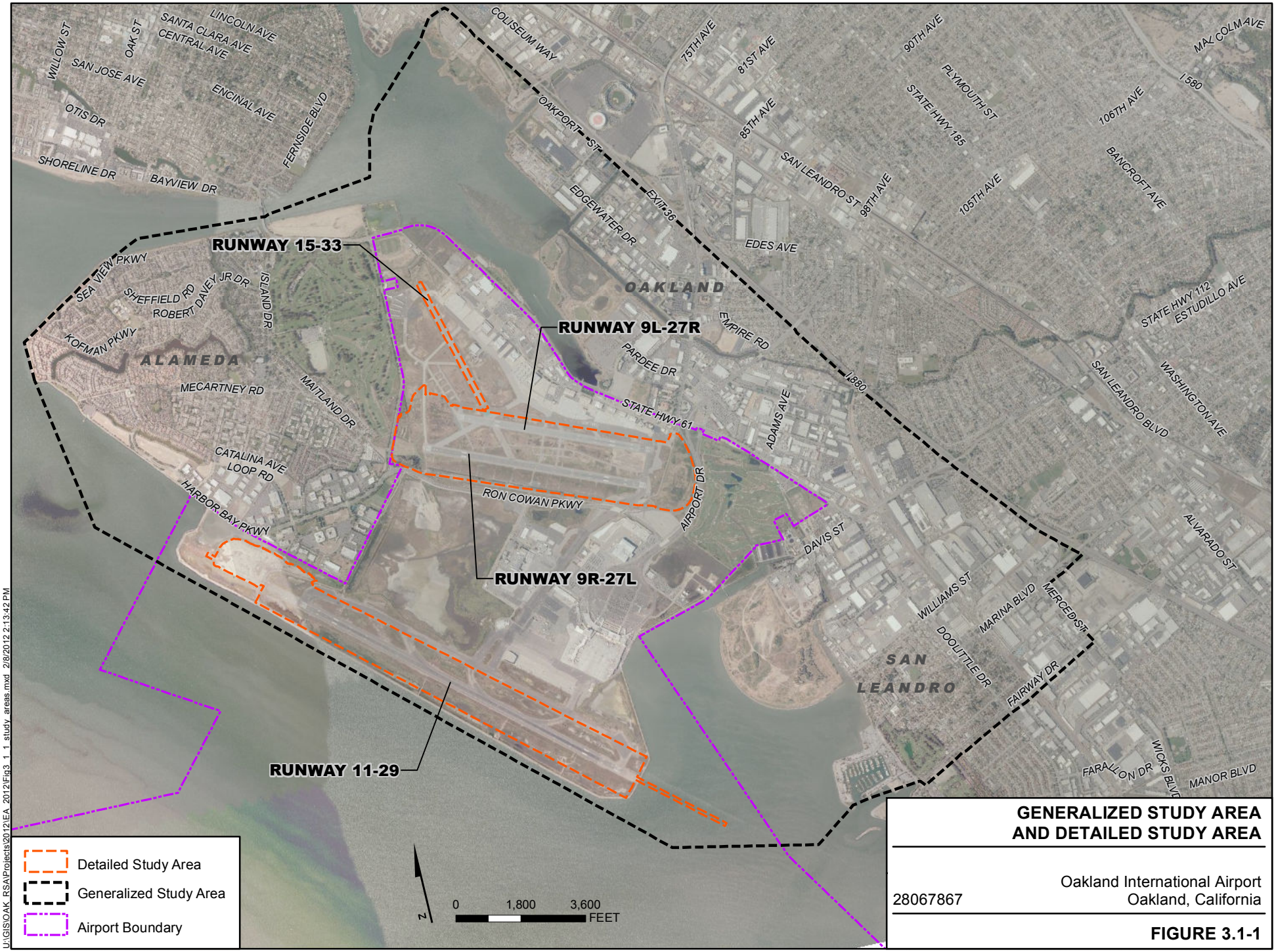
DNL is the standard metric designated by the FAA for determining cumulative exposure of individuals to noise. California law mandates use of the Community Noise Equivalent Level (CNEL), and the FAA recognizes CNEL[1] as an alternative metric for airports in California (California Code of Regulations, Title 21, Division 2.5, Chapter 6; FAA Order 1050.1E, in Appendix A, Paragraph 14.1 [FAA, 2006a]). Additional information regarding CNEL is included in **Appendix B** in the discussion of Fundamentals of Aircraft Noise.

Methodology

Noise analysis was conducted to reflect current noise conditions for the Airport. This analysis includes maps depicting general and noise-sensitive land uses in the noise impact area and generalized flight tracks. Noise exposure tables were developed to evaluate land use information and population data, including the following:

- The number of residences or people living within each noise contour at or above 65 dB CNEL;
- The locations and numbers of noise-sensitive land uses within each contour at or above 65 dB CNEL; and
- The number of people within various land use classifications with the CNEL noise contours.

[1] CNEL is a 24-hour, time-weighted average noise metric, expressed in A-weighted decibels (dBAs), that accounts for the noise levels of individual aircraft events, the number of times those events occur, and the time of day they occur.



GENERALIZED STUDY AREA AND DETAILED STUDY AREA

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Oakland International Airport
Oakland, California

FIGURE 3.1-1

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Source: Aerial Photo, National Agriculture Imagery Project, 2010.

In accordance with guidance contained in FAA Order 1050.1E, detailed noise analyses were performed using the latest version of the FAA's Integrated Noise Model (INM) (Version 7.0b, released on September 30, 2009). The INM is FAA's standard noise modeling tool for predicting airport noise levels in the vicinity of airports. CNEL contours of equal noise for the 65, 70, and 75 A-weighted decibels[2] (dBA) levels were calculated based on the 2010 airport operating conditions.

The data and methodologies used to develop the noise contours for the existing condition are provided in **Appendix B** under Noise Modeling Methodology.

3.2.3 2010 (EXISTING) NOISE ENVIRONMENT

The existing noise exposure contour maps reflect annual aviation noise conditions for the calendar year 2010. A detailed description of the aircraft operations and Airport operational characteristics is provided in **Appendix B** under Noise Modeling Methodology.

The total aircraft operational levels were derived from the OAK Aircraft Noise and Operations Monitoring System (ANOMS). **Table 3.2-1** shows the annual and average daily operations by aircraft category.

Table 3.2-1
Oakland International Airport 2010 Operations

Aircraft Category	Annual Operations[1]			Average Daily Operations		
	Day	Evening	Night	Day	Evening	Night
Air Carrier	77,178	21,573	18,442	211.45	59.10	50.53
Air Taxi	14,156	2,662	7,337	38.79	7.29	20.10
General Aviation	65,350	11,797	6,508	179.03	32.32	17.83
Military	349	119	87	0.96	0.33	0.24
Total Operations	**157,033**	**36,151**	**32,374**	**430**	**99**	**89**

Note: Calendar Year 2010. Numbers may not add up due to rounding.
[1] One operation equals one takeoff or one landing.
Source: HMMH, 2011.

Aircraft fleet mix categories were defined relative to types of aircraft (i.e., jet or propeller), as well as size and noise characteristics. These categories were determined from the OAK ANOMS. A detailed description of the fleet mix is provided in **Appendix B,** Noise Modeling Methodology.

Table 3.2-2 shows the distribution of annual operations by time of day. Operations by time of day for each INM aircraft type are provided in **Appendix B,** Noise Modeling Methodology.

An additional important consideration in developing noise exposure contours is the percentage of time each runway is used. Wind speed and direction dictate the direction in which the runways are operated (north versus south). In general, aircraft operate into the wind — landing into the wind and departing into the wind. Aircraft operations are shifted to the runway end that favors the best operating conditions.

[2] A-weighted decibel is a decibel scale that reflects the exclusion of frequencies that humans do not normally hear.

Table 3.2-2
Summary of Operations by Time of Day (2010)

Aircraft Category	Annual Operations		
	Day	Evening	Night
Air Carrier	65.85%	18.40%	15.73%
Air Taxi	58.60%	11.02%	30.38%
General Aviation	78.11%	14.10%	7.77%
Military	62.88%	21.44%	15.67%

Note: Numbers may not add due to rounding.
Source: HMMH, 2011.

Other factors affecting OAK runway use include, but are not limited to, the following:

- Required runway length for takeoff per aircraft type and weight;
- Noise abatement procedures;
- Airport operational efficiency;
- Interaction with other Bay Area airports;
- Weather minimums; and
- Terrain and obstacle clearances.

The existing runway use at OAK was determined based on 2010 ANOMS data. **Table 3.2-3** summarizes the runway use as a percentage of total operations. A description of the runway use assumptions per aircraft category is provided in the **Appendix B** description of Noise Modeling Methodology**.**

Table 3.2-3
Runway and Helipad Use (2010)

Runway	Arrivals			Departures		
	Day	Evening	Night	Day	Evening	Night
09L	0.6%	0.7%	0.7%	1.1%	0.6%	1.4%
09R	0.8%	0.3%	0.3%	1.6%	0.6%	6.9%
11	7.0%	6.4%	6.4%	6.4%	6.4%	6.3%
15	0.4%	0.5%	2.0%	0.4%	0.1%	0.1%
27L	5.8%	2.6%	2.1%	2.3%	0.9%	3.2%
27R	25.7%	20.8%	20.2%	13.0%	7.4%	13.0%
29	57.8%	68.0%	67.4%	67.7%	80.2%	66.7%
33	0.8%	0.2%	0.6%	6.6%	3.0%	2.0%
Helipad 3	0.2%	0.1%	0.0%	0.4%	0.3%	0.1%
Helipad 6	0.9%	0.5%	0.2%	0.5%	0.4%	0.2%

Note: Numbers may not add due to rounding.
Source: HMMH, 2011.

The location and use of aircraft flight tracks were identified using radar data from the OAK ANOMS noise monitoring system and Aircraft Situational Display for Industry data that identify the procedure flown by the pilot of each aircraft. A full year of 2010 radar data from both sources was used to determine the existing arrival and departure flight paths and flight path use. A detailed description of the flight tracks is provided in **Appendix B**'s section on Noise Modeling Methodology**.**

Standard INM inputs were used to determine arrival and departure profiles. INM input files, flight profiles, or other factors were not modified.

CNEL Contours

Noise levels are commonly depicted as isopleths (contours). These areas of equal value are depicted as CNEL contours and present a graphical representation of the cumulative distribution of noise over the surrounding area. These values are based on average annual daily aircraft operations.

Based on the operational conditions presented above, noise contours were developed using the INM. Noise exposure resulting from 2010 aircraft operations at OAK is depicted on **Figure 3.2-1** as CNEL 65, 70, and 75 dBA contours, superimposed over the local land use map. Noise-sensitive land uses and general land uses within the existing CNEL 65 dBA or greater noise contours are listed in **Table 3.2-4**.

As shown in **Table 3.2-4,** there are no existing incompatible land uses within the 65 dB CNEL noise contour.

Land Use Compatibility

As shown on **Figure 3.2-1** and **Table 3.2-4**, there are currently no incompatible land uses, as defined by noise-sensitive land uses within the 65 CNEL, in the GSA for this EA.

3.2.4 EXISTING NOISE MANAGEMENT PROGRAM

The Port of Oakland (Port) has a long history of comprehensive noise management programs for Oakland International Airport. The current programs originated from the implementation of noise abatement procedures that began in the 1970s. The early procedures served as the foundation of the OAK noise program, which included a number of elements such as aircraft flight procedures for noise abatement, limitations on the use of certain runways by jet aircraft, policies and procedures for aircraft engine testing and run-ups, and the establishment of a noise abatement committee to periodically review noise abatement procedures and make recommendations for changes in procedures to maintain noise compatibility.

In the mid-1980s, the Port initiated a comprehensive study of its ongoing OAK noise program under the provisions of Title 14, Code of Federal Regulations (CFR) Part 150. The purpose of the Part 150 study was to complete a Noise Compatibility Plan (NCP) to modify and supplement the existing OAK noise program, as appropriate, to ensure that: (1) noise and land use compatibility between Oakland International Airport and neighboring communities is maintained through noise remedy programs that are realistic and that are capable of being implemented by the Port, FAA, and local jurisdictions; (2) the provisions of the California Airport Noise Standards are met; and (3) the Port maintains its eligibility for federal funds for eligible noise compatibility purposes under the FAA Airport Improvement Program.

Table 3.2-4
2010 Existing Noise Exposure

Number of Noise-Sensitive Land Uses and Sites		65 to 70 CNEL	70 to 75 CNEL	Over 75 CNEL
Residential	Residential, other than mobile homes and transient lodgings	0	0	0
	Mobile Home Parks	0	0	0
	Transient Lodgings	0(2)	0	0
Public Use	Schools	0	0	0
	Hospitals and Nursing Homes	0	0	0
	Churches, Auditoriums, and Concert Halls	0	0	0
	Government Services	0	0	0
	Transportation	0	0	0
	Parking	0	0	0
Commercial Use	Offices, Business and Professional	0(2)	0	0
	Wholesale and Retail – Building Materials, Hardware and Farm Equipment	0	0	0
	Retail Trade – General	0(2)	0	0
	Utilities	0	0	0
	Communication	0	0	0
Manufacturing and Production	Manufacturing, General	0	0	0
	Photographic and Optical	0	0	0
	Agriculture (except livestock) and Forestry	0	0	0
	Livestock Farming and Breeding	0	0	0
	Mining and Fishing, Resource Production and Extraction	0	0	0
Recreational	Outdoor Sports Arenas and Spectator Sports	0	0	0
	Outdoor Music Shells, Amphitheaters	0	0	0
	Nature Exhibits and Zoos	0	0	0
	Amusements, Parks, Resorts, and Camps	0	0	0
	Golf Courses, Riding Stables, and Water Recreation	0	0	0
Population Estimates and Housing Unit Estimates		**65 to 70 CNEL**	**70 to 75 CNEL**	**Over 75 CNEL**
Number of People		0	0	0
Number of Housing Units		0	0	0

Note:
For the purposes of this study, the hotel located within the 65 to 70 CNEL noise contours complies with indoor noise reduction standards; therefore, it is not considered a noise-sensitive site. There are no other residential land uses or sites within the noise contours.

CNEL = Community Noise Equivalent Level

Source: Adapted from the best available data: California Department of Social Services, 2011; Alameda County, 2011; Cal-Atlas, 2011; URS, 2011.

65 CNEL Noise Contour
70 CNEL Noise Contour
75 CNEL Noise Contour
School
Church
Child Care
Elderly Care
Park
Golf Course
Hotel
City Limits
Airport Boundary
Generalized Study Area
Detailed Study Area

LAND USE DESIGNATIONS

Residential
Public Use
Commercial Use
General Industrial/Transportation
Recreational

0 2,500 5,000 FEET

N

Sources (Adapted from the best available data):
- Dept. of Social Services (CA), City of Oakland, 2009
- CAL-Atlas, 2011; INM v7.0b; URS, 2011

2010 EXISTING NOISE EXPOSURE CONTOURS

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Oakland International Airport
Oakland, California

FIGURE 3.2-1

3/9/12 hk...U:\GIS\OAK_RSA\Graphics_figures\Fig3_2_1 2010 Existing Noise Exposure Contours.ai

The Part 150 study was completed in April 1988. A copy of the FAA Record of Approval for the Part 150 study is included in **Appendix G** of this EA. All but four of the measures recommended for inclusion in the Part 150 NCP were approved by FAA on May 21, 1991.

As part of the Part 150 NCP, the Port adopted noise abatement runway use and engine run-up procedures. The Port's current aircraft operational noise management measures include the following:

Airport-Wide Measures:

1. Aircraft Engine Run-up Restrictions;
2. Use of a Ground Run-up Enclosure; and
3. Development of Aircraft Noise Reports.

North Field Measures (General Aviation):

4. Runway Signage for Noise Abatement;
5. Visual Flight Rules Departure Procedure;
6. Quiet Hours and Quiet Hours Noise Level Report;
7. Jet Landings Discouraged on Runway 9R, Runway 11 is preferred for Noise Abatement;
8. Jet Departures Discouraged on Runway 27R and Runway 27L, Runway 29 is preferred for Noise Abatement; and
9. Quiet Hours Departure Procedure.

South Field Measures (Commercial Airlines and Cargo):

10. Rolling Takeoff Procedure;
11. Runway 11 Night Departure Procedure; and
12. Silent Seven Departure Procedure.

In addition to the operational noise control measures, the Port has provided residential acoustical insulation for homes located on Bay Farm Island within the 65 dBA CNEL noise contour as shown in the Part 150 NCP. This program, known as the Alameda Residential Program, offered sound insulation improvements to 629 eligible homeowners, of which 558 homeowners participated. The program, completed in 2006, was successful in reducing interior noise levels by 5 to 7 dBA and also improved energy efficiency of the homes.

An ongoing program is the San Leandro Residential Program. This program was started in 2006 and will eventually insulate up to a maximum of 200 homes in the City of San Leandro. The Port has also provided funding for the acoustical insulation of five schools. Four of the schools are located in the San Leandro Unified School District, and one school is located in the San Lorenzo Unified School District.

In the years since the Part 150 NCP was adopted, aircraft engine technologies have improved. These improvements and the phase-out by 1999 of older, louder Stage II aircraft as mandated by the Airport Noise and Capacity Act of 1990 have resulted in lower aircraft noise emissions. Because of these factors, the size of the 65 dBA CNEL has decreased at many airports, including OAK. As of 2010, there

are no incompatible land uses, including residential and educational land uses, within the OAK 65 dBA CNEL.

Local Noise Policies Associated with Construction Noise

The maximum allowable noise levels for construction activity during the weekdays (7:00 a.m. to 7:00 p.m.) as defined by the City of Oakland noise standards are 80 and 85 dBA for residential and commercial/industrial land uses, respectively. The maximum allowable noise levels for construction activity during the weekends (9:00 a.m. to 8:00 p.m.) are 65 and 70 dBA for residential and commercial/ industrial land uses, respectively.

3.3 COMPATIBLE LAND USE

This section describes existing and planned land use in areas surrounding the Airport. The land use information included in this section is derived from the *Oakland International Airport Land Use Compatibility Plan* (OAK, 2010), as well as the general plans and zoning ordinances of the jurisdictions in the Airport area, including Oakland.

3.3.1 EXISTING LAND USE

Figure 3.2-1 shows existing land use and CNEL contours for the GSA, as well as the areas around the Airport. The Airport extends into the San Francisco Bay to the west, and is generally bordered by Doolittle Drive to the east. The Airport is surrounded by the City of San Leandro to the south, the City of Oakland to the east, and the City of Alameda to the north. Existing land use patterns in these areas vary by jurisdiction.

3.3.2 LOCAL PLANS AND LAND USE REGULATIONS

The general plans for each of the jurisdictions intersected by the GSA boundary provide land use guidance for future development in areas around the Airport. The following sections describe planned land use for Alameda County and the cities of Oakland, San Leandro, and Alameda. The Land Use Compatibility Plan for OAK, which provides for the development of compatible land use in areas affected by the Airport, is also discussed below.

Alameda County

The Alameda County General Plan is currently being updated. As previously stated, the Airport is owned and operated by the Port of Oakland and situated on land in the City of Oakland, and a small portion in the City of Alameda, in Alameda County. The Alameda County General Plan identifies the area of the Airport as planned for airport uses, and no change in land use is anticipated.

City of Oakland

The City of Oakland updated and adopted its General Plan in 1998, and it is in effect until 2015 (City of Oakland, 1998). The Airport occupies 2,600 acres in the southwestern corner of the City of Oakland. According to the City of Oakland General Plan, the Airport is located in the Seaport and Airport/Showcase District, which serves to attract related and compatible commercial and industrial uses. The planned land

uses in the area of the Airport are generally consistent with existing land use patterns, and land use changes in this part of Oakland are not anticipated.

City of San Leandro

The City of San Leandro updated its General Plan and adopted it in 2002 (City of San Leandro, 2002). In general, areas within the City of San Leandro and in the GSA are fully developed, and planned land use is consistent with existing land use. Land use patterns are primarily focused on residential and commercial uses, with open space and recreational uses along San Francisco Bay.

City of Alameda

The City of Alameda lies to the north of the Airport and includes the community of Bay Farm Island. The Airport occupies 21 acres on Bay Farm Island. The City of Alameda General Plan was adopted in 1991 (City of Alameda, 1991). Planned land use in areas of Alameda is consistent with the existing land use pattern, and changes in land use in this part of Alameda are not anticipated.

Alameda County Airport Land Use Policy Plan

In 1986, the Alameda County Airport Land Use Commission adopted the Alameda County Airport Land Use Policy Plan (ALUPP) (ALUC, 1986) to promote compatibility between the public use airports in Alameda County and the land uses that surround them. The Plan was updated in 2010. The ALUPP is concerned with land uses near the three public-use airports in Alameda County: Hayward Executive Airport, Livermore Municipal Airport, and Oakland International Airport. The ALUPP establishes land use compatibility criteria for areas around airports based on four compatibility factors: safety, airspace, overflight, and noise. Jurisdictions with planning authority in areas covered by the ALUPP are required to ensure that their planning documents and zoning ordinances are consistent with the ALUPP, or to take specific steps to override the document.

Port of Oakland Land Use and Development Code

The City of Oakland Charter grants land use jurisdiction to the Port of Oakland for land within the Airport, Seaport, Commercial Real Estate, and the Oakland Airport Business Park. The Business Park encompasses approximately 400 acres northeast of the Airport. There are currently no incompatible land uses in the Business Park. The Land Use and Development Code for the Oakland Airport Business Park was adopted in December 2010 and will ensure that future development in the Business Park is restricted to uses that are consistent with OAK operations (City of Oakland, 2010).

3.4 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F) AND LAND AND WATER CONSERVATION FUND ACT, SECTION 6(F) RESOURCES

The U.S. Department of Transportation Act of 1966, as amended, requires a Section 4(f) analysis of any federally funded transportation project if the project proposes to use property from a publicly owned park, recreation area, wildlife or waterfowl refuge area, or any significant historic site. The Secretary of Transportation may approve a transportation program or project requiring the use of Section 4(f) land only if:

- There is no prudent and feasible alternative to using that land; or
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuges, or historic sites resulting from the use.

For Section 4(f) purposes, use also includes not only actual physical takings of Section 4(f) lands, but also adverse indirect impacts (or constructive use). Constructive use only occurs if existing use of Section 4(f) lands are substantially impaired by a project action, which includes substantially diminishing the activities, features, or attributes of the Section 4(f) resource that contribute to its significance or enjoyment.

Section 6(f) of the National Park Service Land and Water Conservation Fund (LWCF) Act contains provisions for the protection of federal investments in land and water resources. The LWCF Act discourages the conversion of parks or recreational facilities that are funded by the LWCF to other uses.

3.4.1 INVENTORY OF SECTION 4(F) AND SECTION 6(F) RESOURCES

The GSA includes several parks managed by the Port of Oakland, Alameda County, the East Bay Regional Park District, and the cities of Oakland, Alameda, and San Leandro that are Section 4(f) resources. **Table 3.4-1** lists the parks in the GSA, and **Figure 3.4-1** shows the locations of these parks.

The portion of the San Francisco Bay Trail, located within the Martin Luther King Jr. Shoreline Park, is listed in the National Park Service's 2004 Annual Report as a Section 6(f) property that received funds from the Land and Water Conservation Fund (NPS, 2004). The San Francisco Bay Trail is located in the GSA northwest of the Airport.

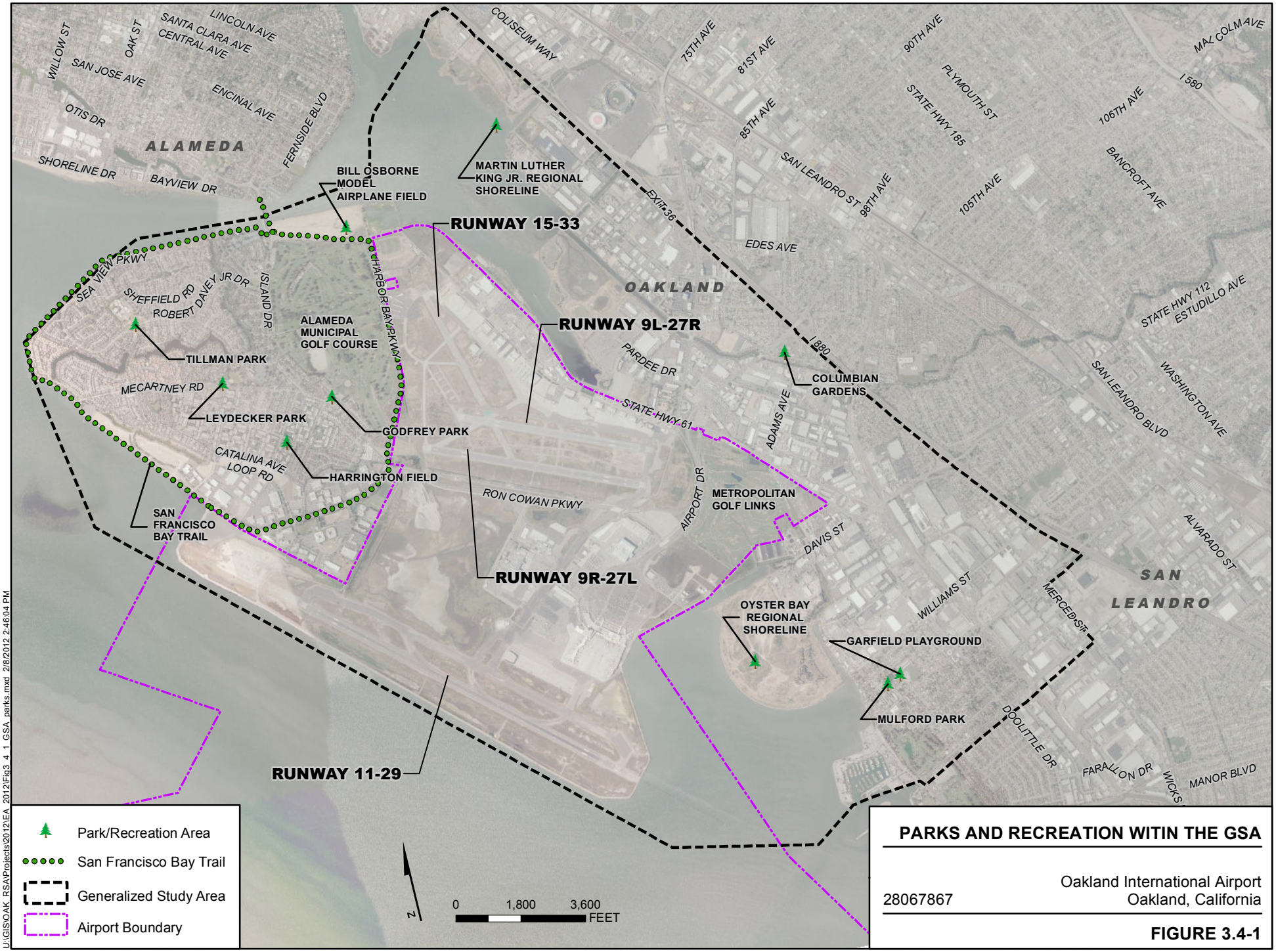
3.5 SOCIAL, SOCIOECONOMIC AND TRANSPORTATION CHARACTERISTICS

3.5.1 INTRODUCTION

This section describes existing economic and demographic conditions and transportation characteristics of the GSA. Socioeconomic issues relevant to the evaluation of environmental impacts include ethnicity of population and poverty status, surface transportation and traffic, public services, and children's environmental health and safety.

3.5.2 ETHNICITY OF POPULATION AND POVERTY STATUS

Census tracts (CTs) in the GSA are presented on **Figure 3.5-1**. The race and poverty data in 2000 and 2010, respectively, for the GSA are shown in **Table 3.5-1**. CTs in the GSA have a wide variety of percentages of minority populations. CT4090 has the highest minority percentage (79 percent), and CT 4283.02 has the lowest percentage of minorities (52 percent). CT 4090 has the highest percentage of population living below the poverty level at 24 percent. CT 4283.02 has the lowest percentage of population living below the poverty level at 2 percent (U.S. Census Bureau, 2009).



PARKS AND RECREATION WITIN THE GSA

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Oakland International Airport
Oakland, California

FIGURE 3.4-1

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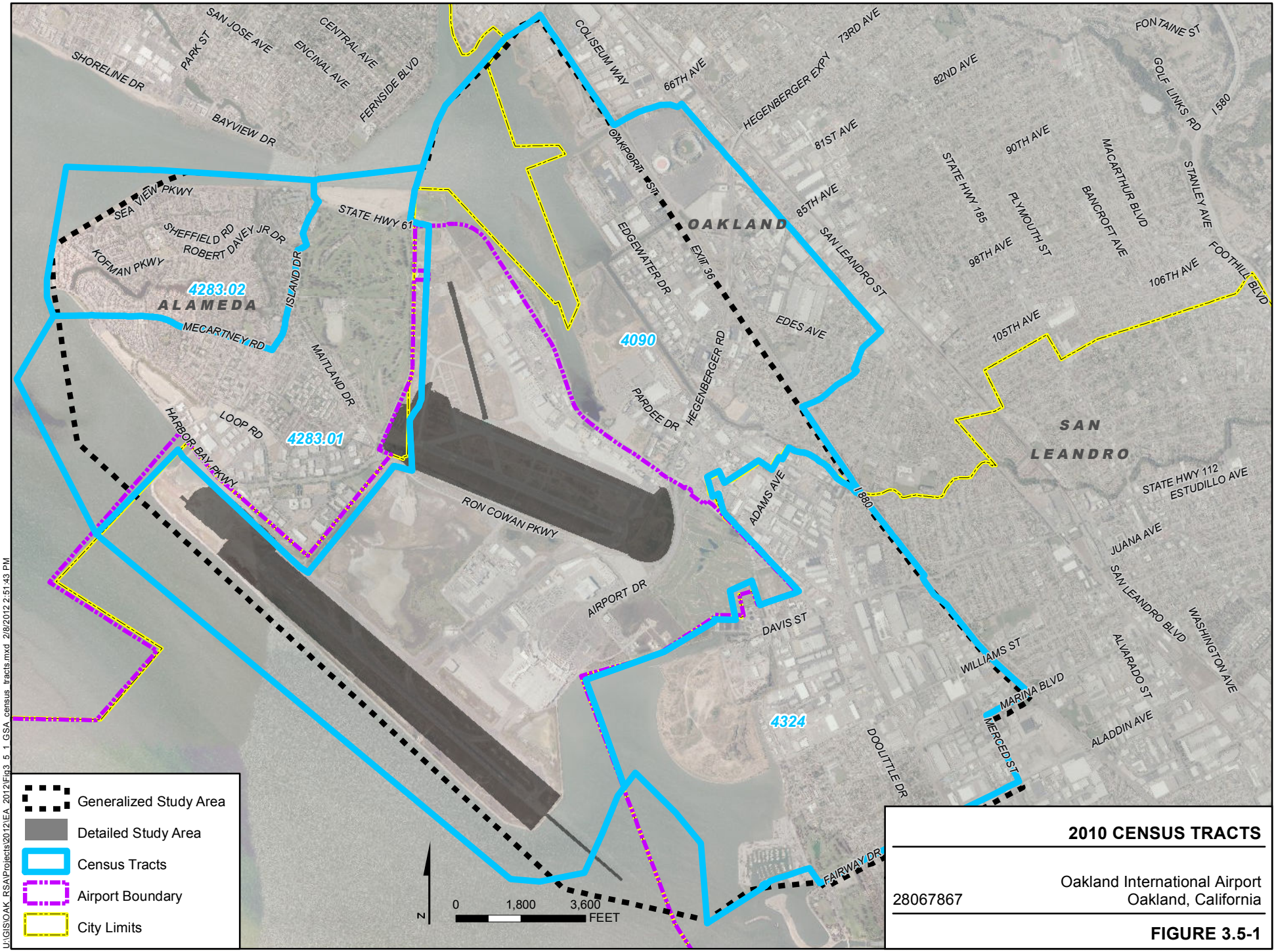
Source: Aerial Photo, National Agriculture Imagery Project, 2010.



2010 CENSUS TRACTS

28067867

Oakland International Airport
Oakland, California

FIGURE 3.5-1

Source: Aerial Photo, National Agriculture Imagery Project, 2010.

Table 3.4-1
Parks and Recreation Areas within the Generalized Study Area

Name	Location	Acreage	Facilities
San Francisco Bay Trail	Alameda (north of the Airport)	N/A	Biking and hiking trail
Bill Osborne Model Airplane Flying Field	Doolittle Drive, Alameda (immediately northwest of the Airport)	1.3 acres	Two flying circles: one grass, the other paved
Godfrey Park	Beach Road, Alameda (north of the DSA)	5.5 acres	Baseball field, soccer field, play lots, volleyball, and basketball courts
Leydecker Park	Mecartney Road, Alameda (northwest of the DSA)	5.9 acres	Recreation center, play lots, picnic areas, a softball field, a football field, basketball court, tennis courts, and a volleyball court
Tillman Park	Aughinbaugh Way, Alameda (northwest of the DSA)	4 acres	Recreation building, play lots, picnic areas, a softball field, and a soccer field
Harrington Field	Holly and Oleander Streets, Alameda (northwest of the DSA)	2 acres	Softball field and picnic areas
Martin Luther King Jr. Regional Shoreline Park	Adjacent to the Airport on the eastern side of Doolittle Drive, Oakland	741 acres	Picnic areas, paved bicycle and pedestrian paths, a boat launch, and a shoreline center
Columbian Gardens Park	Empire Road, Oakland (east of the DSA)	2.3 acres	Ball fields and play area
Oyster Bay Regional Shoreline	Neptune Drive, San Leandro (south of the DSA)	157 acres	Dog parks and dog runs
Mulford Park	Aurora Drive, San Leandro (southeast of the DSA)	N/A	Trail, picnic areas
Garfield Playground	Aurora Drive, San Leandro (southeast of the DSA)	N/A	N/A
Alameda Golf Course	Clubhouse Memorial Road, Alameda	TBD	Golf course, clubhouse
Metro Links Golf Course	Doolittle Dr., Oakland	TBD	Golf course, clubhouse

Notes:
DSA = Detailed Study Area
N/A = not available

Table 3.5-1
Race and Poverty Data in 2000 and 2010

Area	Population (2010)	Minority Population[1] (2010)	Percentage Minority[2] (2010)	Population Living Below Poverty Level[2] (2000)	Percentage Living Below Poverty Level[2] (2000)
City of Oakland	390,724	255,799	65	76,489	19
City of Alameda	73,812	36,352	49	5,887	8
City of San Leandro	84,950	53,004	62	5,037	6
Alameda County	1,510,271	861,149	57	156,804	11
California	37,253,956	15,800,022	42	4,706,130	14
Individual Census Tracts Within the GSA					
CT 4090	3,552	2,820	79	783	24
CT 4283.01	6,526	3,695	57	346	6
CT 4283.02	7,074	3,702	52	128	2
CT 4324	5,814	3,599	62	439	8

Notes:

[1] The minority percentage represents the number of residents that, in 2010, were included in the following race or ethnicity categories (defined by the U.S. Census): Hispanic/Latino, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Some Other Race, and Two or More Races.

[2] Low-income percentage represents the number of residents living below the poverty level, based on their 1999 income, taken as a percentage of the population for whom poverty status is determined (which includes all persons except institutionalized persons, persons in military group quarters and in college dormitories, and unrelated individuals under 15 years old).

CT = census tract

Sources: U.S. Census Bureau, 2000 and 2010.

3.5.3 SURFACE TRANSPORTATION

Existing Roadway Network

Roadway access to OAK is provided by a network of highways and local streets, as shown on **Figure 3.1-1**. The major regional and local roadways that connect various locations of Oakland and adjacent cities to the Airport are described below.

Regional

Interstate 880 (I-880) – Known as the Nimitz Freeway, I-880 is the major regional transportation corridor in the GSA. This freeway runs north–south along the eastern shore of San Francisco Bay between the Bay Bridge interchange in Oakland and the City of San Jose. I-880 is an eight-lane freeway with auxiliary lanes between the major interchanges. Key freeway interchanges with access to OAK are located at 66th Avenue, Hegenberger Road, 98th Avenue, and Davis Street.

Interstate 580 (I-580) – The MacArthur Freeway is another major regional transportation corridor in the GSA. This eight-lane freeway parallels I-880 about 3 miles to the east, and has roadway connections to the Airport provided by High Street, Edwards Avenue/73rd Avenue, 98th Avenue, and Estudillo Avenue/ Davis Street.

Local

Hegenberger Road is a major arterial street that provides primary east–west access to OAK. Hegenberger Road is a six-lane facility from the I-880 interchange to Doolittle Drive. West of the Doolittle Drive intersection, Hegenberger Road connects with lanes from 98th Avenue and becomes Airport Drive, a six-lane roadway to OAK.

98th Avenue is a major arterial street that also provides primary east–west access to OAK via a six-lane facility from the I-880 interchange to Doolittle Drive. At the Airport Access Road intersection, 98th Avenue becomes Airport Drive, providing six lanes into OAK. East of I-880, 98th Avenue narrows to a four-lane roadway that connects with I-580.

Doolittle Drive (State Route [SR] 61) provides direct access to the North Field complex, and serves as the primary north-south arterial in the vicinity of the Airport. Doolittle Drive becomes SR 61 at Davis Street (SR 112) in San Leandro, which continues north through Oakland to the City of Alameda. Doolittle Drive is a four-lane undivided highway in the GSA.

Airport Drive provides direct access to the South Field complex and employee/passenger parking areas. Airport Drive is six lanes wide, providing three westbound lanes toward OAK and three eastbound lanes away from OAK. An additional westbound lane is provided between Hegenberger Road and Ron Cowan Parkway. Near the public parking areas, Airport Drive transitions from three lanes to four lanes at the passenger terminal building curbside. Weekday (Monday through Thursday) peak-hour traffic operations and on-Airport vehicle circulation level-of-service is adequate under current conditions. Friday afternoon, weekend, and holiday Airport traffic typically results in increased congestion on the roadway and at the terminal curbside.

Airport Access Road is five lanes wide, providing two westbound lanes and three eastbound lanes between Hegenberger Road and Doolittle Drive. Airport Access Road provides access to either 98th Avenue or Hegenberger Road to drivers leaving OAK.

Ron Cowan Parkway is a four-lane roadway that connects Harbor Bay Parkway and Airport Drive. The roadway bisects the North Field and South Field airfields at OAK.

Davis Street (SR 112) is a four-lane, east-west arterial south of the Airport in the City of San Leandro. Davis Street forms a full cloverleaf interchange at I-880, and connects with I-580.

Harbor Bay Parkway is a four-lane arterial that provides access to Harbor Bay Isle Business Park. Harbor Bay Parkway intersects Doolittle Drive at the northern boundary of OAK.

High Street is a two-lane, east-west arterial in the GSA that provides access to I-880 and I-580. High Street originates in the City of Alameda at Otis Drive.

3.6 AIR QUALITY

This section describes existing air quality conditions in the vicinity of OAK. Specifically, information on applicable air quality standards, current attainment/designations, and existing air monitoring data is provided.

3.6.1 INTRODUCTION

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (U.S. EPA) to establish, and periodically review, National Ambient Air Quality Standards (national standards or NAAQS) to protect public health, welfare and the environment. NAAQS have been established for the following seven air pollutants, many of which have been made more strict by California-specific standards (CAAQS): ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than 10 micrometers (coarse particulates or PM_{10}), particulate matter equal to or less than 2.5 micrometers (fine particulates or $PM_{2.5}$), and lead. These are enforced by the California Air Resources Board (CARB).

California has adopted ambient standards (state standards or CAAQS) that are more stringent than the federal standards for the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These state standards are enforced by the CARB. The CARB also manages air quality, regulates mobile emissions sources, and oversees the activities of county and regional air districts in California. The NAAQS and CAAQS are listed in **Table 3.6-1**.

Table 3.6-1
National and California Ambient Air Quality Standards and Bay Area Air Basin Attainment Status for Criteria Pollutants

Pollutant	Averaging Time	CAAQS		NAAQS	
		Concentration	Bay Area Basin Attainment Status	Concentration	Bay Area Basin Attainment Status
Ozone	1-Hour 8-Hour	0.09 ppm 0.07 ppm	Nonattainment Nonattainment	NA 0.075 ppm	NA Marginally Nonattainment
Carbon Monoxide	1-Hour 8-Hour	20 ppm 9.0 ppm	Attainment Attainment	35 ppm 9 ppm	Attainment Attainment
Nitrogen Dioxide	1-Hour Annual	0.18 ppm 0.030 ppm	Attainment Attainment	0.100 ppm 0.053 ppm	Unclassified Attainment
Sulfur Dioxide	1-Hour 3-Hour 24-Hour Annual	0.25 ppm – 0.04 ppm –	Attainment Attainment	0.75 ppm 0.5 ppm 0.14 ppm 0.03 ppm	Attainment Attainment Attainment Attainment
Respirable Particulate Matter (PM_{10})	24-Hour Annual	50 µg/m^3 20 µg/m^3	Nonattainment Nonattainment	150 µg/m^3 –	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	24-Hour Annual	– 12 µg/m^3	 Nonattainment	35 µg/m^3 15 µg/m^3	Nonattainment Attainment
Lead	Month Quarter	1.5 µg/m^3 –	Attainment	– 0.15 µg/m^3	 Attainment

Notes:

CAAQS = California Ambient Air Quality Standards
µg/m^3 = micrograms per cubic meter
NA = Not applicable
NAAQS = National Ambient Air Quality Standards
PM_{10} = particulate matter equal to less than 10 microns in diameter
$PM_{2.5}$ = particulate matter equal to less than 2.5 microns in diameter
ppm = parts per million

Source: BAAQMD, 2011.

On the local level, the Bay Area Air Quality Management District (BAAQMD) has jurisdiction over the Bay Area Air Basin, which encompasses nine counties (including Alameda County). The BAAQMD is responsible for ensuring that the NAAQS and CAAQS air quality standards are met by monitoring ambient (i.e., outdoor) air pollutant levels throughout the region and implementing strategies to attain the standards. The Association of Bay Area Governments and the Metropolitan Transportation Commission, county transportation agencies, cities and counties, and various non-governmental organizations are also involved in managing air quality in the region.

For the NAAQS, the Bay Area is in attainment for CO, NO_2, SO_2, PM_{10}, and lead. The federal Clean Air Act requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The federal Clean Air Act amendments added requirements for states containing areas that violate the national standards to revise their SIPs to incorporate additional control measures to reduce air pollution. As such, the Bay Area has applicable SIPs for CO, ozone, and $PM_{2.5}$.

In April 1998, the Bay Area was redesignated to attainment for the NAAQS 8-hour CO standard. Thus, it is in a maintenance status for CO. Under the CAA, the U.S. EPA has classified the Bay Area as marginally nonattainment (marginal degree) for the 1997 8-hour ozone standard. In May 2008, the U.S. EPA lowered the 8-hour ozone standard from 0.080 part per million (ppm) to 0.075 ppm. U.S. EPA will issue the classification of the Bay Area towards the 2008 8-hour ozone standard by mid-2012.

In December 2008, the U.S. EPA designated the entire Bay Area as nonattainment for the 24-hour $PM_{2.5}$ NAAQS. The effective date of the designation is December 14, 2009, and the BAAQMD has three years to develop a SIP, which demonstrates the Bay Area will achieve the revised standard by December 14, 2014. The SIP for the new $PM_{2.5}$ standard must be submitted to the U.S. EPA by December 14, 2012.

On June 2, 2010, the U.S. EPA established a 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS, however, must continue to be used until one year following U.S. EPA initial designations of the new 1-hour SO_2 NAAQS. U.S. EPA expects to designate areas by June 2012.

Under the California Clean Air Act, patterned after the federal CAA, areas have also been designated as attainment or nonattainment with respect to the state standards. With respect to these standards, the Bay Area is currently designated as a nonattainment area for ozone and both PM_{10} and $PM_{2.5}$, and attainment for CO, NO_2, SO_2, and lead.

Of note, the Bay Area is classified as a serious nonattainment area for the 1-hour ozone state standard. The “serious” classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the Bay Area update the Clean Air Plan every three years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. On September 15, 2010, the BAAQMD adopted the most recent revision to the Clean Air Plan – the *Bay Area 2010 Clean Air Plan.*

3.6.2 SOURCES OF AIR EMISSIONS

The sources of air emissions associated with OAK are typical of sources associated with most large commercial service airports and include aircraft during the landing cycle, ground support equipment

(GSE), auxiliary power units, airport-related motor vehicles (from passengers, employees, shuttle vans, fleet vehicles, buses, etc.) within the Airport roadway network, stationary sources (e.g., boilers and generators), and construction-related emissions.

Because the number of aircraft operations at OAK would not change as a result of the RSA Improvement Project, an assessment of existing operational emissions associated with aircraft, auxiliary power units, GSE and motor vehicles, and stationary sources at the Airport is not necessary. However, a construction-period emissions inventory associated with the RSA Improvement Project alternatives was prepared, and is presented in **Section 4.6**.

3.6.3 GREENHOUSE GASES AND CLIMATE CHANGE

Research has shown there is a direct correlation between fuel combustion and greenhouse gas (GHG) emissions. In terms of U.S. contributions, the U.S. General Accounting Office reports that "domestic aviation contributes about 3 percent of total carbon dioxide emissions, according to EPA data," compared with other industrial sources, including the remainder of the transportation sector (20 percent) and power generation (41 percent) (GAO, 2009). The International Civil Aviation Organization estimates that GHG emissions from aircraft account for roughly 3 percent of all anthropogenic GHG emissions globally (Melrose, 2010). Climate change due to GHG emissions is a global phenomenon, so the affected environment is the global climate.[3]

The scientific community is continuing efforts to better understand the impact of aviation emissions on the global atmosphere. The FAA is leading and participating in a number of initiatives intended to clarify the role that commercial aviation plays in GHG emissions and climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies (e.g., National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, U.S. EPA, and U.S. Department of Energy), has developed the Aviation Climate Change Research Initiative in an effort to advance scientific understanding of regional and global climate impacts of aircraft emissions. FAA also funds the Partnership for Air Transportation Noise & Emissions Reduction Center of Excellence research initiative to quantify the effects of aircraft exhaust and contrails on global and U.S. climate and atmospheric composition. Similar research topics are being examined at the international level by the International Civil Aviation Organization (Lourdes, 2007).

3.6.4 2010 EXISTING CONDITIONS

The BAAQMD monitors air quality at more than 30 locations throughout the Bay Area. The closest monitoring station to OAK is located at 9925 International Boulevard in Oakland, approximately 2 miles east of the Airport and 7 miles southeast of downtown Oakland. Criteria pollutants monitored at this location include ozone, CO, NO_2, and $PM_{2.5}$. A summary of the monitored pollutants for 2007 through 2009 is provided in **Table 3.6-2**.

[3] As explained by the U.S. Environmental Protection Agency, "greenhouse gases, once emitted, become well mixed in the atmosphere, meaning U.S. emissions can affect not only the U.S. population and environment but other regions of the world as well; likewise, emissions in other countries can affect the United States." Climate Change Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency, *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act 2-3* (2009), available at http://epa.gov/climatechange/endangerment.html.

Table 3.6-2
Air Quality Data Summary (2007–2009) for the Project Area

Pollutant	Monitoring Data by Year		
	2007	2008	2009
Ozone			
Highest 1-Hour Average (ppm)	0.060	0.086	0.092
Days Over State Standard (0.09 ppm)	0	0	0
Highest 8-Hour Average (ppm)	0.053	0.064	0.062
Days Over State Standard (0.07 ppm)	0	0	0
Days Over Federal Standard (0.075 ppm)	0	0	0
Nitrogen Dioxide			
Highest 1-Hour Average (ppm)	0.069	0.070	0.062
Days Over State Standard (0.18 ppm)	0	0	0
Annual Average (ppm)	0.016	0.015	0.014
Exceed State Standard? (0.030 ppm)	No	No	No
Carbon Monoxide			
Highest 1-Hour Average (ppm)	2.5	3.0	4.6
Days Over State Standard (20.0 ppm)	0	0	0
Highest 8-Hour Average (ppm)	1.6	1.6	2.0
Days Over State Standard (9.0 ppm)	0	0	0
Particulate Matter (PM_{10})			
Highest 24-Hour Average (μg/m^3)	70	41	36
Days Over State Standard (50 μg/m^3)	2	0	0
Days Over Federal Standard (150 μg/m^3)	0	0	0
Annual Average (μg/m^3)	21.9	22.0	18.7
Exceed State Standard? (20 μg/m^3)	No	Yes	No
Particulate Matter ($PM_{2.5}$)			
Highest 24-Hour Average (μg/m^3)	45.2	30.1	36.3
Days Over Federal Standard (35 μg/m^3)	5	0	1
Annual Average (μg/m^3)	8.7	9.5	9.3
Exceed State Standard? (12 μg/m^3)	No	No	No

Notes:
μg/m^3 = micrograms per cubic meter
PM_{10} = particulate matter equal to less than 10 microns in diameter
$PM_{2.5}$ = particulate matter equal to less than 2.5 microns in diameter
ppm = parts per million

Source: BAAQMD, 2010.

3.7 WATER RESOURCES

3.7.1 SURFACE WATER

The Airport is located in Alameda County in the City of Oakland, with a small portion in the City of Alameda. It is surrounded by San Francisco Bay to the south and west, by San Leandro Bay to the North, and by Bay Farm Island to the northwest. The Airport originated in the 1920s when tidal marshes were filled with dredged material from San Leandro Bay. The City of Oakland purchased the land and opened the Oakland Municipal Airport in 1927. In 1941, fill was placed at the site and the North Field runways were constructed in 1945. This area, now called North Field, was surrounded by perimeter dikes.

In the 1950s, the Airport extended its property by developing South Field. South Field was created by constructing a perimeter dike around approximately 1,400 acres of additional tideland. Dredged material from San Francisco Bay was used to fill the landside area of the dike. In 1973, fill was added and Runway 11-29 was completed at its current length. South Field is located entirely behind a perimeter dike.

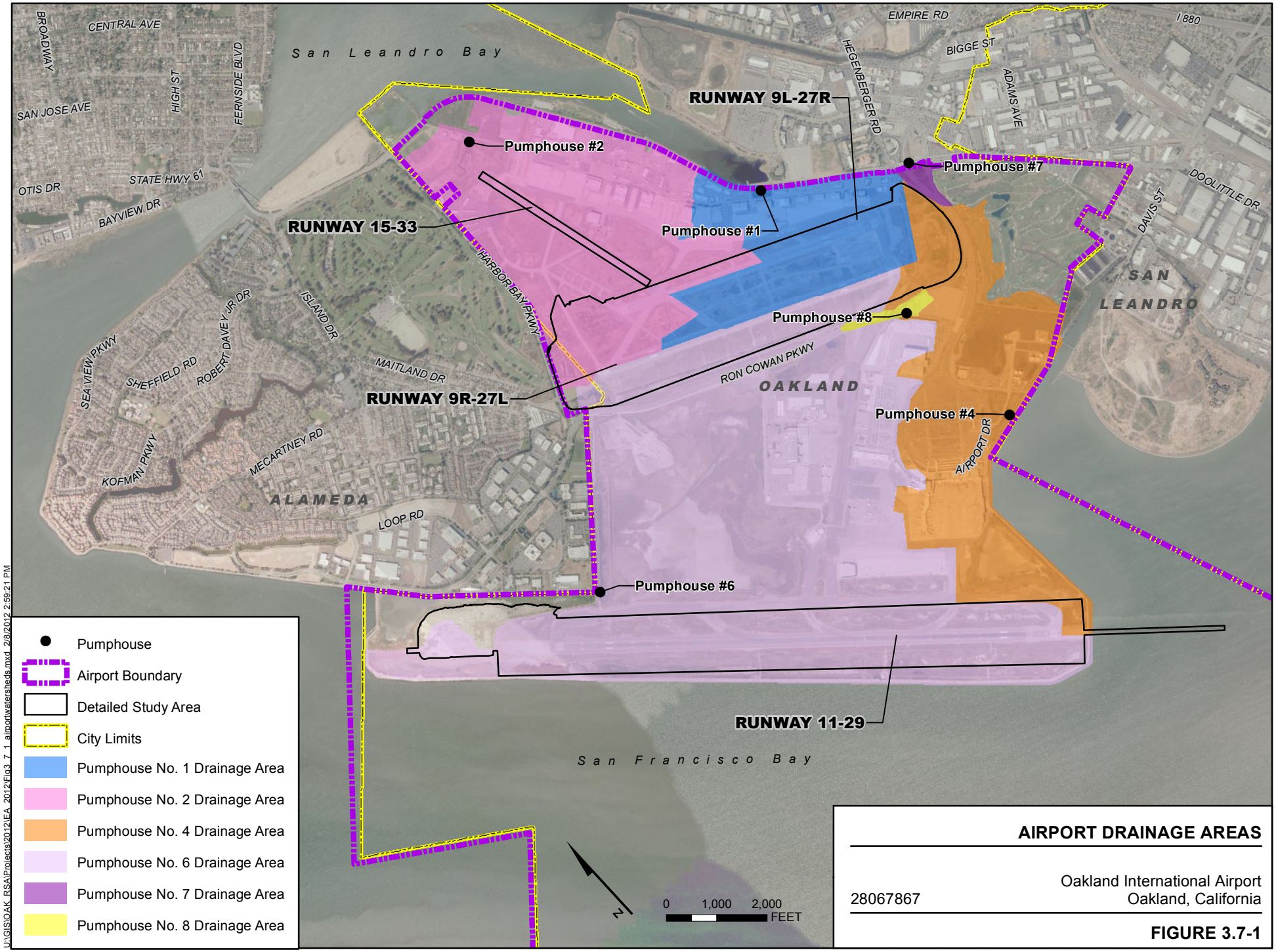
San Leandro Bay has been diverted and channelized, and flows along the eastern boundary of the Airport. Releases from the East Bay Municipal Utility District's (EBMUD) reservoirs contribute to the flow in this area, which also receives stormwater runoff from the cities of Oakland and San Leandro. This area is hydraulically connected with San Francisco Bay and is influenced by tides.

Storm drainage and sanitary systems are separated at the Airport. The storm drainage features at OAK consist of lower interior basins and perimeter dikes that separate the Airport from adjacent drainages. The Airport drainage system is mainly a water detention system that is comprised of storm drain inlets, underground pipes, ditches, swales, channels, culverts, retention basins, berms, and levees. Stormwater runoff is discharged via pumping to either San Leandro Bay or San Francisco Bay. There are currently six pump houses operating at the Airport, as shown on **Figure 3.7-1** and listed in **Table 3.7-1**.

Table 3.7-1
Drainage Areas Served by each Airport Pump House

Pump House	Acres of Watershed Served by Each Pump House
Pump House No. 1	225
Pump House No. 2	466
Pump House No. 4	394
Pump House No. 6	1,261
Pump House No. 7	25
Pump House No. 8	10

Source: Kimley Horn, 2009b



AIRPORT DRAINAGE AREAS

28067867

Oakland International Airport
Oakland, California

FIGURE 3.7-1

Source: Aerial Photo, National Agriculture Imagery Project, 2010; Watersheds, Port of Oakland - Stormwater Infrastructure Management Plan, OAK Watershed Exhibit, Kimley-Horn & Associates, March 2009.

The stormwater at the Airport flows slowly through swales and localized depressions and, briefly, through retention basins before it is pumped into San Leandro Bay or San Francisco Bay. The retention basins at the pump houses retain stormwater runoff for an extended time prior to discharge and thereby allow sediments and potential contaminants that are conveyed in the runoff to settle. The conduits from the basins to the discharge points are, to a great extent, open, vegetated channels. This allows for evaporation and the natural filtering of stormwater through vegetative evapotranspiration and infiltration.

The Port serves as the group leader for the Port of Oakland Group Storm Water Monitoring Program, and has developed, and is currently implementing, a group monitoring plan for sampling and analysis of stormwater discharges at the Airport (Port of Oakland, 2011a and 2011b). The group monitoring plan has been developed in accordance with the requirements of the State Water Resources Control Board, Water Quality Order No. 97-03-DWQ, National Pollutant Discharge Elimination System General Permit No. CAS000001, Waste Discharge Requirements for Discharges to Storm Water Associated with Industrial Activities Excluding Construction Activities (Industrial General Permit).

Stormwater in the North Field portion of the DSA drains to four drainage areas that discharge at Pump House Nos. 1, 2, 4, and 6, as presented on **Figure 3.7-1**. **Table 3.7-1** indicates the drainage area served by each Airport pump house. Water is conveyed to detention basins at each of the respective pump houses by sheet flow and through underground piping and culverts. Beyond the northwestern end of Runway 9R, several retention ponds (non-tidal waters of the U.S.) are connected to the drainage system in Harbor Bay Parkway (Kimley Horn, 2009a). The culvert beneath Harbor Bay Parkway connecting these ponds to the adjacent property slopes away from the Airport (Kimley Horn, 2009b). The South Field drains to Pump House Nos. 4 and 6, as presented on **Figure 3.7-1**. Discharge from the four pump houses is to San Leandro Bay or San Francisco Bay.

3.7.2 GROUNDWATER

OAK is located on the East Bay Plain, which has a major aquifer system (Port of Oakland, 1997). Groundwater may occur in confined or unconfined conditions in the East Bay Plain. The majority of the shallow, confined aquifers are 20 to 60 feet below ground surface. Unconfined groundwater is located in permeable aquifers and may be recharged through surface percolation. The Airport has a relatively shallow groundwater table, with the potential for groundwater to occur within 1 foot of the ground surface. The depth to groundwater may vary depending on seasonal precipitation and tidal fluctuation, but does not fall much lower than the mean level of San Francisco Bay. Groundwater monitoring occurs on a case-by-case basis at locations where contamination has been previously documented, with oversight by the San Francisco Bay Regional Water Quality Control Board, the Department of Toxic Substances Control, or the Alameda County Department of Environmental Health (Port of Oakland, 1997).

3.7.3 WATER SUPPLY AND SANITARY WASTEWATER AND TREATMENT

Potable water is supplied to OAK by EBMUD. OAK's sanitary wastewater is conveyed to and treated at the EBMUD Wastewater Treatment Plant at the eastern end of the San Francisco–Oakland Bay Bridge before it is released into San Francisco Bay. Wastewater created from airplane-washing services, terminal sanitary sewer waste, aircraft lavatory waste, and grease traps are also directed into the sanitary sewer system.

3.8 FISH, WILDLIFE, AND PLANTS

This section describes existing conditions at OAK relating to vegetation, wildlife, and fish species, including special-status species. In this document, special-status species include plant and animal species that are regulated under the federal Endangered Species Act (ESA), California ESA, or other state and local regulations. The existing site conditions, including land use and wildlife habitats, were reviewed from aerial photographs, existing planning and environmental documents, and various site reconnaissance surveys. In addition, a list of special-status species that potentially occur in the DSA was generated from a variety of existing documents and biological databases (See **Appendix D, Biological Assessment**). The DSA corresponds to the maximum area of potential direct and indirect impacts to special-status species.

3.8.1 METHODS

Database Searches

Information and an official species list on threatened, endangered, or proposed species that may occur in the vicinity of the Airport were acquired through the U.S. Fish and Wildlife Service (USFWS) Sacramento Field Office for the four U.S. Geological Survey 7.5-minute quadrangles surrounding the GSA: San Leandro (Airport location), Hayward, Oakland East, and Oakland West. In addition, the California Department of Fish and Game's California Natural Diversity Database (CNDDB) was searched for known occurrences of special-status species within a 10-mile radius surrounding the Airport. A literature review was conducted to identify the habitat requirements and distribution of these species. Species that were assessed for presence in the GSA are presented in the Biological Assessment in **Appendix D**.

Reconnaissance Surveys

Reconnaissance surveys were conducted to identify habitat types potentially suitable for federally listed species in the DSA. URS Corporation (URS) biologists conducted reconnaissance surveys in the DSA on the following dates: May 6, 2009; February 4 and 11, 2011; May 11, 2011; and January 5, 2012. In addition, biological resources surveys (species-specific) were conducted at OAK (FAA, 2008; GANDA, 2008; NRM Environmental, 2007; Port of Oakland, 1997; URS, 2002, 2005a, 2007, 2008).

Focused Species Surveys

The results of focused special-status species surveys conducted at the Airport for previous projects were reviewed. Some of the surveys included portions of the DSA and evaluated the potential presence of the western snowy plover (*Charadrius alexandrius nivosus*), California least tern (*Sternula antillarum browni*), and salt marsh harvest mouse *(Reithrodontomys raviventris*). The results of these surveys are summarized in **Section 3.8.4**.

3.8.2 BIOTIC COMMUNITIES

Based on reconnaissance surveys and aerial photograph interpretation, special-status species habitats in the DSA were mapped and digitized in a Geographical Information System. Special-status species habitats identified in the DSA include non-tidal wetlands, non-tidal waters of the U.S., the sand area, and

upland habitat. The terms "wetlands" and "waters of the U.S." used in this discussion refer to wetlands and waters within Clean Water Act jurisdiction. **Table 3.8-1** and **Figure 3.8-1** present the acreage of each special-status species habitat within the DSA, respectively.

Table 3.8-1
Special-Status Species Habitats and Acreage Within the DSA

Wildlife Habitat	Area (acres)
Non-tidal wetlands	67.56
Tidal wetlands	0.00
Non-tidal waters of the U.S.	24.09
Tidal waters of the U.S.	0.00
Sand Area	3.53
Non-native Annual Grassland	126.40

Source: URS, 2011.

Note: Non-native annual grassland does not provide suitable habitat for federally listed species. It has historically provided habitat for certain migratory birds, including western burrowing owl; however, as described above, it does not currently provide valuable habitat for these species.

Tidal and Non-Tidal Wetlands

Tidal wetlands are not present within the DSA. However, tidal wetlands are present in two areas at OAK: (1) at Fan Marsh, located on the northeastern corner of the Airport boundary, east of the northern end of Harbor Bay Parkway; and (2) vegetated areas surrounding the muted tidal lagoon located at the northwestern end of Runway 11-29, just south of Harbor Bay Parkway (**Figure 3.8-1**). At the muted tidal lagoon, the tidal flow comes from two culverts that run under the perimeter dike vehicle service road, which effectively slows or "mutes" the tidal flow both into and out of the lagoon.

Tidal influence has created a lagoon at this location, supporting suitable habitat for some plant and wildlife species (**Figure 3.8-2**). The dominant vegetation surrounding these tidal waters consists of pickleweed (*Salicornia virginica*) and saltgrass (*Distichilis spicata*). Other vegetation species include bird's foot trefoil (*Lotus corniculatus*), fat hen (*Atriplex patua*), Australian saltbush (*Atriplex semibaccata*), Mediterranean barley (*Hordeum marinum*), rabbit's-foot grass (*Polypogon monspeliensis*), sheep sorrel (*Rumex acetosella*), and curly dock (*Rumex crispus*).

Non-tidal wetlands occur in the North Field and in the South Field at OAK. In the North Field, large patches of non-tidal wetlands occur at the end of Runways 27R and 27L, and only one small patch occurs at the end of Runways 9R and 9L. In South Field, non-tidal wetlands extend along the edges of Runway 11-29. The dominant surrounding vegetation consists of pickleweed, saltgrass, and alkali heath. Other vegetation species include bird's foot trefoil, fat hen, Australian saltbush, Mediterranean barley, rabbit's-foot grass, sheep sorrel, and curly dock. These areas are predominantly located on the dredged soils that were deposited above San Francisco Bay. These areas originally may not have been covered with salt marsh (most likely tidal

mudflat, historically [Goals Project, 2000]), but as they exist today, they mostly resemble a salt marsh that has been drained. Seasonal inundation appears to be the result of both precipitation and high groundwater. Algal mats, debris lines, and water marks on vegetation are indicative of wetland hydrology. The majority of the non-tidal wetlands at the Airport and in the DSA have a seasonal hydrology in the South and North Fields during the rainy season. Topographic depressions in the DSA along the western side of Runway 11 in the South Field are identified in this report as “non-tidal wetlands” to distinguish the vegetation composition and duration of ponding from other seasonal wetlands in the vicinity of Runway 29 in the South Field, and wetlands in the North Field (**Figure 3.8-1**).

The non-tidal wetlands are dominated by pickleweed and saltgrass, with small patches of cordgrass. The non-tidal wetland features remain ponded throughout most of the year. In contrast, the seasonal wetlands are typically ponded for only a short period of the year. These seasonal wetland features artificially resemble marsh pannes (shallow pools with persistent ponding found in poorly drained portions of a tidal marsh) in both hydrology and vegetative cover. Specifically, the water level is generally shallow yet persistent throughout the year, and contains sufficiently brackish water, which favors the presence of native tidal marsh vegetation around the margins.

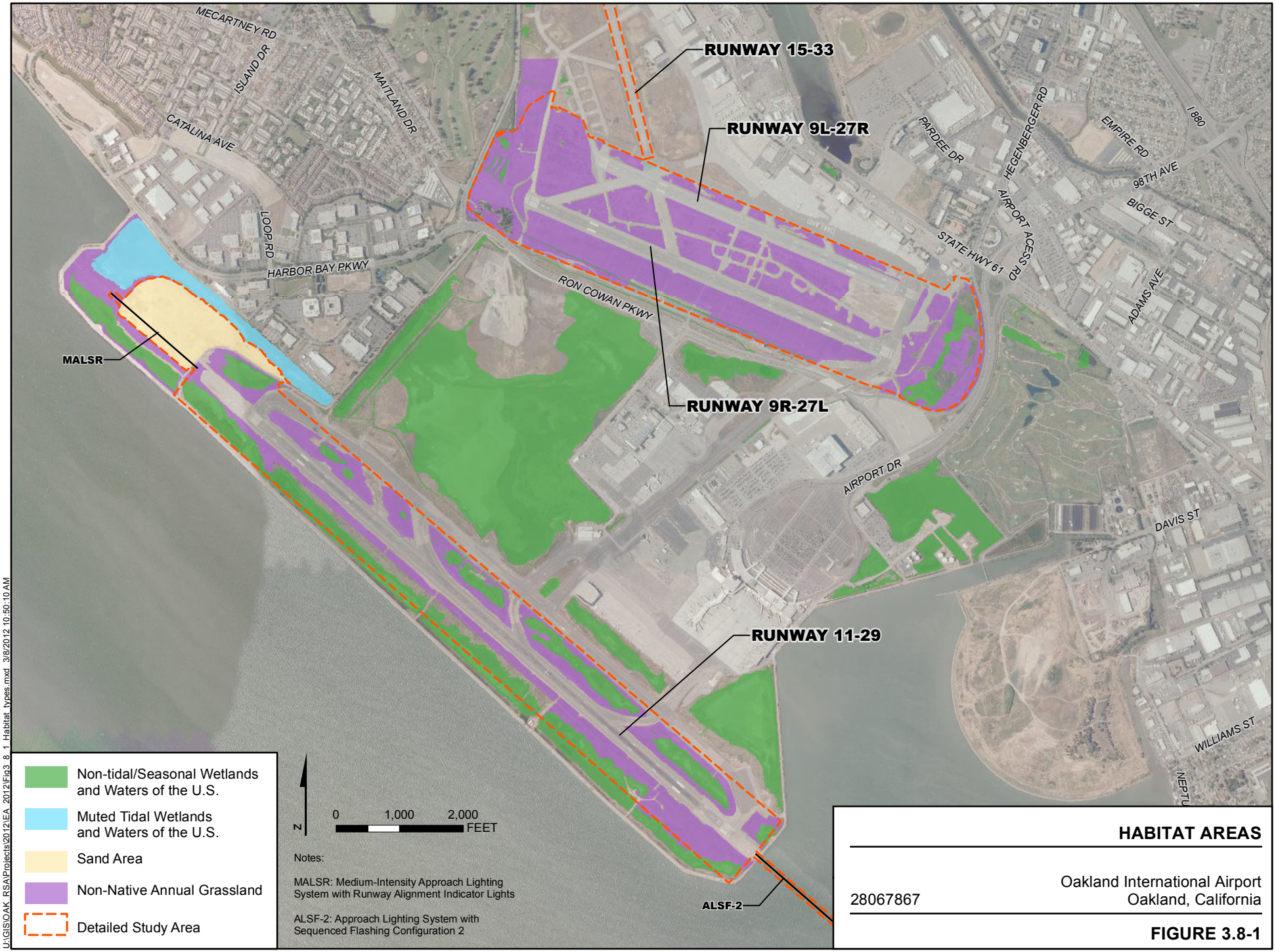
Tidal and Non-Tidal Waters of the U.S. (Non-Wetlands)

Tidal waters within Clean Water Act jurisdiction only occur in the DSA beneath the trestle supporting the Approach Lighting System with Sequenced Flashing Configuration 2 (ALSF-2) lighting equipment southeast of the Runway 29 threshold. Tidal waters just outside the DSA include the tidal lagoon north of Runway 11-29, and the tidal waters of San Francisco Bay, which are separated from OAK by the Airport's perimeter levees. However, most of the waters of the U.S. at OAK are not subject to tidal influence. Non-tidal waters of the U.S. occur in the study area. Non-tidal waters of the U.S. in North Field include one long ditch and three ponds located at the western end of Runway 9R. This ditch feature is shallow and narrow and appears to be manmade. This feature is primarily an open-water source that converges into a linear canal and is connected to the adjacent property to the west of the Airport boundary through a culvert extending under Harbor Bay Parkway. The composition of this feature varies; however, the majority of the area is open water, with portions that are seasonally devoid of water and vegetation and contain exposed mudflats, while other areas contain small amounts of emergent vegetation such as pickleweed and saltgrass.

In the South Field, non-tidal waters of the U.S. extend along both sides of the western end of Runway 11-29. These non-tidal waters of the U.S. are located behind the perimeter dike. Year-round inundation from low elevations appears to be the result of precipitation, seepage through the perimeter dike, and high groundwater.

Sand Area

In the DSA, 3.53 acres of sand area habitat are located on the western end of Runway 11. After placement of the perimeter dike, the Merritt Sand placed there from dredging in San Francisco Bay was left uncovered. Therefore, the sand area present in the study area is a direct result of human activity.



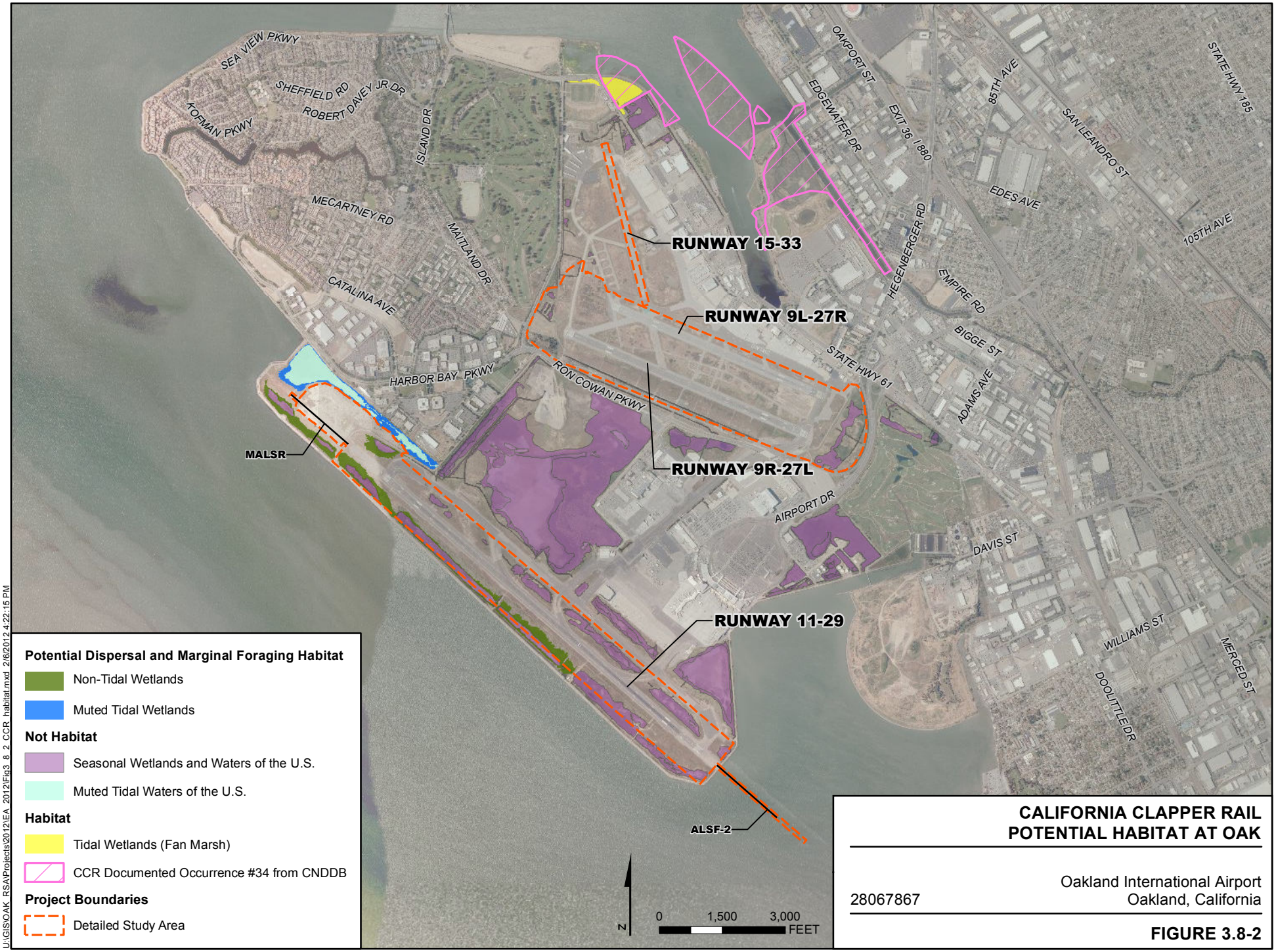
HABITAT AREAS

28067867

Oakland International Airport
Oakland, California

FIGURE 3.8-1

Source: Aerial Photo, NAIP, 2010; Habitat, URS, 2009.



CALIFORNIA CLAPPER RAIL POTENTIAL HABITAT AT OAK

28067867

Oakland International Airport
Oakland, California

FIGURE 3.8-2

Source: Aerial Photo, NAIP, 2010; Habitat, URS, 2009; CNDDB, 2011.

Upland Area

Upland habitat is a prevalent vegetation community occurring at the approach of and surrounding the runways in the DSA. This community is primarily composed of non-native annual grassland and herbaceous species such as mustard (*Brassica nigra*), fennel (*Foeniculum vulgare*), wild radish (*Raphanus sativ*us), filaree (*Erodium botrys*), bird's foot trefoil (*Lotus corniculatus*), plantain (*Plantago sp.),* Mediterranean barley (*Hordeum hystrix*), common wild oat (*Avena fatua*), ripgut brome *(Bromus diandrus*), Italian ryegrass (*Lolium multiflorum*), foxtail (*Hordeum leporinum*), Queen Anne's lace (*Daucus carota*), sweet clover (*Melilotus alba*), bristly oxtongue (*Picris echioides*), and purple thistle (*Cirsium vulgare*). Within the non-native grassland there are also small stands of coyote bush (*Baccharis pilularis*), monotypic stands of pampas grass (*Cortaderia jubata*), and large patches of invasive iceplant (*Carpobrotus* sp.). In addition, small shrubby areas are found in scattered locations dominated by coyote bush (*Baccharis pilularis*).

3.8.3 WILDLIFE

OAK is located in an urbanized area, isolated from known wildlife corridors. Wildlife living in or adjacent to the Airport boundary may use portions of the DSA for breeding, foraging, or as shelter habitat, either during species migration periods or year-round. Due to the high level of human activity at the Airport, the existing visual and noise disturbance, the Airport's maintenance activities, and the ongoing wildlife hazard management, upland areas within the Airport boundary provide marginal habitat for common wildlife species, primarily those species that are either attracted to, or tolerant of, human disturbance.

Bird species that use the tidal and non-tidal marshes, muted tidal lagoon, and channels include migratory and resident shorebirds, wading birds, waterfowl, and other water bird species. However, the ongoing U.S. Department of Agriculture Wildlife Hazard Management Program deters species from getting established for public safety reasons.[4] Pursuant to 14 CFR Part 139, an airport sponsor is required to eliminate wildlife hazards whenever they are detected. The Wildlife Hazard Management Program addresses wildlife hazards at OAK. Small mammals and marine invertebrates may also be present in the marshes or open grasslands. Common amphibians and reptiles may also be present in the tidal and non-tidal wetland habitats. However, fish species have not been found within the Airport boundary, and may only reside in the open waters outside of the Airport boundary, on the outward side of the perimeter dike. A list of common wildlife species casually observed in the Airport boundary is included in **Table C-2** in **Appendix C**.

3.8.4 SPECIAL-STATUS SPECIES

An inventory of special-status species (plants or animals that are legally protected under the Federal ESA, the California ESA, or other regulations), and designated and proposed critical habitats known or potentially occurring in the vicinity of the Airport, was created based on existing federal, state, and resource agency information. **Table C-1** in **Appendix C** lists all the special-status species with potential to occur in the vicinity of the Airport boundary. For each of the special-status species plant and wildlife species, habitat requirements were assessed and compared to habitats present within the DSA. Factors

[4] Animal Damage Control Act (7 USC 426-426c) -- The Act of March 2, 1931, (46 Stat. 1468) provided authority for investigation, demonstrations and control of mammalian predators, rodents and birds. Public Law 99-19, approved December 19, 1985, transferred administration of the Act from the Secretary of the Interior to the Secretary of Agriculture.

such as onsite habitat quality and known geographic distribution of individual species were considered in evaluating the likelihood of their occurrence within the DSA.

The original list suggested that approximately 83 special-status species could potentially occur in the vicinity of the Airport, of which 71 species were ruled out of occurring in the DSA based on the lack of suitable habitat or extensive areas converted by human development, local or regional extirpations, and/or because the DSA lies outside the species' known current geographic range.

After this background review, it was determined that a total of 12 special-status species have the potential to occur within the DSA. Those special-status plant and wildlife species with potential to occur within the DSA are addressed in the following two sections. The only federally designated critical habitat areas for fish, wildlife, or plant species in the DSA are designated critical habitat units for listed fish species in San Francisco Bay underneath the trestle supporting the ALSF-2 lighting equipment.

Special-Status Plant Species

Due to the historical locations of the plant populations and habitat suitability (**Appendix C**, **Table C-1**), the existing conditions likely preclude these species from occurring within the DSA. Rare plant and floristic surveys were conducted by the Port's consultant, Environmental Science Associates botanists, in October 1991 and during September, October, and November 1992; and by botanists from H.T. Harvey and Associates in July and August 1992 and in January 1993. While these are the most recent rare plant surveys at OAK, the Airport is planning to conduct additional rare plant surveys in summer 2012. These surveys were carried out to coincide with the normal flowering periods of the rare plant species reported at that time (Port of Oakland, 1997). Habitats and conditions that were present in the 1991 and 1992 floristic surveys mentioned previously are likely similar to those currently found at OAK, which were verified during URS site reconnaissance surveys on May 6, 2009; February 4 and 11, 2011; May 11, 2011; and January 5, 2012.

There were no individuals or populations of special-status plant species observed in the DSA during the 1991 to 1993 surveys. Several individual salt marsh gumplants (*Grindelia stricta* var. *angustifolia*), that at the time of discovery were listed as California Native Plant Society List 4 species (plants of limited distribution), were observed within the DSA (H.T. Harvey and Associates, 1993). Since the time of the discovery, the California Native Plant Society has de-listed the species and determined that protection of the species is not warranted. In addition, there are no other federally listed or state-listed plant species with the potential to occur in the DSA.

Special-Status Wildlife Species

Based on the results of background research and analysis, the following 12 special-status wildlife species have the potential to occur in the DSA. These wildlife species have been divided into federally listed wildlife species and other special-status wildlife species for the discussions below and summarized in **Table 3.8-2**.

Table 3.8-2
Special-Status Wildlife Species With Potential to Occur in the DSA

Species Common Name/Scientific Name	Federal/State/ Other Status
Federally Listed Species	
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT, MBTA/SSC
California clapper rail (*Rallus longirostris obsoletus*)	FE, MBTA/SE, FP
California least tern (*Sternula antillarum browni*)	FE, MBTA/SE, FP
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	FE/FP
Green sturgeon (*Acipenser medirostris*)	FT
Central California Coast steelhead (*Oncorhynchus mykiss irideus*)	FT
Other Special-Status Species	
Western burrowing owl (*Athene cunicularia*)	MBTA/SSC
Northern harrier (*Circus cyaneus*)	MBTA/SSC
White-tailed kite (*Elanus leucurus*)	MBTA, FP
Salt marsh common yellowthroat (*Geothlypis trichas sinuosa*)	MBTA/SSC
California black rail (*Laterallus jamaicensis coturniculus*)	MBTA/ST, FP
Alameda song sparrow (*Melospiza melodia pusillula*)	MBTA/SSC
Double-crested cormorant (*Phalacrocorax auritus*)	MBTA/WL
Longfin smelt (*Spirinchus thaleichthys*)	ST

Notes:

Federal Status

FE Endangered. Species in danger of extinction throughout all or a significant portion of its range.
FT Threatened. Species likely to become endangered within the foreseeable future.
MBTA Species protected under the Migratory Bird Treaty Act

California State Status

FP Fully protected species defined in the State of California under Sections 3511 of the Fish and Game Code.
SE Endangered. Species whose continued existence in California is in jeopardy.
ST Threatened. Species likely to become endangered within the foreseeable future.
SSC California Department of Fish and Game species of special concern.
WL California Department of Fish and Game Watch list

Habitat requirements for the special-status wildlife species identified above were compared to existing habitat present in the DSA. **Table C-1** in **Appendix C** presents a summary of the habitat requirements for these special-status wildlife species, their status, and their potential to occur in the DSA. The likelihood of any of these species occurring in the DSA was evaluated based on incidental detections during recent field visits, existing biological reports, individual species' geographic distribution, onsite habitat quality, and connectivity to existing populations. Following is a summary of their potential to occur within the DSA.

Other Special-Status Wildlife Species

The other eight special-status wildlife species identified in **Table 3.8-2** are protected by the California ESA, Migratory Bird Treaty Act, or by the California Department of Fish and Game, and may also occur in the DSA. Species with potential to occur in non-tidal wetlands include California black rail, salt marsh common yellowthroat, salt marsh wandering shrew, and Alameda song sparrow. The double-crested cormorant could occur in the non-tidal waters of the U.S. in the DSA. Non-native grasslands that may provide suitable habitat for bird species, such as the burrowing owl, white-tailed kite, and northern harrier, is also present on site. While burrowing owls occurred historically in the non-native annual grasslands (i.e., upland habitat) at OAK, burrowing owls have not been identified during protocol surveys at OAK in the past few years. The potential for all these special-status species to occur in the DSA is low given ongoing Airport operation and maintenance activities, negative findings from field surveys, and the quality of the habitat at OAK.

Special-Status Fish Species

Special status fish species could occur in the waters of San Francisco Bay that are part of the GSA. The only portion of the DSA that could support any fish species is the portion of San Francisco Bay located underneath the trestle supporting the ALSF-2 approach lighting equipment (See **Section 2.7.3**, and Photograph 9 in **Appendix D, Biological Assessment**). The RSA improvement project alternatives only include work on the trestle, and not in the water under the trestle. Federally threatened and endangered fish species with at least a minimal potential to occur in the DSA include the green sturgeon Southern Distinct Population Segment (*Acipenser medirostris*) and the Central Coast steelhead Evolutionary Significant Unit[5] (*Oncorhynchus mykiss irideus*). Designated critical habitat for those species also occur in the DSA. Essential fish habitat as defined in accordance with the Magnuson-Stevens Fisheries Conservation and Management Act is also present in the GSA and the DSA below the trestle. The longfin smelt (*Spirinchus thaleichthys*), which is listed as a threatened species by the State of California, has at least minimal potential to occur in the GSA and DSA.

Federally Listed Wildlife Species

Four of these special-status wildlife species that are federally listed have the potential to occur in the DSA: California clapper rail (*Rallus longirostris obsoletus*), western snowy plover (*Charadrius alexandrinus nivosus*), California least tern (*Sterna antillarum browni*), and salt marsh harvest mouse (*Reithrodontomys raviventris*). Critical habitat for these species does not occur within the DSA. The life history, previously documented occurrences, critical habitat, and potential habitat at OAK for each of these four species are summarized in the following sections and in **Appendix D**.

[5] The Federal Register (50 CFR Part 226) uses the term "Central California Coast steelhead Evolutionary Significant Unit," but the National Marine Fisheries Service letter to FAA, dated March 10, 2010, uses the term "Central California Coast steelhead Distinct Population Segment" (in the Biological Assessment, included in this document in **Appendix D**). This document uses the term Evolutionary Significant Unit.

California Clapper Rail (*Rallus longirostris obsoletus*)

Life History

One of three distinct subspecies of clapper rail that occur in California, the California clapper rail was federally listed as endangered in 1970 (Federal Register 35:16047). This bird is endemic to tidal and brackish wetlands of the San Francisco Estuary, including the northern, central, and southern regions of San Francisco Bay; Carquinez Strait; and portions of Suisun Bay. California clapper rails are restricted to densely vegetated tidal marshes that provide nesting and foraging habitat relatively free of predators. Foraging habitat for California clapper rails is typically the edge of tidal mudflats and slough channels, where prey items such as mussels, clams, crabs, worms, and other invertebrates are found. As an opportunistic species, the California clapper rail may also prey on fish, carrion, and small rodents when the opportunity arises. Nesting habitat consists of dense stands of tidal vegetation that are adjacent to preferred foraging areas and that also contain suitable nest-building locations.

Dispersal of rails within the estuary is poorly understood, but in general, juvenile rails seem to disperse to new tidal marshes during the fall to establish breeding territories. A male radio-marked California clapper rail dispersed 27.8 miles from Colma Creek in the South Bay (San Mateo County) to McInnis County Park in San Pablo Bay (Marin County) during the breeding season (Casazza et al., 2008). Migratory rails are unlikely to be found in areas that do not contain both breeding and foraging habitat. Mature and relatively young tidal wetlands displaying a high degree of channelization (tidal slough density and penetration into the interior extent), limited predator access routes (generally limited by dense vegetation and/or open channels), and a dense mosaic of mid- to upper-marsh-zone vegetation used for cover from predators and nest building provide the best habitat for this species.

The California clapper rail breeding season begins in February, with the peak nesting period lasting from April through May, and extending through August 31 (Raabe, 2011). Adults are monogamous for life, show a high degree of site fidelity, and are tenacious defenders of their territory. Nests are typically mound-shaped and built in a thicket that is tall enough to obscure aerial predators and prevent inundation during high-tide events. Nests can occur in invasive or native cordgrass, marsh gumplant (*Grindelia stricta*), pickleweed, or in bulrush (*Scirpus* sp.), and are typically found within a few feet of a tidal slough edge. Primary threats to this species include habitat loss, introduced and native predators, lack of high-tide refugia, and stochastic events, among others (Albertson and Evens, 2000).

Critical Habitat and Recovery Plan

Population recovery and habitat restoration goals for this species are outlined in the *Draft Recovery Plan for the Tidal Marsh Ecosystems of Northern and Central California* (USFWS, 2010). OAK is located in the Central/San Francisco Bay Recovery Unit, Segment K, of this Draft Recovery Plan (USFWS, 2010). No critical habitat has been identified for the California clapper rail.

Previously Documented Occurrences

California clapper rail documented populations within a 10-mile radius of OAK include the San Leandro Bay wetland complex to the northeast (within 1 mile); Elsie Roemer Bird Preserve immediately northwest

of the Airport (within 2 miles); the Hayward Shoreline wetland complex to the south (within 8 miles); and at the Emeryville Crescent to the north (within 8 miles). According to the most current and extensive survey records, collected by the San Francisco Estuary Invasive Spartina Project, the existing population in the San Leandro Bay complex (Arrowhead Marsh) is comprised of between 38 and 54 individuals (ISP, 2010). The Elsie Roemer Bird Sanctuary appears to support one to two individuals, although nesting habitat has been largely eradicated in recent years (ISP, 2010). The Hayward Shoreline complex, which extends from Highway 92 north to Oyster Bay Regional Shoreline, has between 51 and 76 individuals (ISP, 2010). At Emeryville Crescent, just north of the Bay Bridge, between 8 and 10 individuals were detected (ISP, 2010). A recent nearby occurrence includes CNDDB Occurrence #34, primarily at Arrowhead Marsh, where California clapper rails were identified on October 8, 2010, as shown on **Figure 3.8-2** (CDFG, 2011). No California clapper rails have been detected in the DSA.

Potential to Occur

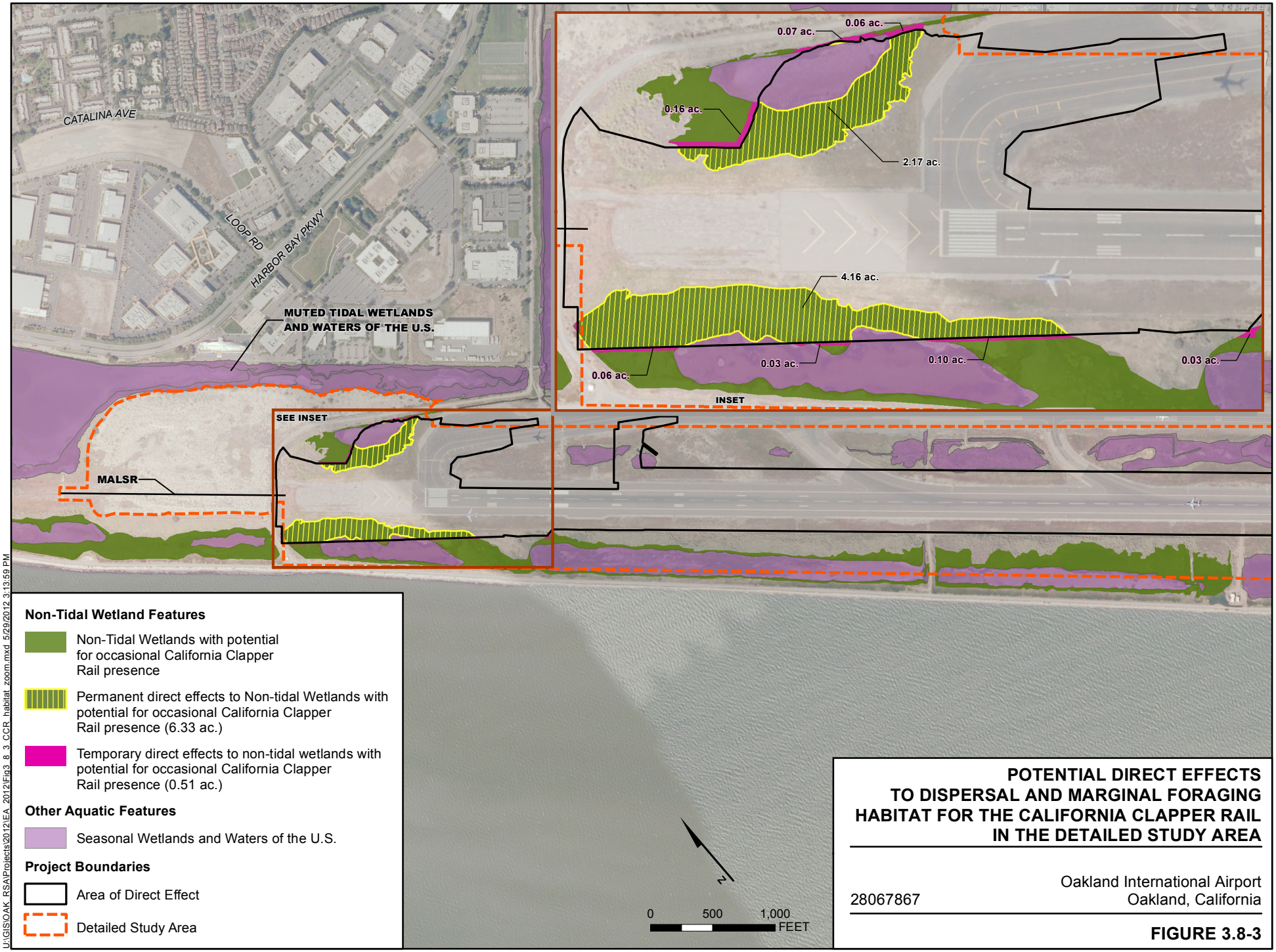
In spite of the presence of potential dispersal and marginal foraging habitat, the non-tidal wetlands in the DSA do not provide nesting or breeding habitat for the California clapper rail. Three rounds of protocol-level surveys conducted by the Invasive Spartina Project in 2010 did not detect California clapper rail in the non-tidal South Field wetlands (ISP, 2010). These non-tidal wetlands lack the channelization, tidal influence, prey base, and vegetative structure that typically define nesting and foraging habitat for this species. Fledged juvenile California clapper rails from nearby source populations in the San Leandro Bay, to the north, and Hayward Regional Shoreline, to the south, may sporadically attempt to forage in these non-tidal wetlands, but are unlikely to persist due to the lack of suitable prey, absence of protective vegetative cover, and conspicuous exposure to predators. In addition, superior habitat throughout the region is likely to be more attractive to this species. **Figures 3.8-2** and **3.8-3** show the non-tidal wetlands that contain low-growing pickleweed and a single small, sparse stand of invasive *Spartina* grass. Based on verbal communications with the USFWS, juvenile California clapper rails could potentially disperse and land in the non-tidal wetlands, but this habitat would only provide marginal foraging opportunity and would not be used for breeding.

Migratory juvenile California clapper rails typically disperse during the fall and winter, when they become vulnerable to spring tide events and exposure to predators. Potential predators at OAK include the red fox, feral cats, raccoons, striped skunk, and Norway rats. In addition, the wildlife habitats at OAK are surrounded by vehicle service roads, runways, riprap, and maintained vegetated or landscaped areas that provide access and cover for these predators.

Western Snowy Plover (*Charadrius alexandrinus nivosus*)

Life History

The western snowy plover, federally listed as threatened in 1993 (Federal Register 58:12864), is a shorebird species that occurs from British Columbia, Canada, south to Baja California, Mexico. During the fall, inland populations of plovers migrate to the coast to overwinter. These migrants return to inland regions in the spring to breed. A distinct sub-segment of the larger regional population of western snowy plovers resides year-round in the San Francisco Estuary.



POTENTIAL DIRECT EFFECTS TO DISPERSAL AND MARGINAL FORAGING HABITAT FOR THE CALIFORNIA CLAPPER RAIL IN THE DETAILED STUDY AREA

28067867

Oakland International Airport
Oakland, California

FIGURE 3.8-3

Source: Aerial Photo, NAIP, 2010; Habitat, URS, 2009; CNDDB, 2011.

During the breeding season—from March 1 through September 14 (Raabe, 2011) (see the Biological Opinion, included in this document in **Appendix D**) — these birds are largely restricted to inactive salt crystallizer ponds, levees, salt pannes, and sand dunes, although the latter habitat type is less common in San Francisco Bay. Western snowy plovers prefer this type of habitat because it provides open, sandy, lightly vegetated areas in which to build their scrape nests. These nests are simple scrapes on the ground, lined with bits of plant matter, shells, and other nearby materials that help to conceal the nest from predators. Western snowy plovers, much like other shorebirds, prey on benthic invertebrates such as polychaete worms and brine fly larvae, so nesting locations must also be proximal to foraging areas. Threats to this species include habitat loss; introduced predators such as feral cats, red fox, rats and native predators such as raccoons, northern harrier, and gulls; and disturbances close to their preferred nesting habitat that frequently occur near areas of human activity, such as public beaches or on top of levee roads.

Critical Habitat and Recovery Plan

Population recovery and habitat restoration goals for this species are outlined in the *Final Western Snowy Plover Recovery Plan* (USFWS, 2007). OAK is located in Recovery Units CA-30A (i.e., sand area) and CA-30B (western end of Runway 11-29) (see the Biological Opinion, included in this document in **Appendix D**) (USFWS, 2007). Critical habitat for this species is currently being updated and is not present in the DSA[6].

Previously Documented Occurrences

Regional western snowy plover breeding and wintering habitat occurs at several locations in the vicinity of OAK, including Alameda Point (formerly Naval Air Station Alameda), Elsie Roemer Bird Sanctuary in Alameda, and the Hayward regional shoreline. Detailed maps of identified western snowy plover habitat in the aforementioned locations can be found in the *Final Western Snowy Plover Recovery Plan* (USFWS, 2007).

Various historical occurrences of this species were noted in the sand area at the northwestern end of Runway 11-29 at OAK from 1988 through 1999, but observations in the last 12 years have not identified this species at OAK. In 1988, four nesting pairs of western snowy plovers were observed in the sand area (ESA, 1988). In 1996, surveys conducted by Laura Feeney identified a total of 12 to 16 adult breeding snowy plovers in Recovery Unit CA-30 (i.e., the sand area at OAK) as cited by USFWS (2007). On May 26, 1999, a group of five western snowy plovers were detected during evening field surveys in muted tidal lagoon in the South Field (URS, 1999). Biological surveys by URS biologists in 2002, 2007, and 2009 did not detect western snowy plovers or their nests in or near the sand area.

Potential to Occur

The sand area in the DSA (**Figure 3.8-1**) provides potential suitable habitat for nesting western snowy plovers, and is identified as Recovery Unit CA-30 in the *Final Western Snowy Plover Recovery Plan* (USFWS, 2007). The sand area is composed of dredged Merritt Sand excavated from beneath San Francisco Bay during a planned (but not realized) extension of Runway 11-29. There are no recent documented snowy plover nests

[6] The goal of the recovery units is to manage known breeding and wintering locations. Recovery units differ from critical habitat, which is a geographic region containing features essential for the conservation of the species that may require special management or protection.

at OAK. However, it is possible that nesting has occurred at this location without detection. Based on the presence of suitable nesting and wintering habitat in the sand area, this species may occur in the DSA.

California Least Tern (*Sternula antillarum browni*)

Life History

The California least tern was federally listed as endangered in 1970 (Federal Register 35:16047) and is one of three recognized subspecies of least tern found in North America (Ehrlich et al., 1988). Least terns are migratory, returning to colonial nesting locations throughout California, including the San Francisco estuary, starting approximately April 15. Nesting activities are typically completed by August 15 (Raabe, 2011) (see the Biological Opinion, included in this document in **Appendix D**), followed by migration to wintering sites in Central and South America from late August to mid-September.

Two complete breeding cycles occur during the nesting season: from May through June, and from July through August. Suitable nesting habitat—typically large, sparsely vegetated expanses of land composed of a sandy or gravelly substrate—is extremely limited due to shoreline development and habitat loss. Furthermore, least tern nests are extremely vulnerable to predation, so intensive predator management is necessary for colony breeding success (USFWS, 1980). Nesting colonies are located adjacent to estuarine hunting grounds that contain their preferred prey: small schooling fish such as northern anchovy and herring (Goals Project, 2000). Primary threats to this species during the breeding season include the limited availability or loss of suitable nesting habitat, and nesting colony proximity to introduced and native nest predators. Potential predators include terrestrial mammals and avian predators.

Critical Habitat and Recovery Plan

Population recovery and habitat restoration goals for this species are outlined in the *California Least Tern Recovery Plan* (USFWS, 1985). OAK has been identified in the Recovery Plan with the goal to "preserve and manage nesting areas for currently insecure colonies" of the California least tern (USFWS, 1985). Critical habitat for this species has not been designated.[7]

Previously Documented Occurrences

The largest least tern colony in the region occurs 6 miles north of OAK, at Alameda Point (former Naval Air Station Alameda). At this location, least terns nest in open, sandy habitat in the former airfield, and may occasionally forage near OAK. Census efforts in 2000 estimated the range of breeding pairs to be between 282 and 301 (Patton, 2002). An additional small colony was recently established approximately 8 miles south of OAK, at the Hayward Regional Shoreline, where a total of 15 nests were counted in this location in 2005, on a small island in a larger tidal marsh complex (Riensche, 2007). Historical records indicate that there was a colony on the northern end of Bay Farm Island, in the City of Alameda, in 1975 (CDFG, 2011). However, this colony was displaced during the construction of the Harbor Bay Isle housing development.

[7] The goal of the recovery units is to manage known breeding and wintering locations. Recovery units differ from critical habitat, which is a geographic region containing features essential for the conservation of the species that may require special management or protection.

A timeline of California least tern occurrences at OAK is summarized below:

- 1971 to 1992: CNDDB Occurrence #3 for California least tern identified several pairs of the species multiple times at OAK.
- 1982 to 1990, and 1992: An active nesting colony was present at OAK. The size of the colony was variable, from a maximum of 80 breeding pairs in 1983 to a minimum of fewer than 20 by 1987 (BFS, 1995).
- 1988: California least tern nests were observed on the sand area at the northern end of Runway 11-29 (ESA, 1988). They used the nearby tidal lagoon for feeding. The breeding colony varied in size between 14 and 65 pairs (ESA, 1988).
- 1992: Two pairs were documented nesting at OAK "where there is sparse vegetation and rolling sand dunes" (CDFG, 2011). The Recovery Plan for the California least tern identified OAK as one of the sites with historical numbers of least terns prior to 1983 (USFWS, 1985). No subsequent nesting efforts by California least terns have been documented at OAK after 1992.
- May 4 through August 29, 1994: a maximum of 31 California least terns displaying courtship behavior were observed during intensive breeding colony surveys, but no nests were observed (BFS, 1995). However, biologists detected approximately 15 California least terns roosting and foraging near the tidal lagoon at the northern end of Runway 11-29 on April 30, 2002 (URS, 2002).
- July 11 and August 13, 2007: A group of three California least terns were observed roosting and foraging near the tidal lagoon (NRM Environmental, 2007).

Potential to Occur

The sand area in the DSA, located at the northwestern end of Runway 11-29, is potentially suitable for nesting California least terns. The last documented nesting activity in the Airport is from 1992. However, based on the proximity of the DSA to the existing nesting colony at Alameda Point in Alameda, there is potential for least terns to use the sand area in the DSA, as well as the shoreline areas, for nesting. Based on the presence of suitable nesting habitat in the sand area, this species may occur in the DSA.

Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*)

Life History

The salt marsh harvest mouse, federally listed as endangered in 1970 (Federal Register 35:16047), is restricted to tidal saline-emergent wetlands in the San Francisco estuary ecosystem and has adapted to use diked (i.e., areas cut off from tidal influence by a manmade structure) saline emergent wetlands since humans have built dikes in the San Francisco Bay. The salt marsh harvest mouse spends the majority of its life in the vegetation that dominates the upper-elevation tidal zone, such as pickleweed, alkali heath (*Frankenia salina*), and saltgrass. The salt marsh harvest mouse forages on the leaves, stems, and seeds of tidal marsh flora and does not require a fresh water source because it can tolerate drinking

brackish or saline water. Because the salt marsh harvest mouse does not build burrows for cover, nests are built of dried vegetative matter and are tucked into the marsh understory.

Two distinct subspecies are currently recognized: *R. r. halicoetes* and *R. r. raviventris*. The southern subspecies *(R. r. raviventris)* is known to occur in the marshes located in southern San Francisco Bay, along the peninsula in San Mateo County, and in Contra Costa and Alameda counties. The northern subspecies *(R. r. halicoetes)* is known to occur primarily in tidal marshes and riverine systems of San Pablo Bay and the Suisun Delta. Habitat loss and fragmentation, invasive species, predation, lack of adequate upland refugia during periodic high-tide events, sea-level rise due to climate change, and genetic bottlenecking (i.e., population inbreeding) of geographically isolated subpopulations are all considered risk factors for this species' continued survival (Goals Project, 2000).

Critical Habitat and Recovery Plan

Efforts to protect and restore habitat for this species are outlined in the *Draft Recovery Plan for the Tidal Marsh Ecosystems of Northern and Central California* (USFWS, 2010). OAK is located in the Central/San Francisco Bay Recovery Unit, Segment K, of this Draft Recovery Plan (USFWS, 2010). No critical habitat has been designated for the salt marsh harvest mouse.

Previously Documented Occurrences

There are no current or historical CNDDB records of the salt marsh harvest mouse within the Airport boundary. The salt marsh harvest mouse was not detected during six trapping efforts at OAK. These trapping efforts include surveys for salt marsh harvest mouse in 1985, 1990, 1991, 2000, and 2001. Trapping efforts in the 1980s through 2003 consistently detected salt marsh harvest mouse presence at Robert's Landing, approximately 8 miles south of OAK. Six salt marsh harvest mice were captured in 1982 at Emeryville Crescent, 8 miles north of OAK, during a 540-trap night event.

The most current records of salt marsh harvest mouse in the San Leandro Bay are from collection efforts conducted between 1910 and 1938 at Arrowhead Marsh (CNDDB Occurrence #59). Suitable salt marsh harvest mouse habitat is present in some of the wetland sites of San Leandro Bay, such as Arrowhead Marsh, but no trapping efforts have been conducted since 1938 to confirm this species presence. However, the East Bay Regional Park District assumes that salt marsh harvest mice are currently present at Arrowhead Marsh (Bell, 2010).

Potential to Occur

All of the documented occurrences of salt marsh harvest mouse in the region are outside of the Airport boundary; there are no records of this species in the DSA or in the Airport. Ongoing, multi-year intensive trapping efforts conducted in habitat within the OAK boundary between 1985 and 2001 did not result in even a single salt marsh harvest mouse detection. The consistent and long-term negative findings of salt marsh harvest mouse trapping efforts is likely due to the absence of emigration pathways between existing populations of the salt marsh harvest mouse and identified habitat at OAK.

An additional relevant ecological factor at OAK is the lack of historical habitat. Habitat considered sufficient for this species has developed on fill placed in areas that were historically open water. The salt

marsh harvest mouse is presumed to be absent from these areas because these wetlands developed after the 1950s on fill material.

URS biologists conducted a habitat assessment for the salt marsh harvest mouse within the DSA on January 5, 2012 (**Appendix D**). Based on the January 5 habitat evaluation, wetlands in the DSA where pickleweed is present are generally sparse and lack the vegetative structure and cover typical of habitats occupied by the salt marsh harvest mouse. Wetlands within the DSA that are potentially suitable for the salt marsh harvest mouse are all located in the South Field, primarily in the wetlands adjacent to Runway 11 (**Figure 3.8-4**). Wetland habitats within the North Field are not suitable habitat for the salt marsh harvest mouse based on the criteria utilized in the assessment. All of the pickleweed stands at OAK are small, fragmented, patchy and surrounded by disturbed habitats.

The nearest known population of salt marsh harvest mouse is at Roberts Landing, more than 8 miles to the south. Habitats in the vicinity of OAK that are potentially suitable for the salt marsh harvest mouse include the San Leandro Bay wetland complex 3 miles to the east; the Hayward Shoreline wetland complex 4.5 miles to the south; and the Emeryville Crescent shoreline 1.6 miles to the north. Barriers to movement of the salt marsh harvest mouse from these areas include open water, major roadways, the Airport perimeter dike, and the Airport runways. There are no continuous corridors of suitable habitat for salt marsh habitat between known salt marsh harvest mouse populations and existing habitat fragments at the Airport. Therefore, it is highly unlikely that the salt marsh harvest mouse occurs in either the North Field or South Field of OAK.

3.9 WETLANDS AND OTHER WATERS OF THE U.S.

3.9.1 INTRODUCTION

This section refers to the wetlands and waters of the U.S. present in the DSA. Please refer to **Section 3.8.2** for a detailed description of these wetlands features, and to **Figure 3.9-1**. The DSA corresponds to the maximum area of potential direct and indirect impacts to wetlands. Waters within Clean Water Act jurisdiction at OAK include wetlands and open water areas known as "other waters," collectively described as waters of the U.S. in this EA.

The U.S. Army Corps of Engineers conducted a field verification of wetlands and waters of the U.S. at OAK on October 28, 2009, and the jurisdictional determination was approved by the U.S. Army Corps of Engineers on March 15, 2011. This is the most updated jurisdictional delineation at the Airport and it is valid for 5 years.

3.9.2 WETLANDS AND WATERS

Nearly all delineated wetlands and waters of the U.S. at OAK can be described as “human induced” or “modified” wetlands. These wetlands are a result of human activities necessary for the Airport’s development and maintenance. Over the period of time the Airport has been in operation, the conditions could now be considered “normal circumstances” for the Airport. Extended stormwater retention near runways may have played a role in the formation of these wetlands. The low elevation, low drainage gradient, and high groundwater table combine to keep these areas saturated or inundated, allowing

hydric soils to form and wetland vegetation to grow. The amount of wetlands located in the DSA is detailed in **Table 3.9-1**.

OAK consists of a highly modified section of land that is surrounded by the cities of Alameda, Oakland, and San Leandro. Land that currently supports OAK was mapped in 1855 as salt marsh, mudflat, and open water of San Francisco Bay. Changes to the salt marsh and mudflat have occurred through the conversion and development of OAK in two major phases: construction of North Field and construction of South Field.

Table 3.9-1
Wetlands and Waters of the U.S. within the DSA

Wetland or Waters Type	Areas in DSA (acres)
Tidal wetlands	0.0
Non-tidal wetlands	67.56
Tidal waters of the U.S.	0.0
Non-tidal waters of the U.S.	24.09
Total	**91.65**

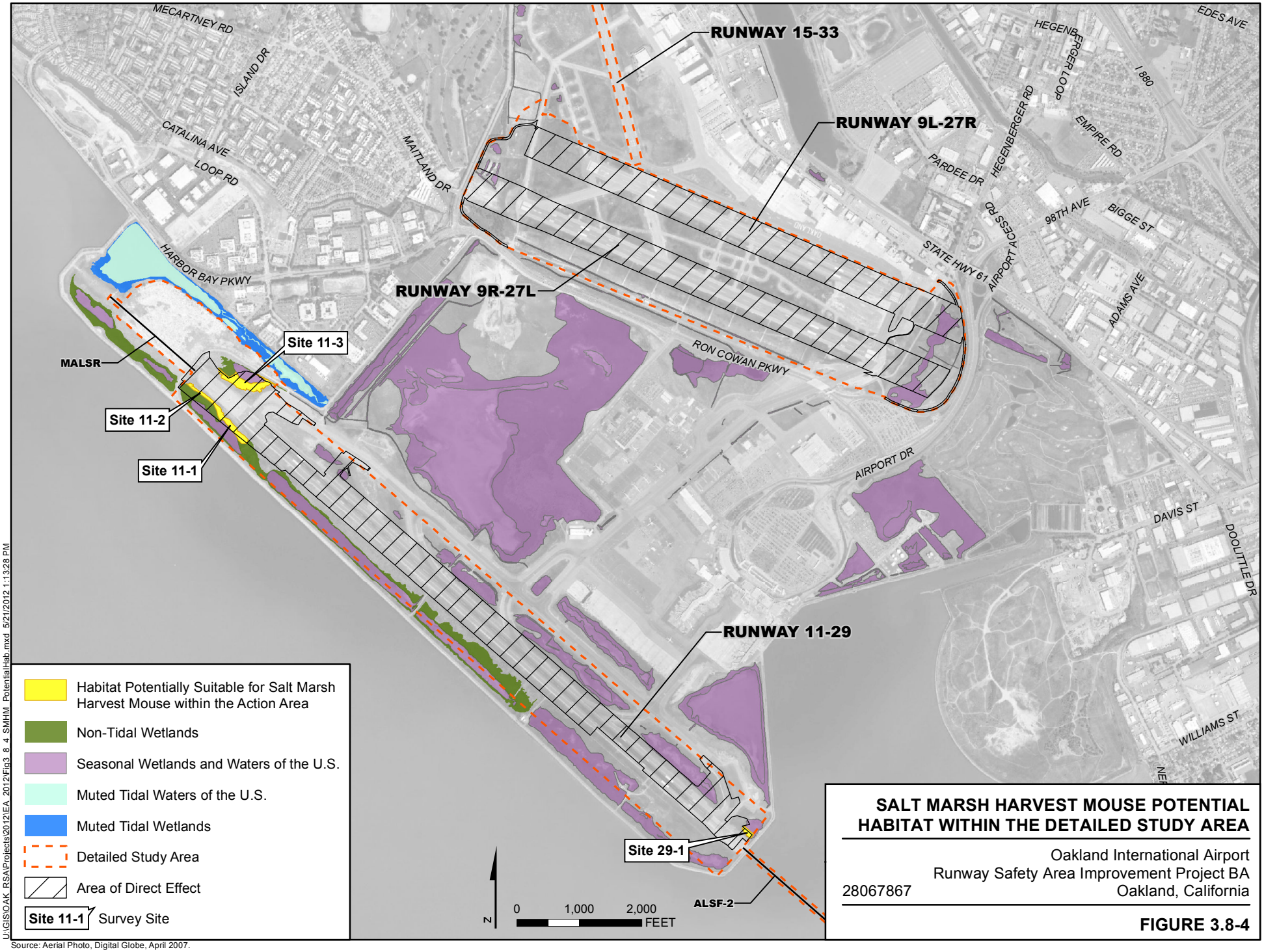
Note:
DSA = Detailed Study Area
Sources: Port of Oakland, 2007; Huffman-Broadway Group, 2007; Heinze, 2008.

OAK currently consists of a variety of wildlife habitats (see **Section 3.8**), including tidal and non-tidal wetlands, and tidal and non-tidal waters of the U.S., including mudflats, a muted tidal lagoon, and open water. The vast majority of these areas within the Airport are not subject to tidal influence, except for two areas: the tidal lagoon at the northwestern end of Runway 11-29, and the fan marsh located in the northeast of the Airport in North Field. These habitats may be used by a variety of common species, as well as several special-status animal species. Wetlands at OAK are influenced by a variety of human activities that are necessary for Airport maintenance, such as regular mowing, and providing for drainage and management of stormwater. Non-tidal wetlands are present in the DSA. Descriptions of wetland plant communities are provided in **Section 3.8.2**.

3.10 FLOODPLAINS

OAK is depicted on the Federal Emergency Management Agency Flood Insurance Rate Map Community Panel Numbers 06001C0251G, 06001C0252G, 06001C0253G, and 06001C0254G. All maps have an effective date of August 3, 2009 (FEMA, 2009a, 2009b, 2009c, and 2009d). Most of the current Airport facilities are in Zone X, which is designated as an area of minimal flooding outside the 100-year floodplain, as shown on **Figure 3.10-1**.

The Airport is protected from San Francisco Bay flooding by a perimeter dike. The estimated base flood elevation for the San Francisco Bay is approximately 7 feet National Geodetic Vertical Datum (FEMA, 1982a). The top elevation of the perimeter dike ranges from approximately 11 to 12.8 feet National Geodetic Vertical Datum (URS, 2009). The dike is currently being studied for possible improvements.

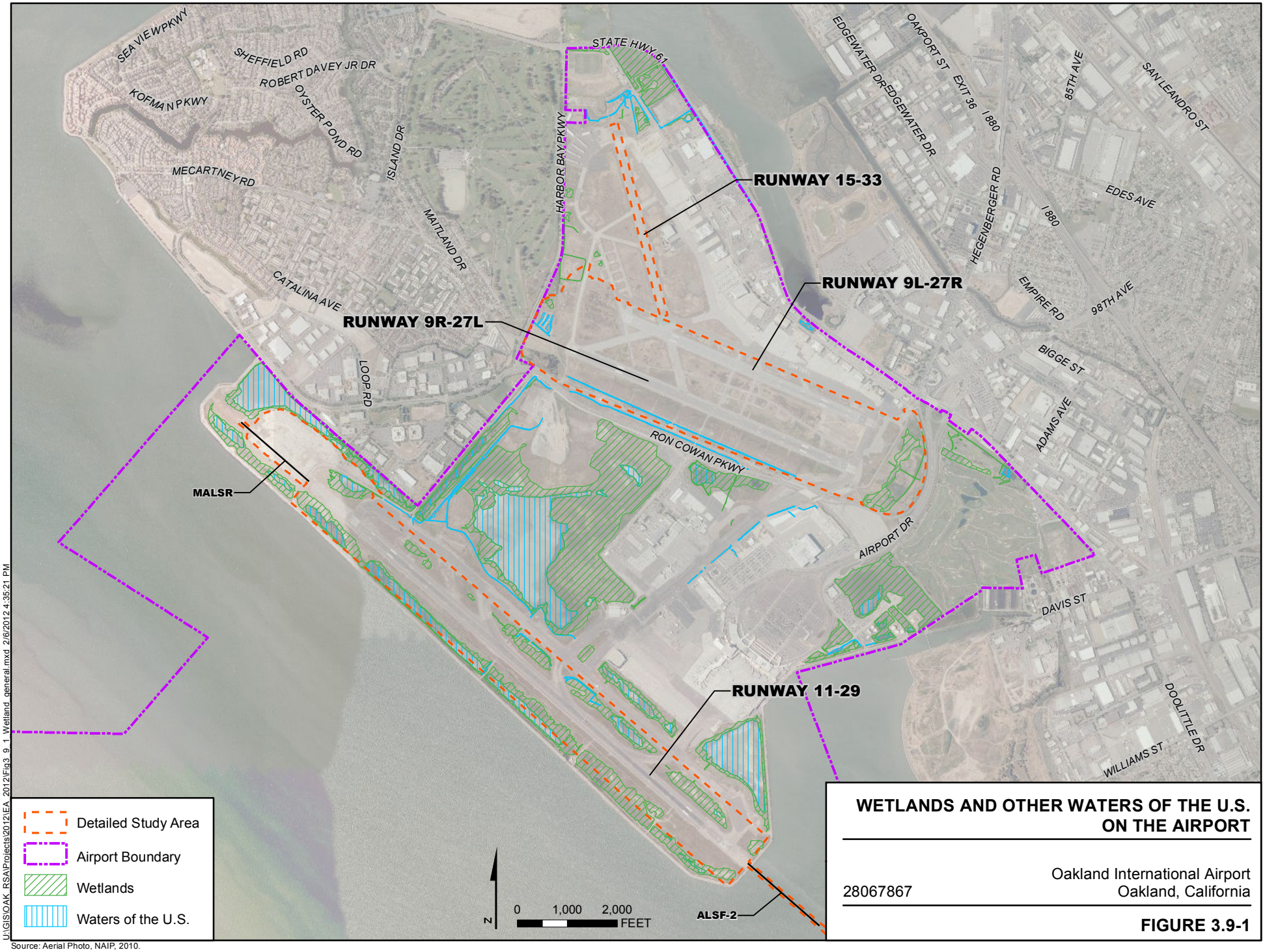


SALT MARSH HARVEST MOUSE POTENTIAL HABITAT WITHIN THE DETAILED STUDY AREA

Oakland International Airport
Runway Safety Area Improvement Project BA
28067867 Oakland, California

FIGURE 3.8-4

Source: Aerial Photo, Digital Globe, April 2007.



WETLANDS AND OTHER WATERS OF THE U.S. ON THE AIRPORT

28067867

Oakland International Airport
Oakland, California

FIGURE 3.9-1

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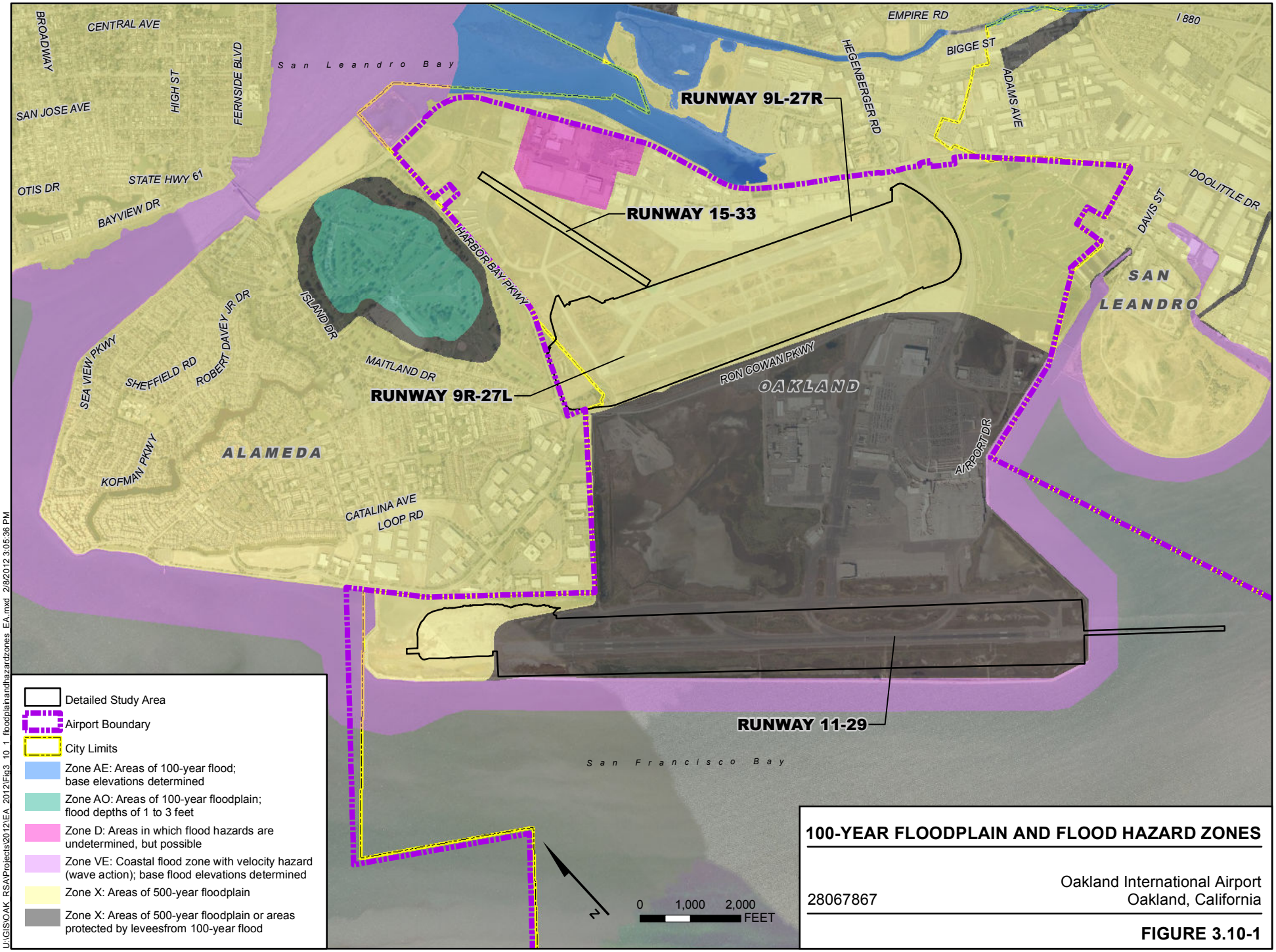
Source: Aerial Photo, NAIP, 2010.



100-YEAR FLOODPLAIN AND FLOOD HAZARD ZONES

28067867

Oakland International Airport
Oakland, California

FIGURE 3.10-1

Source: Aerial Photo, NAIP, 2010; Flood Zones, FEMA Proof DFIRM Database, January 27, 2009.

3.11 COASTAL RESOURCES

The San Francisco Bay Conservation and Development Commission (BCDC) is the agency responsible for administering the provisions of the Federal Coastal Zone Management Act of 1972 under the State of California's approved coastal zone management program. BCDC's coastal management program is based on the provisions and policies of the McAteer-Petris Act, the Suisun Marsh Preservation Act of 1974, the San Francisco Bay Plan (Bay Plan [BCDC, 2008]), the Suisun Marsh Protection Plan, and the BCDC's administrative regulations.

BCDC's jurisdiction covers all tidal areas within the San Francisco Bay, including a shoreline band extending inland 100 feet from the mean high water line. **Figure 3.11-1** shows the BCDC's jurisdiction relative to the DSA. Within this area, BCDC has permitting responsibility for all Bay filling, dredging, and related shoreline developments. BCDC's jurisdiction at OAK extends from the San Francisco Bay to the mean high water line, and includes the first 100 feet inland from the shoreline band. These areas include Airport-related facilities, such as the approach lighting system and portions of the localizer antenna for Runway 29 that are mounted on trestles extending into San Francisco Bay. The length of the San Francisco Bay shoreline within OAK's boundary is approximately 4.5 miles.

The BCDC's Bay Plan was originally adopted in 1969, and has been periodically updated to guide future uses of San Francisco Bay and the shoreline (BCDC, 2008). The Bay Plan includes policies that address San Francisco Bay resources, uses of the shoreline, and filling of San Francisco Bay, as well as maps that apply the plan policies to current uses of the San Francisco Bay shoreline. BCDC requires consistency with Bay Plan policies for the issuance of BCDC permits for filling, dredging, and shoreline development. (See the San Francisco Bay Plan for additional details regarding applicable policies to the San Francisco Bay resources.)

3.12 HISTORIC ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance.

3.12.1 COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In 1966, Congress passed the National Historic Preservation Act, which required all federal agencies to assess the effects of any agency-sponsored undertaking on cultural resources. Under NEPA (42 United States Code Sections 4321 through 4327), federal agencies are required to consider potential environmental impacts and appropriate mitigation measures for projects with federal involvement. The federal agencies' process for consultation is established by regulations outlined in 36 CFR Part 800, as identified in 36 CFR § 60.4.

There are four evaluation criteria to determine a resource's eligibility to the National Register of Historic Places. These evaluation criteria, listed in **Section 4.12**, are used to assist in determining what properties, if any, should be considered for protection from destruction or impairment resulting from project-related activities (36 CFR § 60.2).

3.12.2 AREA OF POTENTIAL EFFECTS

For the RSA Improvement Project alternatives, FAA used the boundaries of the entire area that would have physical disturbance to delineate the Area of Potential Effects (APE). FAA determined these boundaries through consultation with the Port of Oakland on the extent of the RSA Improvement Project. The RSA Improvement Project would not change the number or type of aircraft using the Airport, and would not result in a change in the indirect effects of aircraft noise or vibration. Therefore, FAA delineated a direct effects APE only, including only areas where physical disturbance would occur. **Figure 3.12-1** shows the APE for the proposed RSA Improvement Project.

The APE for the RSA Improvement Project is discontinuous, and includes separate runways because no construction work associated with the RSA Improvement Project occurs in the area between the North Field and South Field runways. The APE includes the various demolition, construction, and navigational aid work described in **Chapter 1** of this EA, such as the runway shifts, filling of portions of non-tidal waters of the U.S. adjacent to the runways to meet RSA standards, repainting threshold markings, relocating and constructing vehicle service roads and taxiways, and making modifications to existing Navigational Aid Systems.

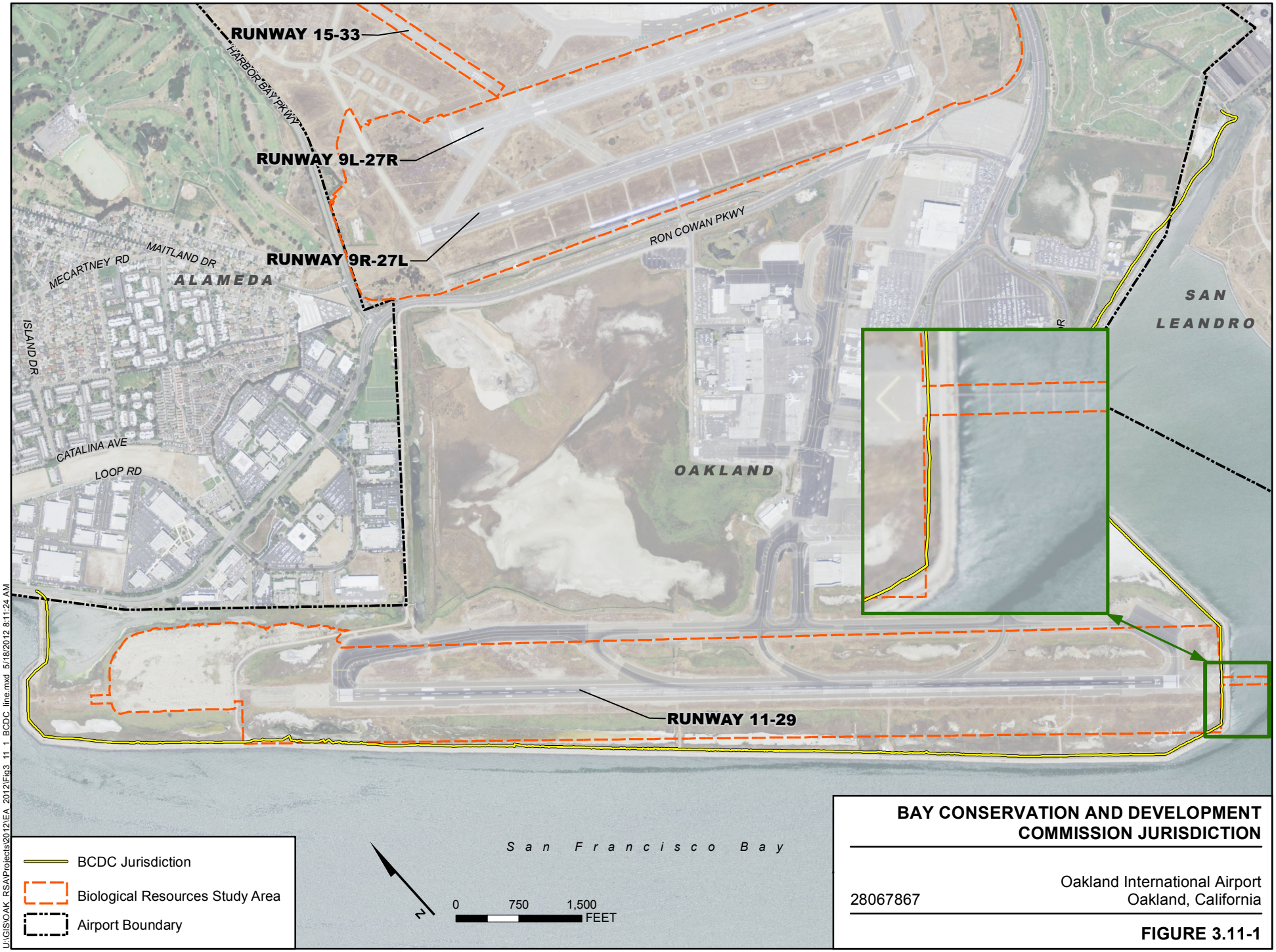
3.12.3 ARCHAEOLOGICAL RESOURCES

Record Search and Literature Review

In May 2009, a record search and literature review for the entire Airport property was received from the Northwest Information Center (NWIC) of the California Historic Resource Information System at Sonoma State University (NWIC File No. 08-1361). Due to changes in the project description, a supplemental record search was requested from the NWIC on September 14, 2011 (NWIC File No. 11-0254) for the entire Airport property, with a quarter-mile search radius. The NWIC serves as a regional clearinghouse of the State of California Office of Historic Preservation. The purpose of the record searches was to ascertain whether any cultural resources had been previously identified in or adjacent to the Airport property, and to identify any previous cultural resources investigations that may have included the current APE. The requested research included a review of ethnographic and historic literature and maps; federal, state, and local inventories of historic properties; archaeological base maps and site records; and survey reports on file at the NWIC.

The supplemental record search results did not identify any new or previously conducted archaeological investigations, or sites that were not identified as part of NWIC File No. 08-1361. The record searches revealed that little of the current APE had been subjected to previous archaeological survey. However, the extreme eastern portion of the APE between the ends of the current North Field runways and Airport Drive was inventoried for archaeological resources in 1993 (Smith et al., 1993).

Most of the APE consists of artificially placed fill in areas that were formerly open waters of the San Francisco Bay. The record searches revealed that no archaeological resources have been previously identified within the APE. Furthermore, the record search indicated that no archaeological sites have been identified within 0.5 mile of the APE.



BAY CONSERVATION AND DEVELOPMENT COMMISSION JURISDICTION

28067867

Oakland International Airport
Oakland, California

FIGURE 3.11-1

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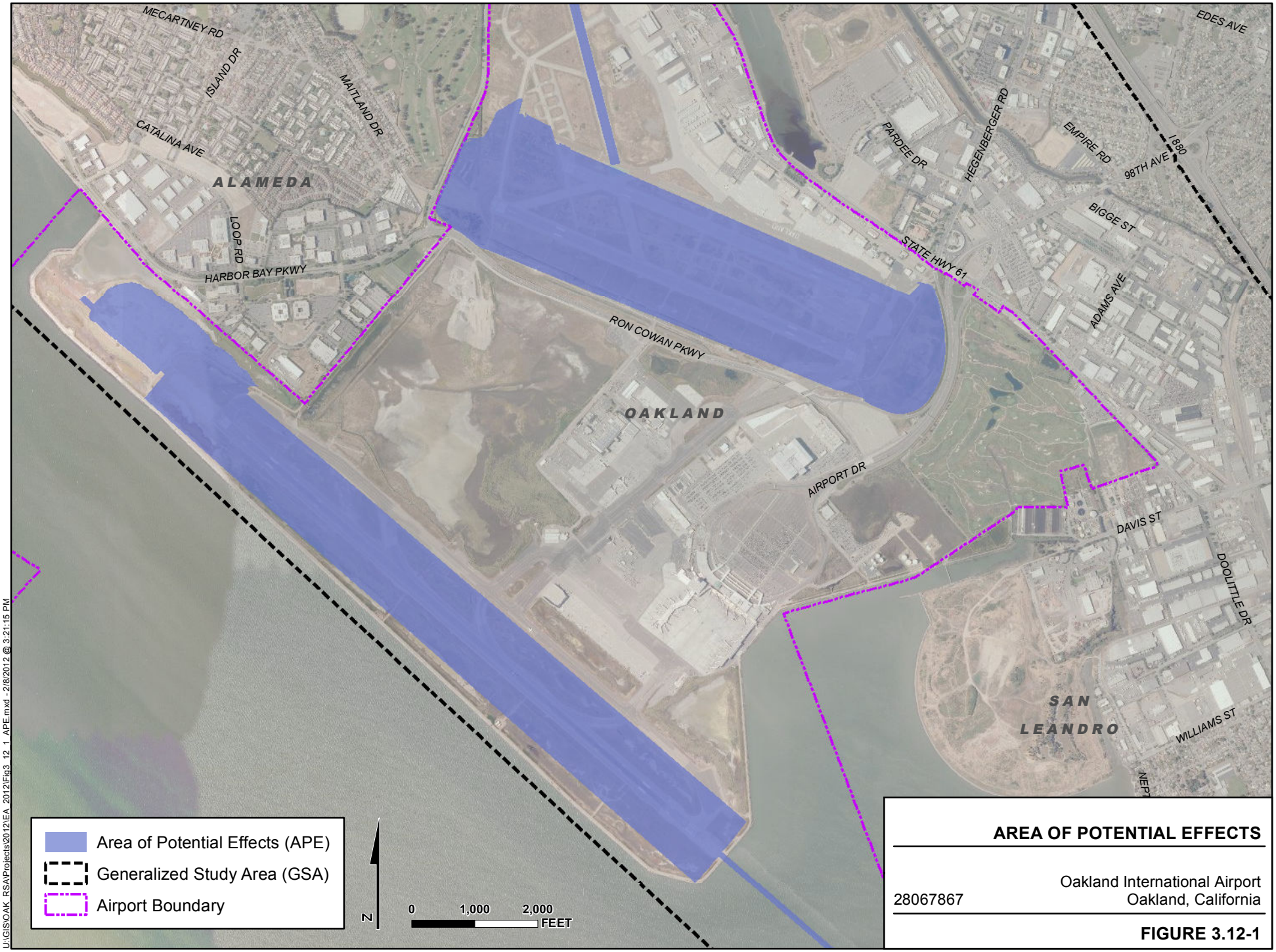
Source: Aerial Photo, Digital Globe, April 2007.



AREA OF POTENTIAL EFFECTS

Oakland International Airport
Oakland, California

28067867

FIGURE 3.12-1

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Source: NAIP, 2010.

Native American Consultation

On January 28, 2011, the FAA consulted with the California Native American Heritage Commission (NAHC) to identify and seek input from Native American Tribes that may be uniquely concerned with or significantly affected by planned and proposed Airport improvements. Specifically, the NAHC was asked to review its Sacred Lands Files as well as provide the names of Native American groups or individuals that might have knowledge or concern about potential resources within the vicinity of OAK.

FAA received a response from the NAHC on February 3, 2011, stating that the Sacred Land Files did not indicate the presence of cultural resources in the immediate project area. In its transmittal, the NAHC also enclosed a list of Native American individuals and/or organizations (which are not federally recognized) that may have knowledge of cultural resources in the project area, and suggested that all on the list be contacted. On June 13, 2011, the FAA sent these Native American individuals and organizations letters requesting these groups provide any information or concerns regarding cultural resources that could be affected by the proposed RSA Improvement Project alternatives. No responses were received.

Archaeological Field Reconnaissance

On May 6, 2009, a windshield reconnaissance and limited pedestrian survey of the APE was conducted. No archaeological resources were identified. Due both to aviation security issues and the fact that OAK was in active use at the time of the survey, an intensive survey of the APE was not possible. This approach was considered adequate for identifying archaeological resources, because most of the APE was formerly open waters of the San Francisco Bay. The entire APE was constructed on fill imported during the twentieth century, and is thus unlikely to contain intact archaeological deposits pre-dating the Airport. Furthermore, much of the ground surface is obstructed by large expanses of pavement, and the remaining unpaved portions of the APE are subject to routine maintenance, including mowing and occasional grading.

3.12.4 HISTORIC ARCHITECTURAL RESOURCES

Record Search and Literature Review

Research relating to the historic context for the project vicinity and site-specific research was conducted. As discussed in **Section 3.12.3,** a record search and literature review for the entire Airport property was received from the NWIC in May 2009 (NWIC File No. 08-1361), and a supplementary search for the entire Airport property and a quarter-mile search radius was received on September 14, 2011 (NWIC File No. 11-0254). The NWIC results were reviewed. In addition, the Port, the Oakland Aviation Museum, the Oakland Public Library, and various online sources were consulted.

The material received from the NWIC record searches indicated no previously recorded historic architectural resources within the APE. Supplementary research of materials archived with the Port did not identify any historic property on or eligible for the National Register of Historic Places within the APE.

Field Reconnaissance

On September 22, 2011, a historic architecture reconnaissance field survey of the APE was performed to account for buildings and structures that are known to be or appeared to be more than 45 years of age (i.e., constructed in 1966 or earlier) and require additional study. Prior to fieldwork, primary and secondary sources concerning the APE were reviewed as described in **Section 3.12.3.** Results of these evaluations are provided in **Chapter 4.**

3.13 LIGHT EMISSIONS AND VISUAL CHARACTER

Land in the vicinity of the GSA and the DSA is characterized by mixed-used and light industrial developments. Natural features that remain in the GSA are generally flat and have been previously disturbed by development activities.

The visual character in the vicinity of the Airport is primarily characterized by commercial and industrial buildings, the open expanse of the Alameda Municipal Golf Course, San Leandro Bay and San Francisco Bay. In the GSA, the visual character is informed by the Airport facilities, surface parking, and undeveloped open areas, including the Metropolitan Golf Links golf course, and in the DSA, the visual character is formed by level, graded surfaces and paved runways. Lighting is used throughout the GSA and on the Airport to support existing operations during nighttime periods, and other periods of low visibility.

3.14 NATURAL RESOURCES AND ENERGY SUPPLY

3.14.1 NATURAL RESOURCES

Mining activities for oil, coal, natural gas, sand, gravel, and crushed stone do not occur in the GSA, and no known deposits of such resources exist. Fresh water is supplied to OAK by EBMUD for Airport-related activities, including aircraft/vehicle washing, irrigation, and potable water (drinking water). **Section 3.7**, **Water Resources**, includes detailed information regarding water resources at OAK.

3.14.2 ENERGY SUPPLY

Pacific Gas and Electric Company supplies natural gas to OAK, and owns and maintains the natural gas distribution system at the Airport. The Port purchases electricity on the wholesale market that is distributed at OAK through a system maintained and owned by the Port. The Port has an 820-kilowatt photovoltaic system along Ron Cowan Parkway, which generates enough electricity to supply approximately 20 percent of the electric power used at OAK's terminals. FedEx Corporation has also installed a 904-kilowatt roof-mounted solar power system at its facility at OAK (Port of Oakland, 2011c).

Energy is used at OAK to operate aircraft, service vehicles, safety lighting, ventilation, air conditioning, computer systems, terminals, and other facilities. The energy requirements for OAK are dependent on the amount and type of aviation activity occurring at any given time. During 2010, energy use totaled approximately 38,846 megawatt hours of electricity for landside operations, and approximately 339,946 therms of natural gas (Port of Oakland, 2011c). Aircraft and motor vehicles consume petroleum fuels at OAK. In 2010, 97,222,537 gallons of jet fuel and 356,843 gallons of aviation gasoline were used at OAK (Port of Oakland, 2011c).

3.15 HAZARDOUS MATERIAL, POLLUTION PREVENTION, AND SOLID WASTE

3.15.1 INTRODUCTION

An assessment was conducted in order to identify sites and facilities that are known, suspected, or likely to contain or store hazardous substances, and to identify areas of known subsurface soil and/or groundwater contamination. Because the description and assessment of hazardous materials, pollution prevention, and solid wastes at OAK are largely based on the compilation and evaluation of information previously developed or disclosed by others, the approach to completing this work consisted of the following:

- Collection and review of reports, maps, and other relevant documents related to subsurface environmental conditions at OAK. These include site investigation and proposed remedial action documents, as well as maps, figures, and exhibits depicting sites and facilities of potential relevance; and
- An independent electronic database survey of federal, state, and local agency files pertaining to hazardous waste sites and environmental contamination in the vicinity of OAK.

3.15.2 HAZARDOUS MATERIALS REGULATIONS

For the purposes of this assessment, the term "hazardous materials" includes the regulatory-defined terms of hazardous wastes, hazardous substances, and dangerous goods; contamination to soil, surface waters, or groundwater; as well as the assortment of similarly regulated substances such as fuel and other petroleum-based products. Regulatory agencies involved in hazardous materials, pollution prevention and solid waste, including their roles and responsibilities, are described in **Appendix H, Table 1**.

A summary of regulations pertaining to the management of hazardous materials and other hazard conditions in the Alameda County area are listed in **Appendix H, Table 2**.

3.15.3 KNOWN/POTENTIAL HAZARDOUS MATERIALS SITES

The types, characteristics and occurrences of hazardous materials and other similarly regulated substances at OAK are typical of most metropolitan airports that offer commercial, cargo, and general aviation services. These include the fueling, servicing, and repair of aircraft, GSE, and motor vehicles; the operation and maintenance of the airfield, main terminal complex, and parking facilities; and a range of other special purposes connected with aviation (i.e., rental car and air cargo facilities, navigation, and air traffic control functions). Off-Airport activities in the GSA include a mixture of industrial, commercial, warehousing, and residential uses.

The overall largest quantities of substances used at OAK that are classifiable as hazardous materials include aircraft and motor vehicle fuels. Other, smaller amounts of petroleum products (e.g., lubricants and solvents), waste materials (e.g., used oils, filters, cleaning residues and spent batteries) and manufactured chemicals (e.g., herbicides, fertilizers, paints, fire-fighting foam, and de-icing fluids) are stored in various locations throughout the Airport. These materials and substances are characteristically

used on a routine basis in support of aircraft, GSE, and motor-vehicle maintenance activities, and for a range of other similar functions to keep the Airport operational and meet aviation safety requirements.

The Airport was partially developed on portions of San Francisco Bay that were filled from the 1920s to the 1960s. The nature of the materials used as fill in specific areas is unknown, although it appears that the majority of the fill at OAK consists of dredged San Francisco Bay sediments (Sorensen, 1989). These fill materials may have included hazardous materials. However, the Port's Environmental Division has no evidence that the fill at the Airport contains any contaminants (Heinze, 2012).

An assessment was conducted to identify sites and facilities that are known, suspected, or likely to contain or store hazardous materials and to identify areas of known subsurface soil and/or groundwater contamination at OAK and within the vicinity of the Airport. In order to assess these sites of potential concern, a database containing federal, state, and local regulatory agency file information was searched to support this assessment (EDR, 2011). This radius map database report prepared by Environmental Data Resources, Inc. (EDR) was used as a screening tool to identify known hazardous materials release sites, generators of hazardous waste(s), and underground storage tank sites that are reported to be present in the general vicinity of the Airport. The locations of the sites identified in the EDR database report are shown on **Figure 3.15-1** and **Appendix H**, **Table 3**. Hazardous materials release sites on and listed within 0.25 mile of the Airport were evaluated in greater detail.

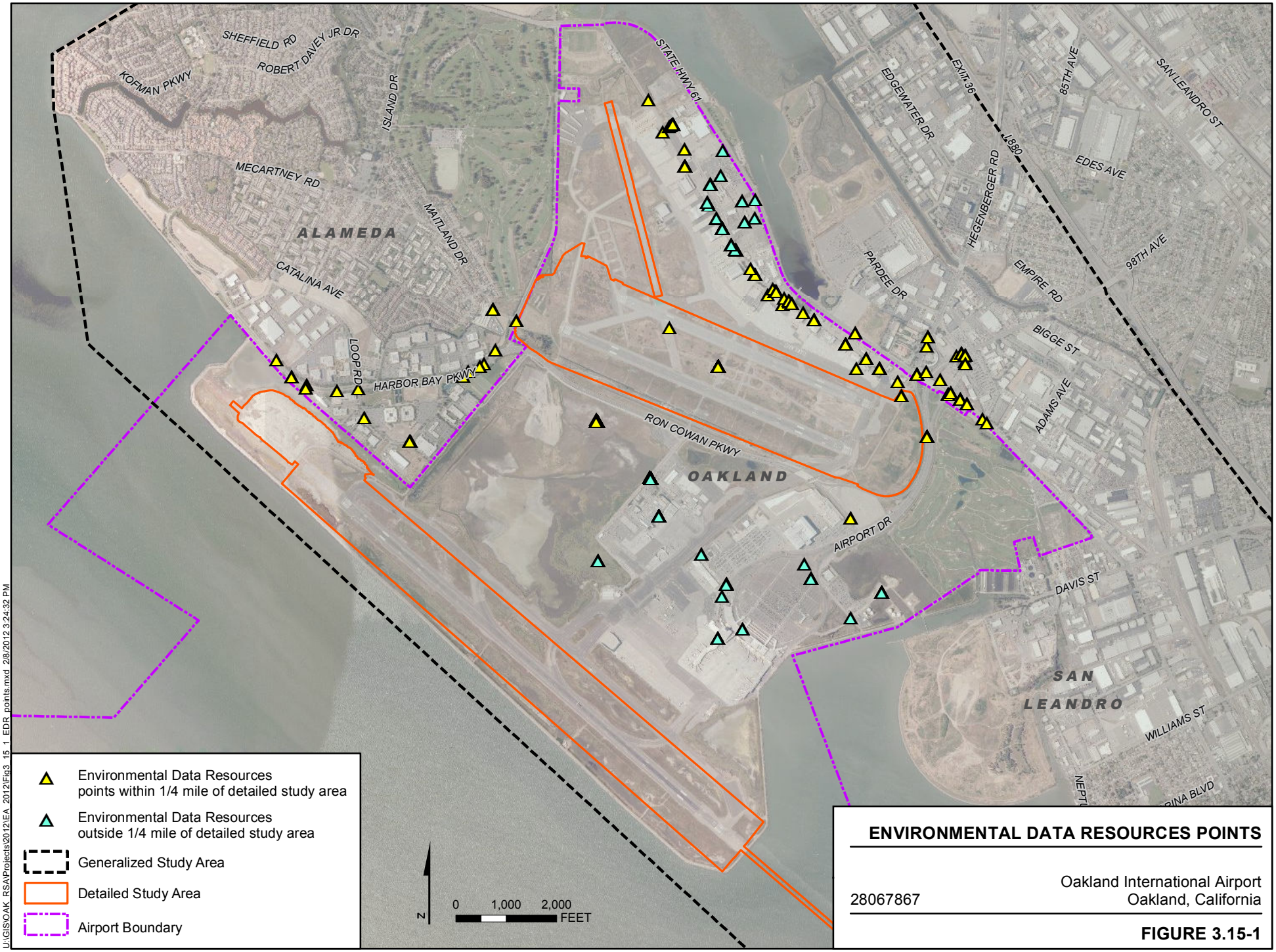
The database report identified 70 sites within 0.25 mile from the project site. However, location information included in the database records was often incomplete, and many records were mapped at the approximate center of the North Field rather than at the actual release location on the Airport. For these reasons, all sites mapped within OAK and within 0.25 mile from the project site were reviewed to assess the potential for contamination and for impacts to occur.

In addition to the EDR record search, a review of site-specific reports from the Port's environmental files was performed. The review identified sites relevant to this analysis that were not mapped by EDR (Port of Oakland, 2003). Furthermore, the review provided additional information about the listings identified in the EDR at the Airport and within a 0.25-mile radius (LFR, 2008a and LFR, 2008b). The releases at the identified sites have primarily been of petroleum hydrocarbons from leaking underground storage tanks and jet fuel releases from surface spills and below-grade pipeline leaks. Based on the record search and files review, site investigations have concluded that contaminants from past releases at the Airport are either absent or present in low levels in the soil or groundwater and the regulatory agencies have recommended no further action (Port of Oakland, 2003; LFR, 2008a; LFR, 2008b; EDR, 2011).

Other sites within a 0.25-mile radius of the DSA were either listed because they generate hazardous waste routinely without indication of a release, or were reported fuel releases from fuel pipelines that were not associated with a specific location and could not be researched further.

3.15.4 Solid Waste Collection and Disposal

Alameda County Department of Environmental Health's Solid/Medical Waste program oversees the solid waste collection, disposal, recycling, and hazardous waste programs at OAK. The solid wastes collected



ENVIRONMENTAL DATA RESOURCES POINTS

28067867

Oakland International Airport
Oakland, California

FIGURE 3.15-1

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Source: Aerial Photo, National Agriculture Imagery Project, 2010.

at OAK are taken to local transfer stations, where they are prepared for transportation to Altamont Landfill and Resource Recovery Facility, Tri-Cities Landfill, Vasco Road Landfill, or any other appropriate landfills (Alameda County, 2011). The Airport recycling program has achieved a greater than 50 percent diversion rate, and includes cardboard, paper, plastic, metals, and food waste.

3.16 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

This section describes cumulative actions in the EA study areas for the purpose of considering potential cumulative impacts in **Section 4.16**, **Cumulative Impacts,** of this EA.

Section 3.16.1 lists and describes past, present, and reasonably foreseeable future projects at, or in the vicinity of, OAK that have been considered in this EA for potential cumulative impacts in the resource categories evaluated. Spatial and temporal boundaries were delineated to ascertain appropriate parameters for analysis of cumulative effects. Projects considered in this evaluation meet three criteria:

- The project has the potential for impacts to all or some of the resource categories evaluated in this EA;
- The spatial boundary includes a geographic area close enough to the Airport that there may be a potential for it and the proposed RSA Improvement Project alternatives to have additive impacts to any resource category; and
- The temporal scope includes projects that have occurred or will occur in a timeframe similar to that of the Proposed Action, such that there is the potential for additive impacts on any resource category.

The GSA was used to define the spatial boundary. As shown in the paragraphs below, the timeframe ranges from 2005 through 2016. General types of on-Airport projects include, but are not limited to, tower relocation, terminal improvements, taxiway improvements, dike improvement, a Bay Area Rapid Transit (BART) connector, and utility and stormwater upgrade. Off-Airport cumulative projects include a BART connector, a medical facility, residential units, warehouse development, and bikeway expansion.

3.16.1 AIRPORT CAPITAL DEVELOPMENT AND NON–AIRPORT-SPONSORED CURRENT AND PROPOSED PROJECTS

Past Projects (2005-2011)

Terminal Improvements — Expanded Terminal 2 to include five new boarding gates and a new baggage claim area; relocated existing second curbside in front of Terminals 1 and 2; created additional lanes for passenger drop-off/pick-up; and improved existing third curbside. Construction began in 2005 and ended in 2007.

North Field Airfield Improvements — Pavement replacement for Runway 9R-27L. Construction occurred between 2007 and 2008.

South Field Airfield Improvements — Pavement (concrete and asphalt) replacement for various areas in South Field, including taxiways and the east Apron (1.3 million square feet). Construction occurred between 2005 and 2010.

Remain-Overnight Parking — Constructed a remain-overnight parking aircraft apron located in South Field adjacent to Taxiway B1, between the Oakland Maintenance Center and Taxiway B. The apron encompasses an area approximately 270,000 square feet. Construction occurred between 2009 and 2010.

Current (2012)

North Field Airfield Improvements — Paving and edge lighting projects include adding taxiway edge lighting to all taxiways west of Runway 15-33 (Taxiways N, Q, M, L). Design and construct North Field lighting vault conduit, above-finished lighting, and cable (improvements to the electrical, conduit, and lighting systems). Construction is estimated to occur between 2011 and 2015.

Replacement of Airport Traffic Control Tower — Construct a new FAA air traffic control tower to consolidate the two existing towers to improve visibility of the airfield. FAA commenced construction in 2010, and the project is expected to be complete by end of 2013.

FedEx — Construction of a new 200,000-square-foot International Sort Building for handling cargo, and a 4,000-square-foot building for security administrative purposes; minor interior renovations to the existing international and Metroplex buildings; expansion of the GSE maintenance facility; and relocation of the loading docks and container decks. Installation of a fuel cell power generation facility (converts natural gas to electricity). Construction commenced in 2008 and is expected to be completed by 2012.

Terminal Improvements — Renovate and retrofit Terminal 1, including a utility plant; upgrade security systems; replace Terminal 2 roof (Building M-130). Construction initiated and is estimated to be completed by 2016.

Stormwater System Rehabilitation — Replace and upgrade stormwater drainage, pump houses, and collection, detention and pumping systems Airport-wide. Reconstruction of Pump House No. 4 commenced in 2011.

Oakland Fuel Farm Facilities — Replace 124,000-barrel capacity of fuel storage with three new above-ground storage tanks (total fuel storage capacity of about 107,000 barrels), replacing a 12-inch fuel line from the tank farm to the airfield, relocating an electrical transformer, and constructing a small structure (approximately 2,100 square feet) to operate the fuel tanks, support life safety services, store the electrical equipment system and other related improvements to support the fueling facility. Construction began in 2010 and is expected to be complete by 2012.

Future (2012–2016)

North Field Leased Area Improvements — Renovate entrance to rental car customer service area; demolish buildings and retrofit and rehabilitate Hangars 5, 6, 9, and Business Jet Center leased hangars/ spaces. Construction is estimated to occur between 2012 and 2016.

South Field Taxiway and Runway Reconstruction — Rehabilitate Runway 11-29 pavement. Construction is estimated to occur between 2012 and 2016.

Curbside Improvements — Enhance curb 1 between Terminal 1 and Terminal 2. Construction is estimated to occur between 2012 and 2015.

Bike Path Improvements — A Class 1 bike trail will be extended along the south side of Ron Cowan Parkway connecting Airport Drive to Harbor Bay Parkway. This will occur either when the parcel of land south of Ron Cowan Parkway is developed, or by March 19, 2014, whichever is sooner. This trail will be a minimum of 12 feet wide, will be striped in the middle, and will reflect the conclusions of the planning studies being conducted by the Port on the transportation needs of the Airport area and the security constraints associated with the requirements of OAK and the FAA.

The Class I bike trail should provide a seamless, safe, efficient, direct, and pleasant connection to public access trails on either side of the trail extension. Proposed plans for this connection will be reviewed by BCDC staff or the BCDC Commission's Design Review Board. It is envisioned that preliminary plans for the Class I trail will be submitted to BCDC Commission staff by December 19, 2013.

Utility Program Upgrade — Replace critical and deteriorating utility infrastructure, a Terminal 1 substation, and a sanitary sewer along Airport Drive. Construction is estimated to occur in 2012.

South Field Perimeter Dike Improvement Project — The Port of Oakland plans to improve the perimeter dike that forms the boundary between the Airport and San Francisco Bay for flood control and seismic events. Construction is estimated to occur between 2012 and 2015.

Pump Station No. 6 and other Drainage Projects — Replace the existing Pump House No. 6 and upgrade stormwater drainage and equipment. Construction is scheduled to begin in 2012.

Pump House No. 6 was constructed around 1956 at the time that the South Field Airport was developed and consists of a steel building structure supported by timber piles that houses a mechanical pump and motors. It is located near the northwest end of Runway 11-29 (end of Runway 11) and services about 1,345 acres of the Airport that include Runway 9R-27L, Runway 11-29, taxiways, aircraft remain-overnight parking areas, undeveloped areas, and the FedEx Metroplex.

Pump House No. 6 is in current need of repair and upgrade to provide efficient and reliable stormwater drainage system services for OAK. Replacement of Pump House No. 6 would involve construction of a flat, reinforced-concrete structure supported by concrete piles located next to the existing Pump House No. 6. New pumps, motors, and associated equipment would be housed within new weatherproof structure.

Other drainage projects that will be implemented as part of the capital improvements to the Airport drainage system include improvements to pump houses, culverts installation, channels construction, and channels grading.

3.16.2 OTHER AREA DEVELOPMENT PROJECTS

Within Detailed Study Area

BART Oakland Airport Connector Project — BART project would consist of a link to OAK via an automated guideway transit system from the Coliseum BART Station to a new BART station at the Airport. The 3.2-mile elevated connector would be located primarily within the median of Hegenberger Road from the Coliseum BART Station to Doolittle Drive, and on Airport property. The automated guideway transit would be operated in its own exclusive right-of-way. FAA approved the Record of Decision for this project on December 29, 2009. This project is currently under construction.

Outside of Detailed Study Area

Kaiser Property Development — This project consists of developing a 63-acre parcel, formerly the site of an Albertsons distribution center located at Marina Boulevard, west of I-880, in San Leandro. Kaiser intends to develop roughly half of the property into a state-of-the-art medical facility, with the remainder of the property to be used for a retail center. This project is currently under construction.

Harbor Bay Village VI — The proposed project involves construction of 104 residential housing units on about 12 acres. The current development location is under review by the City of Alameda and is likely to change. The residential units would be two-story, single-family detached units. The project also includes common areas such as streets, parking, landscaping, and open space. The Draft Environmental Impact Report prepared for the project identified significant impacts related to air quality, cultural resources, hazardous materials, hydrology and water quality, and noise. The construction period, planned for the near future without any fixed date, would take about 2 years.

Bikeway Projects — This City of Oakland project consists of improving/expanding bike lanes along Hegenberger Road to the Airport (Class 1 and 2), all of Doolittle (Class 1 and 2), Edgewater (Class 2), Hegenberger Loop, and Cairo Street to the Lindheim Memorial overcrossing (Class 3b), and along the Columbian Gardens waterway between Hegenberger and 98th Avenue (Class 1). Construction is expected to occur between 2012 and 2015.

Horizon Beverage Company — Horizon proposes to construct an approximately 156,782-square-foot beverage distribution warehouse on the 8.5-acre project site located in the central portion of the former Fast Track Parking property at the northern terminus of Pardee Drive. The warehouse would receive beverage shipments, primarily from beer companies, via Port of Oakland marine terminals and large-scale trucks, and sort and deliver them to local supermarkets, liquor stores, restaurants, and similar establishments. This project is currently under construction.