

**AMENDMENT TO OAKLAND ZOO MASTER PLAN:  
SUBSEQUENT MITIGATED NEGATIVE  
DECLARATION/ADDENDUM**

DRAFT  
Volume 1

Prepared for City of Oakland  
February 2011







# CITY OF OAKLAND

Community and Economic Development Agency, Planning & Zoning Division  
250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California, 94612-2032

## **NOTICE OF INTENT TO ADOPT A SUBSEQUENT MITIGATED NEGATIVE DECLARATION/ADDENDUM AND NOTICE OF PUBLIC HEARINGS FOR THE PROPOSED AMENDMENT TO THE OAKLAND ZOO MASTER PLAN**

**DATE:** February 11, 2011

**PROJECT LOCATION:** 9777 Golf Links Road, Oakland, CA  
**PROJECT SPONSOR:** East Bay Zoological Society  
**CASE FILE NO.:** CM09085/CP09078/ER09005

**DESCRIPTION OF PROJECT:** The East Bay Zoological Society proposes to amend the previously approved 1998 Master Plan for the Oakland Zoo to refine and revise certain elements of the Master Plan including, but not limited to, reconfiguration of the previously approved new California Exhibit, replacement of the existing veterinary care center with a new Veterinary Medical Hospital, replacement of the previously approved loop road shuttle bus system with a new aerial electric gondola system, and establishment of the specific location of the proposed perimeter fence with modifications from the previously approved general location.

**ENVIRONMENTAL REVIEW:** An application for the above described amendment to the Master Plan has been filed for review and action by the City of Oakland. Pursuant to the California Environmental Quality Act (CEQA), in 1998 the City adopted a Mitigated Negative Declaration (MND) to approve the Master Plan of the Oakland Zoo finding that the Master Plan would not result in a significant impact on the environment with the incorporation of specified mitigation measures. In reviewing the current proposed amendment to the Master Plan, the City has prepared a Draft Subsequent Mitigated Negative Declaration/Addendum (SMND/A). The City is hereby releasing the Draft SMND/A and in so doing finds it to be accurate, complete, compliant with CEQA, and ready for public review.

The Draft SMND/A evaluates whether the buildout of the amended Master Plan would result in new significant environmental impacts, or a substantial increase in the severity of impacts previously identified in the 1998 MND, due to the proposed changes to the Master Plan, new information, and/or changes to the circumstances surrounding the project. The Draft SMND/A finds that the buildout of the amended Master Plan would not result in new significant environmental impacts, or a substantial increase in the severity of impacts previously identified in the 1998 MND, with the incorporation of specified mitigation measures and the City of Oakland standard conditions of approval. Therefore, an Environmental Impact Report (EIR) is not required. The Draft SMND/A identifies mitigation measures related to the following environmental topics: biological resources; geology and soils; hydrology and water quality; and transportation and circulation. The Draft SMND/A also identifies standard conditions of approval related to the following environmental topics: aesthetics; air quality; biological resources; geology and soils; hazards and hazardous materials; hydrology and water quality; noise; public services and utilities; and transportation and circulation. Together, the mitigation measures and the standard conditions of approval would reduce all potential environmental impacts to a less-than-significant level. The project site is not listed on the Hazardous Waste and Substances Sites List (Cortese List).

The Draft SMND/A and the application materials for the proposed Master Plan amendment are currently available for review at the Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H.

Ogawa Plaza, Suite 3315, Oakland, California, 94612. The Draft SMND/A is also available on the City's website at <http://www2.oaklandnet.com/Government/o/CEDA/o/PlanningZoning/s/Application/DOWD009157>.

Any interested party may comment on the Draft SMND/A and/or the proposed Master Plan amendment. There is no fee for commenting and all comments received will be considered by the City prior to making a decision on the SMND/A and the proposed Master Plan amendment. Comments on the Draft SMND/A should focus on the sufficiency of the Draft SMND/A in discussing possible impacts on the physical environment and ways in which potential adverse effects might be minimized in light of the SMND/A's purpose to provide useful and accurate information about such factors. Comments must be received within **30 calendar days** of the release of the Draft SMND/A (no later than **4:00 p.m. on March 14, 2011**) and should be submitted in writing to the attention of the case planner, **Darin Ranelletti, Planner III**, via mail or in person to **City of Oakland, Community and Economic Development Agency, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California, 94612**, via fax to **510-238-6538**, or via e-mail to **[dranelletti@oaklandnet.com](mailto:dranelletti@oaklandnet.com)**.

#### **PUBLIC HEARINGS:**

The **Parks and Recreation Advisory Commission (PRAC)** will conduct a public hearing and make an advisory recommendation on the proposed Master Plan amendment to the City Planning Commission on March 9, 2011 at 4:30 p.m. at the Lakeside Park Garden Center, 666 Bellevue Avenue, Oakland.

The **City Planning Commission** will conduct a public hearing and make a decision on the SMND/A and the proposed Master Plan amendment on March 16, 2011 at 6:00 p.m. in the Sgt. Mark Dunakin Hearing Room (Hearing Room 1), City Hall, 1 Frank H. Ogawa Plaza, California. A decision to approve the proposed Master Plan amendment will be forwarded to the City Council for consideration at a future duly-noticed public hearing. A decision to deny the proposed Master Plan amendment will be final unless appealed to the City Council.

If you challenge the environmental document or proposed Master Plan amendment in court you may be limited to raising only those issues raised in written correspondence received by the Community and Economic Development Agency prior to the deadline stated above.

For further information, please contact Darin Ranelletti at (510) 238-3663 or [dranelletti@oaklandnet.com](mailto:dranelletti@oaklandnet.com).

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DRAFT  
Volume 1

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February 2011

Prepared by:  
PLACEMAKERS

*in association with*

AECOM  
ARCADIS  
ENVIRON  
Environmental Collaborative  
LSA  
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Questa Engineering Corporation





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# GENERAL PROJECT INFORMATION

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## PROJECT NAME

Amendment to Oakland Zoo Master Plan  
Case Numbers:  
Environmental Review: ER090005  
Major Conditional Use Permit: CM09085  
Creek Protection Permit: CP09078  
Tree Removal Permit: T0900019

## LEAD AGENCY NAME AND ADDRESS

City of Oakland  
Community and Economic Development Agency (CEDA)  
250 Frank H. Ogawa Plaza, Suite 3315  
Oakland, CA 94612  
Contact: Darin Ranelletti, Planner III  
510-238-3663, dranelletti@Oaklandnet.com

## PROJECT SPONSOR'S NAME AND ADDRESS

East Bay Zoological Society  
9777 Golf Links Road  
Oakland, CA 94605  
Contact: Nik Haas-Dehejia, Director Strategic Initiatives, Oakland Zoo  
510-632-9525, extension 138

## PROJECT LOCATION

The proposed Master Plan amendment area is located within Knowland Park, which is situated in south Oakland east of Interstate 580 and adjacent to Anthony Chabot Regional Park (see **Figure 2-1 Project Location Map**). Knowland Park totals approximately 490 acres, of which approximately 93 acres comprise the existing arboretum, zoo, and related support facilities and approximately 62 acres were approved by the City Council in 1998 for development of the Oakland Zoo's California 1820 exhibit. The remaining 335 acres contain upper and lower Knowland Park.

## **DESCRIPTION OF PROJECT**

The project sponsor proposes to amend the Master Plan for the Oakland Zoo which was approved by the City in 1998. The proposed Master Plan amendment would refine and make certain changes to the site plan, including (1) replacement of the previously approved loop road and shuttle bus system to transport zoo visitors from the existing zoo to the California Exhibit with an electric aerial gondola people-moving system; (2) reconfiguration of the previously approved animal exhibits within the California Exhibit; (3) relocation of the previously approved California Interpretive Center within the California Exhibit area to a site approximately 300 feet northwest of the previously approved location, and redesign of the center; (4) elimination of the previously approved off-site breeding activity, with incorporation of this area into the California Exhibit; (5) replacement of the existing veterinary medical hospital with the construction of a proposed new Veterinary Medical Hospital located immediately to the east of the existing zoo parking lot on a portion of the previously approved California Exhibit area; (6) a new overnight camping area located to the northwest of the California Exhibit area; (7) establishment of the specific location of the proposed perimeter fence with modifications from the previously approved general location; (8) improvement of the existing emergency vehicle access road off Snowdown Avenue; and (9) provision of a public walking path located to the southeast and outside of the California Exhibit to provide public access between existing fire roads and knolls in Knowland Park.

## **SURROUNDING LAND USES AND SETTING**

The proposed Master Plan amendment area is generally surrounded by the Oakland Zoo to the southwest, single-family residential development to the north, Knowland Park to the northeast and single-family residential development to the south.

## **ACTIONS/PERMITS WHICH MAY BE REQUIRED, AND FOR WHICH THIS DOCUMENT PROVIDES CEQA CLEARANCE, INCLUDE WITHOUT LIMITATION**

- City of Oakland – Major Conditional Use Permit
- City of Oakland – Creek Protection Permit
- City of Oakland – Tree Removal Permit
- City of Oakland – Grading Permit
- City of Oakland – Building Permits
- City of Oakland – Public Improvement Permit
- State Water Resources Control Board – Section 402 General Construction Activity Storm Water Permit
- U.S. Fish and Wildlife Service - Section 7 Consultation under the Endangered Species Act for Incidental Take
- U.S. Army Corps of Engineers - Nationwide Permit under Section 404 of the Clean Water Act

- California Department of Fish and Game – Section 2081 Incidental Take Permit
- California Department of Fish and Game – Section 1602 Agreement
- Bay Area Air Quality Management District – Engine Permit

## **PREVIOUS ENVIRONMENTAL REVIEW**

The Mitigated Negative Declaration (MND) for the Oakland Zoo in Knowland Park Master Plan was adopted by the Oakland City Council in 1998. The 1998 MND is included as **Appendix A** and is available at the Planning and Zoning Division office located at:

City of Oakland  
Community and Economic Development Agency (CEDA)  
250 Frank H. Ogawa Plaza, Suite 3315  
Oakland, CA 94612  
Contact: Darin Ranelletti, Planner III  
510-238-3663, dranelletti@Oaklandnet.com

## **DETERMINATION**

Pursuant to Section 15164 of the State CEQA Guidelines, the City has determined that the proposed Master Plan amendment meets the requirements for an addendum to the 1998 MND because only minor technical changes or additions are necessary and/or the project does not meet any of the criteria described in Section 15162 of the State CEQA Guidelines, nor are any of the circumstances described in Section 15162 present, requiring a Subsequent Environmental Impact Report (EIR) or Subsequent Negative Declaration. However, in the interest of being conservative and providing additional opportunity for public review, the City is following the procedural requirements for a Subsequent Mitigated Negative Declaration. Therefore, this document is titled a “Subsequent Mitigated Negative Declaration/Addendum.”





## 1.1 PURPOSE OF THE SUBSEQUENT MITIGATED NEGATIVE DECLARATION/ADDENDUM

In 1998 the City adopted a Mitigated Negative Declaration (1998 MND) and approved a Master Plan for the Oakland Zoo. (The 1998 MND is included as **Appendix A**.) The Oakland Zoo now proposes to amend the previously approved Master Plan to refine and make certain changes to the site plan for the Master Plan. This document is a Subsequent Mitigated Negative Declaration /Addendum (SMND/Addendum) to the 1998 MND. This SMND/Addendum analyzes the buildout of the amended Master Plan against the City’s current CEQA Thresholds of Significance and compares the environmental effects of the amended Master Plan to the environmental effects of the approved Master Plan analyzed in the 1998 MND.

Pursuant to Section 15164 of the State CEQA Guidelines, the City has determined that the proposed Master Plan amendment meets the requirements for an addendum to the 1998 MND because only minor technical changes or additions are necessary and/or the project does not meet any of the criteria described in Section 15162 of the State CEQA Guidelines, nor are any of the circumstances described in Section 15162 present, requiring a Subsequent Environmental Impact Report (EIR) or Subsequent Negative Declaration. Specifically, the project would not result in any new significant environmental impacts or a substantial increase in the severity of previously identified significant impacts resulting from substantial changes in the project, substantial changes with respect to the circumstances surrounding the project, or new information of substantial importance which was not known and could not have been known with the exercise of reasonable diligence at the time the previous MND was adopted. However, in the interest of being conservative and providing additional opportunity for public review, the City is following the procedural requirements for a Subsequent Mitigated Negative Declaration. Therefore, this document is titled a “Subsequent Mitigated Negative Declaration/Addendum.”

## 1.2 SUBSEQUENT MITIGATED NEGATIVE DECLARATION/ ADDENDUM SCOPE

### 1.2.1 ENVIRONMENTAL TOPICS COVERED IN THE SUBSEQUENT MITIGATED NEGATIVE DECLARATION/ADDENDUM

The proposed Master Plan amendment requires updated information, clarification, and modified analysis for the following environmental topics, which are addressed in separate sections in Chapter 3 of this SMND/Addendum:

- **Aesthetics:** This section evaluates the potential visual impacts associated with the buildout of the amended Master Plan, including the proposed aerial gondola people-moving system and relocation of the California Interpretive Center.
- **Air Quality:** This section provides an updated analysis that addresses current Bay Area Air Quality Management District guidelines.
- **Biological Resources:** This section provides an updated analysis that addresses the proposed changes in the site plan for the California Exhibit and proposed changes to the final perimeter fence location with new biological surveys. Current regulatory requirements associated with biological resources are described.
- **Geology and Soils:** This section provides an updated geology and soils assessment that addresses the proposed site plan changes and current regulatory requirements.
- **Global Climate Change:** This section addresses an environmental topic that was recently added to the State CEQA Guidelines and therefore was not addressed in the 1998 MND. The analysis addresses greenhouse gas emissions generated by both construction and operation of the buildout of the amended Master Plan.
- **Hazards and Hazardous Materials:** This section discusses the current regulatory requirements applicable to potential hazardous medical material storage at the relocated Veterinary Medical Hospital.
- **Hydrology and Water Quality:** This section evaluates the proposed changes to the California Exhibit site plan and updates the hydrology and water quality assessment. Current regulatory requirements pertaining to hydrology and water quality issues are described.
- **Land Use, Recreation and Planning:** This section evaluates the amended Master Plan as it relates to land use, recreation, and planning issues. Current planning policies and land use requirements are described.
- **Noise:** This section provides an updated noise analysis that addresses the proposed site plan changes and current regulatory requirements.
- **Public Services and Utilities:** This section provides an updated discussion of public services and utilities that addresses the amended Master Plan and current standards and requirements.

- **Transportation and Circulation:** This section provides an updated traffic analysis that accounts for current conditions and provides information about projected future conditions, based on the updated Alameda County Transportation Commission Countywide Transportation Demand model and cumulative year 2015 and year 2035 forecasts.

### 1.2.2 ENVIRONMENTAL TOPICS REQUIRING NO ADDITIONAL DISCUSSION

The following environmental topics have been determined to require no additional discussion in this SMND/Addendum:

- **Agriculture:** The Master Plan area does not include any type of agricultural use or activity. The proposed California Exhibit area is surrounded by the Oakland Zoo, residential development, and Knowland Park.
- **Cultural Resources:** The amended Master Plan would not change any of the information or conclusions in the 1998 MND related to cultural resources. A literature review and archaeological field inspections were undertaken during preparation of the 1998 MND; the literature review confirmed that no recorded prehistoric or historic sites were present, and the field inspection concluded that there was no evidence of aboriginal use or occupancy of the Master Plan area or general vicinity. Additionally the City's Standard Conditions of Approval would apply to the proposed Master Plan amendment and ensure that any unknown resources that may be uncovered during construction are appropriately treated.
- **Mineral Resources:** The Oakland Zoo and proposed California Exhibit area contain no known mineral resources.
- **Population and Housing:** Neither the approved Master Plan nor the amended Master Plan would include, nor affect, housing and therefore would not affect population conditions or the housing supply.

### 1.3 STANDARD CONDITIONS OF APPROVAL

The City's Uniformly Applied Development Standards and Conditions of Approval (referred to in this SMND/Addendum as Standard Conditions of Approval) are incorporated into projects as conditions of approval regardless of a project's environmental determination. As applicable, the Standard Conditions of Approval are adopted as requirements of an individual project when it is approved by the City and are designed to, and will, substantially mitigate environmental effects. For the proposed Master Plan amendment, all of the relevant Standard Conditions of Approval have been incorporated into this SMND/Addendum.

In reviewing project applications, the City determines which Standard Conditions of Approval are applied, based upon the zoning district, community plan, and the type(s) of permit(s)/approval(s) required for the project. Depending on the specific characteristics of the project type and/or project site, the City will determine which Standard Conditions of Approval apply to a

specific project; for example, Standard Conditions of Approval related to creek protection permits will only be applied to projects on creekside properties.

Because these Standard Conditions of Approval are mandatory City requirements, the impact analysis assumes that these will be imposed and implemented by the project. If a Standard Condition of Approval would reduce a potentially significant impact to a less-than-significant level, the impact will be determined to be less than significant and no mitigation will be imposed.

The Standard Conditions of Approval incorporate development policies and standards from various adopted plans, policies, and ordinances (such as the Oakland Planning and Municipal Codes, Oakland Creek Protection Ordinance, Stormwater Water Management and Discharge Control Ordinance, Oakland Tree Protection Ordinance, Oakland Grading Regulations, National Pollutant Discharge Elimination System (NPDES) permit requirements, Housing Element-related mitigation measures, California Building Code, and Uniform Fire Code, among others), which have been found to substantially mitigate environmental effects. Where there are peculiar circumstances associated with a project or project site that will result in significant environmental impacts despite implementation of the Standard Conditions of Approval, the City will determine whether there are feasible mitigation measures to reduce the impact to a less-than-significant level.

Applicable Standard Conditions of Approval are identified for each of the environmental topics addressed in this SMND/Addendum. A complete list of all applicable Standard Conditions of Approval, mitigation measures identified in this SMND/Addendum, and mitigation measures identified in the 1998 MND with revisions approved by the City Council in 1998 is presented in **Appendix B**.

## **1.4 SUBSEQUENT MITIGATED NEGATIVE DECLARATION/ ADDENDUM ORGANIZATION**

This document is organized as follows:

**General Project Information:** This section provides a summary of the environmental review process for the proposed Master Plan amendment and documents the City's determination to proceed with a SMND/Addendum.

**Chapter 1 Introduction:** This chapter describes the purpose and scope of the SMND/Addendum.

**Chapter 2 Project Description:** This chapter describes in detail the proposed changes to the approved Master Plan.

**Chapter 3 Environmental Topics Requiring Updated Discussion:** This chapter provides an update of existing site conditions, an update of applicable policies and

regulations, and an environmental assessment of the buildout of the amended Master Plan. For each environmental topic, the chapter summarizes the 1998 MND analysis and conclusions, identifies currently applicable Standard Conditions of Approval, updates the regulatory setting, summarizes existing conditions, and analyzes the effects the buildout of the amended Master Plan and compares that with the information contained in the 1998 MND. Also, previously imposed mitigation measures from the 1998 MND are identified, and, where appropriate, are clarified, refined, revised, or deleted. This chapter also identifies any new mitigation measures that are required.

**Chapter 4 Persons Involved in Report Preparation:** This chapter identifies the persons involved in the preparation of the CEQA document.

**Appendices:** This section includes all appendices referenced in the SMND/Addendum.



## 2.1 BACKGROUND

### 2.1.1 PREVIOUS MASTER PLAN APPROVAL

In 1997 the Oakland Zoo submitted an application to the City of Oakland for a major conditional use permit for the Oakland Zoo Master Plan (Master Plan) intended to allow development of certain improvements and programs at the zoo over a period of 20 years (Zoning Case No. CM97-25). On April 16, 1997, the Oakland City Planning Commission adopted a Mitigated Negative Declaration (MND) for the Master Plan and approved part of the Master Plan. On June 4, 1997, the City Planning Commission approved the remainder of the Master Plan. On December 15, 1998, the City Council adopted Resolution No. 74736 C.M.S. upholding the City Planning Commission's adoption of the 1998 MND and decision approving the California 1820 exhibit portion of the major conditional use permit, subject to certain conditions of approval. The City's conditions of approval reflected the terms of a Memorandum of Understanding (MOU) reached by the Oakland Zoo and various neighbors regarding several land use issues, including the location of the zoo's perimeter fence. (The 1998 Master Plan Conditions of Approval and Mitigation Measures are included as **Appendix B**.)

### 2.1.2 CURRENT APPLICATION (PROPOSED MASTER PLAN AMENDMENT)

The Oakland Zoo has applied for approval of an amendment to the approved Master Plan that would refine and make certain changes to the site plan for the approved California 1820 exhibit, now identified as the California Exhibit. This Subsequent Mitigated Negative Declaration/Addendum updates the information contained in the 1998 MND in light of the proposed changes to the Master Plan, changed circumstances, and new information. This Subsequent Mitigated Negative Declaration/Addendum uses the following terminology in describing and referring to the current application:

- “Proposed Master Plan amendment” refers to the proposed action under consideration by the City.
- “The buildout of the amended Master Plan” refers to the development that would be allowed if the proposed Master Plan amendment is approved. In accordance with CEQA Guidelines Section 15378, the buildout of the amended Master Plan represents the “project” evaluated in this document.

- “Master Plan area” refers to the entire area subject to the Master Plan, including the existing zoo.
- “Proposed Master Plan amendment area” refers to a subarea within the Master Plan area where the amendments to the Master Plan are proposed.
- “Knowland Park” refers to the entire park area, including the Master Plan area.

## 2.2 SETTING

The Oakland Zoo in Knowland Park is located in south Oakland, east of Interstate 580 and adjacent to Anthony Chabot Regional Park (see **Figure 2-1**). Knowland Park contains a total of approximately 490 acres, of which approximately 93 acres comprise the existing arboretum, zoo, and related support facilities and approximately 62 acres were approved by the City Council for development of the Oakland Zoo’s California 1820 exhibit (see further discussion under **Section 2.3, Approved Master Plan**, below). The remaining 335 acres contain upper and lower Knowland Park. Upper Knowland Park contains approximately 278 acres of open space, vegetation, public trails, and fire roads. Lower Knowland Park contains approximately 57 acres of open space, vegetation, zoo entrance area, and roads. **Table 2-1** presents a breakdown of acreage by use area.

**TABLE 2-1: KNOWLAND PARK ACREAGE BY AREA**

Area	Number of Acres	Zoning
Upper Knowland Park	278 <sup>1</sup>	Open Space (Resource Conservation Area)
Approved California 1820 Exhibit	62 <sup>2</sup>	Open Space (Special Use)
Arboretum, Zoo, and Related Support Facilities	93 <sup>3</sup>	Open Space (Special Use)
Lower Knowland Park	57 <sup>4</sup>	Open Space (Resource Conservation Area)
<b>Total</b>	<b>490</b>	

<sup>1</sup> Zoo-City Management Agreement, May 2005. This agreement identifies 340 acres in the upper area of Knowland Park. Subtracting the 62 acres for the approved California 1820 exhibit leaves a balance of 278 acres.

<sup>2</sup> The project conditions of approval did not identify a total acreage for the California 1820 exhibit. This figure was calculated based on the Final Revised Plan approved by the City Council on December 15, 1998.

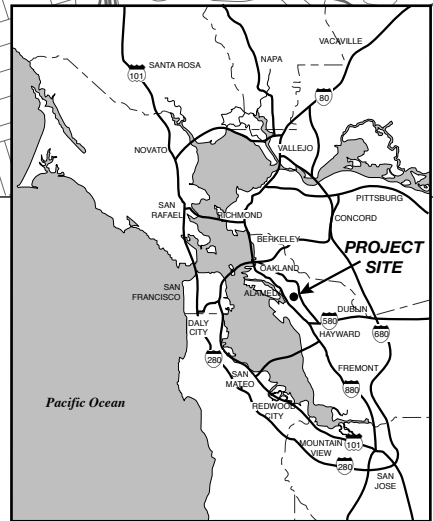
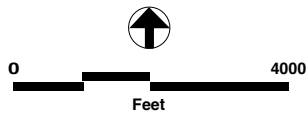
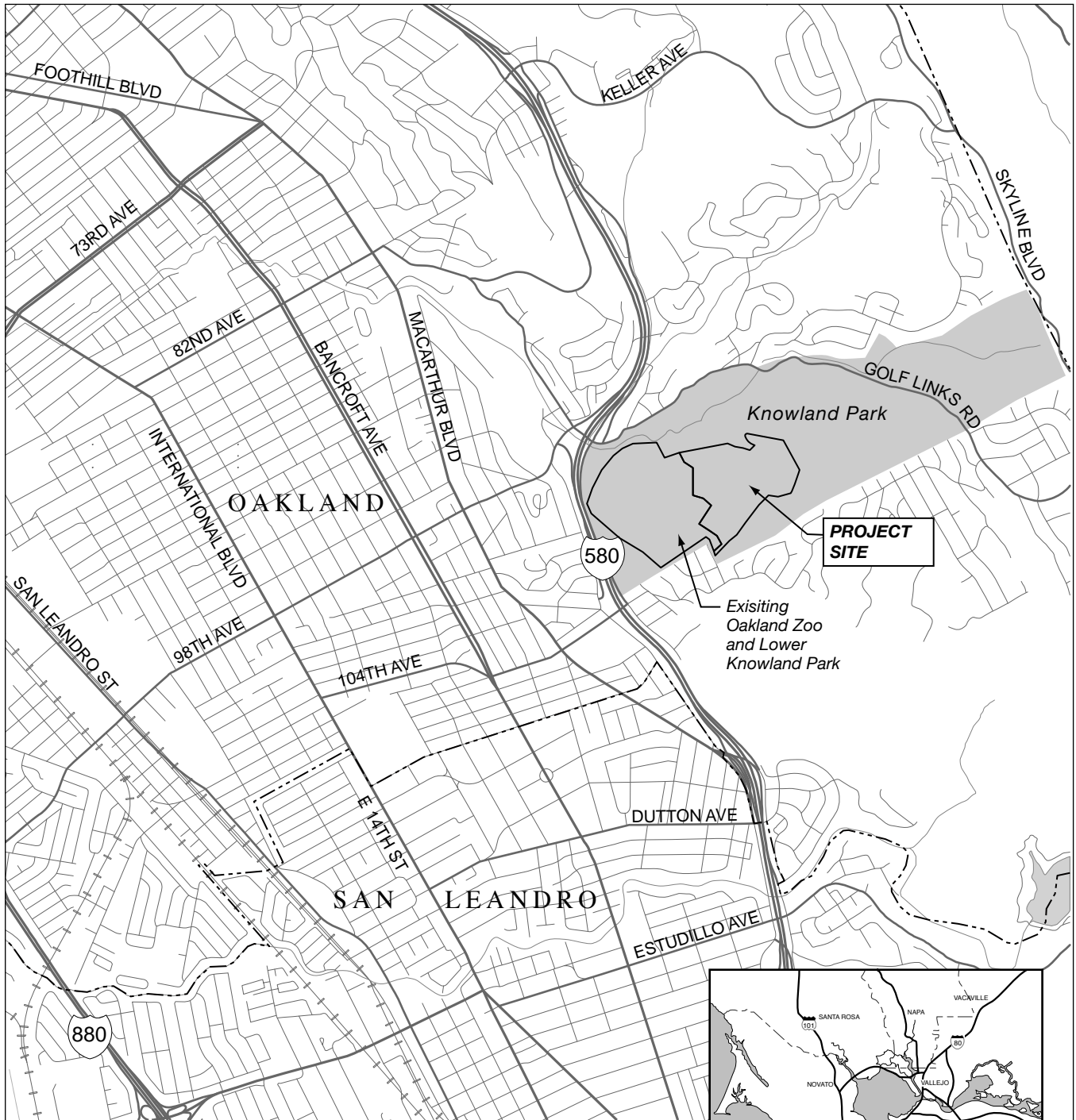
<sup>3</sup> Oakland Zoo In Knowland Park Master Plan Mitigated Negative Declaration/Initial Study, 1998.

<sup>4</sup> Zoo-City Management Agreement, May 2005. This agreement identifies 150 acres in the lower area of Knowland Park. Subtracting the 93 acres for the arboretum, zoo, and related support facilities leaves a balance of 57 acres.

Source: PLACEMAKERS, 2010.

The Oakland General Plan land use designation for the zoo (including the approved California 1820 exhibit) is Urban Open Space, and the zoo (including the approved California 1820 exhibit) is zoned Open Space (Special Use). (See further discussion in **Section 3.8, Land Use, Recreation and Planning**, of this SMND/Addendum.)





◆  
**Figure 2-1**  
 Project Location Map

The residential neighborhood immediately surrounding the zoo was already built out when the Master Plan was approved in 1998 and has changed little since then. Subsequent to approval of the Master Plan, however, two large development projects were proposed in southeast Oakland: Leona Quarry and Oak Knoll. The Leona Quarry project was approved in 2004 and consists of 477 single-family and multi-family residential units to be constructed in two phases. The site is the former Leona Quarry and is located about 2.5 miles northwest of the zoo. The first phase of construction has been completed and includes 427 residential units. The Oak Knoll project is a mixed-use project proposed for the 183-acre decommissioned Naval Medical Center, which is located about 1.3 miles north of the zoo. The Oak Knoll project proposes 960 single- and multi-family residential units, local-serving commercial development, and parks and open space. This project has not been approved and the application is not currently active.

## 2.3 APPROVED MASTER PLAN

The approved Master Plan is a 20-year plan for the Oakland Zoo. (The zoo is now in the thirteenth year of the 20-year process.) The approved Master Plan states two “guiding visions” (Amphion Environmental, Inc. 1996):

- Make optimum use of the unique combination of historic and native Californian landscapes in Knowland Park; and
- Balance fiscal prudence and bold new ideas, building an achievable vision of the future for the Oakland Zoo in Knowland Park.

The approved Master Plan addresses three unique landscape environments at the zoo: (1) the Arboretum, (2) the existing Zoological Park and related support facilities, and (3) the area designated for a new California 1820 exhibit. The approved Master Plan identifies a variety of elements to be built in each of these landscape environments. The Master Plan improvements for each landscape environment are summarized in **Table 2-2** and described further below.

**Figure 2-2** shows the approved Master Plan map.

### 2.3.1 ARBORETUM

The Center for Science and Environmental Education is completed and offers a variety of educational programs for children and adults. Restrooms located within the riparian corridor were removed to facilitate the Arroyo Viejo Creek restoration element, which was completed in 2008. The Arroyo Viejo Creek restoration element included the repair of in-stream locations, bank erosion, and unstable slopes; removal of all non-native vegetation; and re-planting of the entire corridor with native riparian plants. Arroyo Viejo Creek is used for educational outreach, offering educational opportunities to teach students about watersheds, environmental stewardship, and science. The one-way access road from the arboretum to the zoo has been widened to 30 feet to accommodate two-way traffic and a bicycle/pedestrian lane, which has improved circulation.

**TABLE 2-2: APPROVED MASTER PLAN STATUS**

<b>Element</b>	<b>Status</b>
<b><i>Arboretum</i></b>	
<b><i>Built Out</i></b>	
Center for Science and Environmental Education	Completed.
Removal of restrooms from riparian corridor	Completed.
Arroyo Viejo Creek restoration	Completed.
Widening of existing one-way access road to 30 feet to accommodate two-way traffic and bicycle/pedestrian lane	Completed.
New plantings as Arboretum ages	Ongoing.
<b><i>Zoological Park</i></b>	
<b><i>Built Out</i></b>	
African Savanna: new trail extending from existing elephant exhibit to center of zoo; new exhibits along this trail, including warthog, green monkeys, hyena; overlooks to view lions, impala, grater kudu, and baboon exhibits	Completed.
African Village: new restroom; food service and cultural hut adjacent to existing elephant exhibit	Completed.
Improved Safari Restaurant and gift center	Completed.
Improved main entrance including landscaping, new ticket booth, signage, and banners	Completed.
New squirrel monkey and tiger exhibits	Completed.
Rides renovation	Completed.
Wall along southerly boundary across main parking area to screen parking from adjacent residences and provide a sound barrier. A landscaped buffer replaced the wall in response to neighborhood request as specified in the Memorandum of Understanding (MOU).	Completed.
Children's Zoo improvements and upgrades	Completed.
Improved secondary entrance including landscaping, new ticket booth, signage, and banners	Completed.
Replacement of paving in existing overflow parking lots	Completed.
Snow Building: improvements including upgraded kitchen, main hall, and restroom facilities	Completed.
Australian Walk About: new home for existing wallabies, wallaroos, and large flightless emus	Completed.
Ongoing maintenance and upgrades to existing exhibits and facilities	Ongoing.
<b><i>California 1820 Exhibit</i></b>	
<b><i>Not Built</i></b>	
<p>Animal Exhibits:</p> <ul style="list-style-type: none"> <li>• Canyon Exhibit: featuring golden eagle, jaguar, bald eagle, white tailed deer, bobcat, great horned owl, walk-through aviary, and California reptile</li> <li>• River Exhibit: featuring river otter, great blue heron, sandhill crane, and other animal species</li> <li>• Woodland Exhibit: featuring American bison, cougar, barn owl, and grey wolf</li> <li>• Grizzly Bear Exhibit</li> </ul>	<p>Animal Exhibits:</p> <p>The currently proposed Master Plan amendment proposes reconfiguration of the animal exhibits, with some changes to the animals included in the exhibits. Currently proposed exhibits are wolf, jaguar, eagle, condor, beaver, water fowl, grizzly bear, mountain lion, and black bear (Some numbers and types of animals may be substituted based on availability.)</p>

**TABLE 2-2: APPROVED MASTER PLAN STATUS (continued)**

Element	Status
<i>California 1820 Exhibit (cont'd)</i>	<i>Not Built</i>
California Interpretive Center – viewing platform and interpretive exhibits	The currently proposed Master Plan amendment proposes to locate this element approximately 300 feet to the northwest of its originally planned site.
Off-site breeding activity	The currently proposed Master Plan amendment proposes to eliminate this activity from the Master Plan and incorporate the area into the reconfigured California Exhibit.
Paving of existing service road	The currently proposed Master Plan amendment proposes to retain this element.
Loop road and shuttle bus system	The currently proposed Master Plan amendment proposes to eliminate this element from the Master Plan and replace it with an aerial gondola people-moving system.
Perimeter fence	The currently proposed Master Plan amendment proposes to establish the specific location of the final alignment of this fence. The proposed final alignment would reduce the overall area enclosed by the fence by approximately 5.28 acres.
Existing Veterinary Medical Hospital	The currently proposed Master Plan amendment proposes to relocate the existing veterinary medical hospital and build a new Veterinary Medical Hospital on an approximately one-acre portion of the previously approved River Exhibit site.
Emergency vehicle access road from Snowdown Avenue	The currently proposed Master Plan amendment proposes to retain this element.

Source: PLACEMAKERS, 2010.

### 2.3.2 ZOOLOGICAL PARK

The major Zoological Park elements in the approved Master Plan, including the various animal exhibits as well as improvements to the Children’s Zoo, Snow Building, Safari Restaurant, and gift center, have been completed (see **Table 2-2**). The rides have been renovated. The main and secondary entrances have been improved and the overflow parking lot, located to the north of the main parking lot, was re-paved in 2007; these changes have improved parking and circulation conditions at the zoo. A landscaped buffer has been installed along the main parking lot.

### 2.3.3 CALIFORNIA 1820 EXHIBIT

The approved Master Plan provides for an exhibit known as California 1820 that would encompass a variety of animal exhibits, activities, and improvements. This element of the approved Master Plan has not been implemented and is the primary focus of the proposed Master Plan amendment.



SOURCE: Amphion Environmental, Inc.

Figure 2-2  
Approved Master Plan

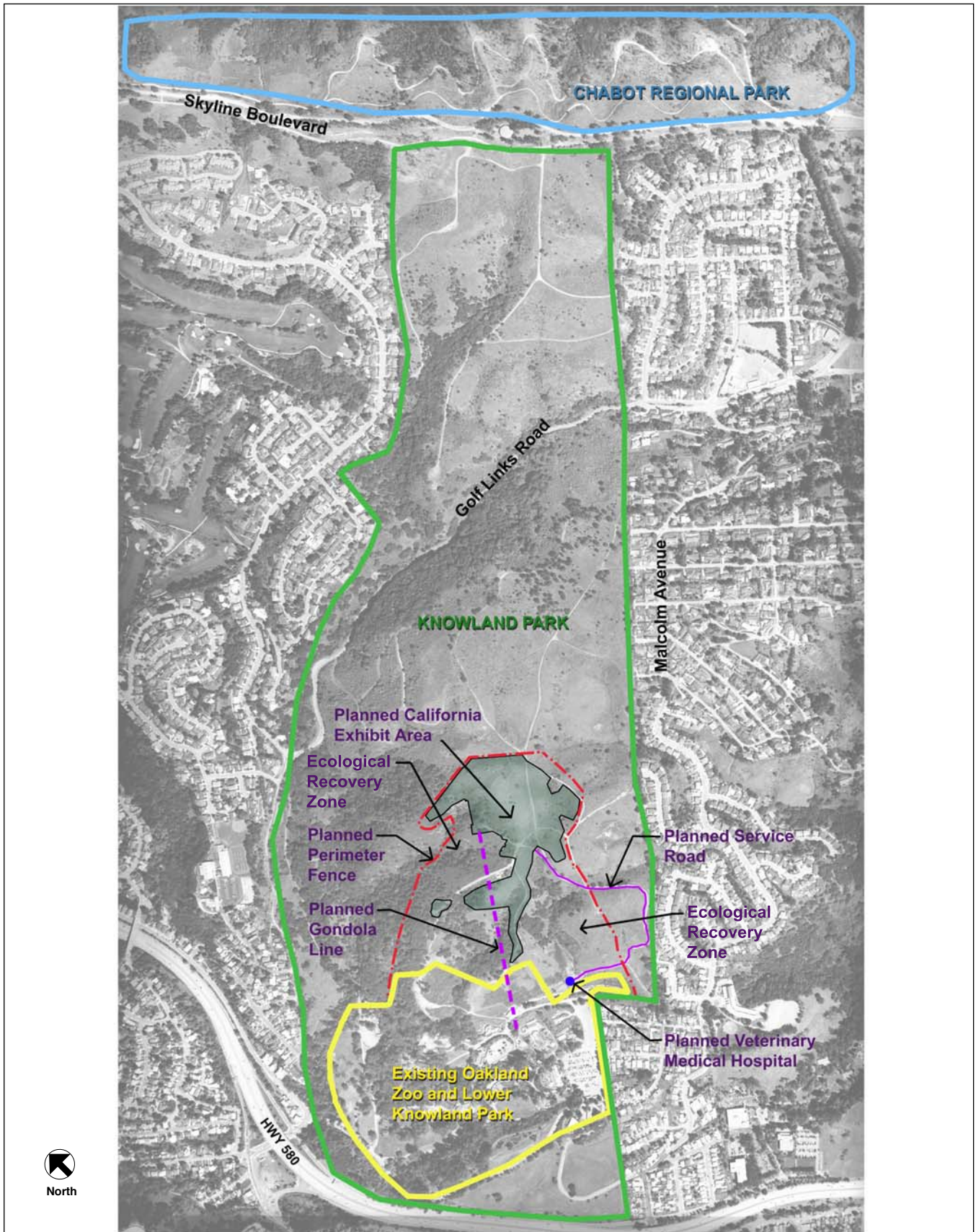


The approved Master Plan calls for locating California 1820 to the east of the existing zoo in an undeveloped portion of Knowland Park. The central theme of the exhibit focuses on regional extinction, featuring native California species present before the Gold Rush. The animal exhibits provided for in the approved Master Plan include a River Exhibit, Grizzly Bear Exhibit, Canyon Exhibit, and Woodland Exhibit. Other features include off-site breeding activity, a California Interpretive Center, a loop road and shuttle bus system, and paving of the existing service road. Additionally, the approved Master Plan allows installation of an approximately eight-foot-high black cyclone perimeter fence around the entire California 1820 area. The Oakland Zoo's original proposal for the location of the fence was modified during the approval of the Master Plan in response to neighbor concerns. The modified fence location was documented in the approved Master Plan conditions of approval and encompasses approximately 62 acres. The approved Master Plan, including the fence location is shown on **Figure 2-2**. To maintain the zoo's accreditation, the perimeter fence is required by the Association of Zoos and Aquariums (Association of Zoos and Aquariums 2010). The perimeter fence is also required by the United States Department of Agriculture for the license to exhibit animals (USDA 2001). In accordance with these requirements, perimeter fences must be separate from all exhibit fencing.

## 2.4 PROPOSED MASTER PLAN AMENDMENT

The Oakland Zoo's currently proposed Master Plan amendment involves the approved California 1820 exhibit area. The Master Plan amendment would refine and make certain changes to the site plan for the approved California 1820 exhibit, which would be renamed the California Exhibit. The approved perimeter fence line would be modified to reduce impacts on biological resources, improve public access to one of the knolls, and avoid encroachment into the area zoned Open Space (Resource Conservation Area). The Master Plan amendment also proposes to relocate the activities that currently take place at the existing Veterinary Care Center within the zoo area to a new Veterinary Medical Hospital facility that would be located within the approved California 1820 exhibit area. **Figure 2-3** shows the proposed Master Plan amendment area. **Figure 2-4** shows the overall site plan for the proposed Master Plan amendment.

The following discussion describes (1) the site plan for the California Exhibit proposed by the Master Plan amendment, (2) the Veterinary Medical Hospital proposed by the Master Plan amendment, (3) proposed access roads and paths, (4) the Habitat Enhancement Plan, (5) the proposed Ecological Recovery Zone, (6) proposed grading, (7) proposed utilities, (8) the estimated number of new employees that would result from the buildout of the amended Master Plan, (9) the estimated zoo attendance increase that would result from the buildout of the amended Master Plan, (10) proposed construction activities and schedule, and (11) ongoing maintenance activities and upgrades.



SOURCE: PJA



**Figure 2-3**  
Proposed Master Plan Amendment Boundary





SOURCE: Aliquot and PJA



**Figure 2-4**  
Proposed Master Plan Amendment: Overall Site Plan



### 2.4.1 PROPOSED SITE PLAN FOR CALIFORNIA EXHIBIT

The proposed Master Plan amendment would provide a detailed site plan for the California Exhibit area (see **Figure 2-5**). The following discussion describes the main elements proposed for the California Exhibit area. (Note: The description of the types of animal exhibits is preliminary and may be adjusted based on animal availability.)

#### 2.4.1.1 Aerial Gondola People-Moving System

A proposed aerial gondola people-moving system would transport visitors from the already-developed zoo area to the California Interpretive Center in the California Exhibit. (See description of the California Interpretive Center in **Subsection 2.4.1.2** below.)

The proposed gondola people-moving system would consist of eight support structures (seven structures ranging from approximately 22 to 39 feet high and one structure located in a ravine that would be approximately 62 feet high); a cable system; a lower terminal located approximately 350 feet from the zoo's main entrance, next to the rides area and the African veldt exhibit; and an upper terminal located at the proposed California Interpretive Center.

The gondola would travel northeast up the south-facing slope over a total length of approximately 1,850 feet and a vertical rise of approximately 331 feet. A total of 15 eight-passenger gondolas would be attached to the haul rope with detachable grips.

Each of the eight support structures would have a base that would be a maximum of approximately 12 feet by 12 feet in size. The support structures and cars would be matte-finish and forest green color or other earth tone color. **Figure 2-6** shows a conceptual representative example of a typical gondola car. The gondola support structures would not include any night lighting.

#### 2.4.1.2 California Interpretive Center

The California Interpretive Center would contain interpretive exhibits, a restaurant, a gift shop, office and employee work areas, classrooms and restrooms. The facility would provide services and may occasionally be used in the evenings for events that currently occur at the zoo, such as zoo-related business meetings, fundraisers, lectures, the ZooLights holiday light show, and the annual members' night. The restaurant would be open only during regular zoo operating hours.

The California Interpretive Center building would be recessed into the hillside. Two stories would be below the finished grade at the southeast elevation where an open bay would be located to receive the gondola cars. The full three stories, at approximately 36 feet in height, would be visible at the northwest elevation. The building would be constructed of concrete and



SOURCE: PJA



**Figure 2-5**  
Proposed Master Plan Amendment:  
Site Plan for California Exhibit



Representative sample of Gondola Terminal Station, Tower Assembly, and Cabin. Tower locations vary in height based on topography. Upper terminal location in California Exhibit will be completely enclosed within the California Interpretive Center's gondola exit and entry section of the building. Lower terminal location will be situated in the existing Zoo. Color of gondola cabins and towers will be forest green and/or other earth tones to blend into surrounding terrain.

SOURCE: CWA Construction – Design



**Figure 2-6**  
Typical Gondola Car

steel with natural wood siding and accents and a non-reflective glass front. **Figures 2-7a and 2-7b** show proposed building elevations for the California Interpretive Center. The building would contain a total of approximately 34,305 square feet in two partially separated spaces. The total footprint of the building, including the open air circulation area between the two spaces, would be approximately 13,320 square feet. An exterior deck off the restaurant would contain approximately 1,140 additional square feet.

The building would be constructed in two parts. The first part would house the receiving area for the gondola. The second part of the building, which would include uses such as offices, classrooms, a restaurant, and a gift shop, would be built later. (See further discussion under **Subsection 2.4.9.1, Construction Phasing**, below.)

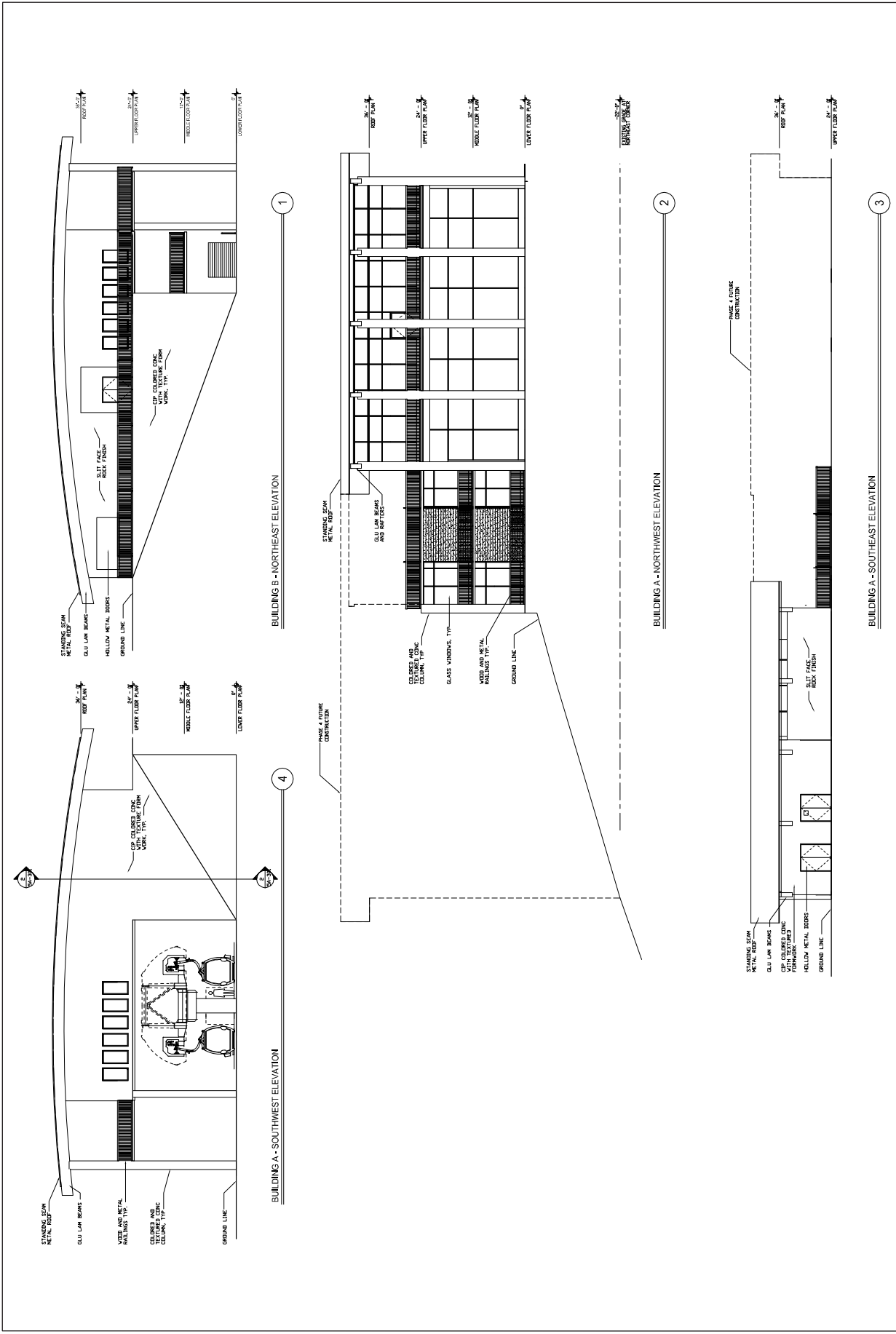
### **2.4.1.3 Wolf, Jaguar, Eagle and Condor Exhibits**

As visitors leave the northeast side of the California Interpretive Center, they would have a choice of walking on a wooden boardwalk or a rope bridge to reach the wolf, jaguar, eagle and condor exhibits. The wooden boardwalk would be approximately 700 feet long and 13 feet wide, with a total area of approximately 11,800 square feet.

An approximately 24,840-square-foot wolf exhibit area would be located on the south side of the boardwalk, and an approximately 67,500-square-foot wolf exhibit area would be located on the north side of the boardwalk. Two approximately 3,200-square-foot wolf holding pens would be located at the far end of the northern exhibit area. The pens would be surrounded by an approximately eight-foot-high chain link fence. One of the pens would be covered with a metal corrugated roof and the other pen would be open. The pens would be screened by vegetation.

An approximately 10,280-square-foot jaguar exhibit area would be located on the south side of the boardwalk, and an approximately 13,640-square-foot jaguar exhibit area would be located on the north side of the boardwalk. The southern jaguar exhibit area would be covered with an approximately four-by-four-inch steel cable mesh enclosure. The northern exhibit area would contain an approximately 2,540-square-foot, 15-foot-high jaguar holding facility that would be screened from view from the boardwalk and accessible by service road. The facility would be constructed using concrete modular unit (CMU) block and metal mesh walls to allow natural ventilation through the holding rooms.

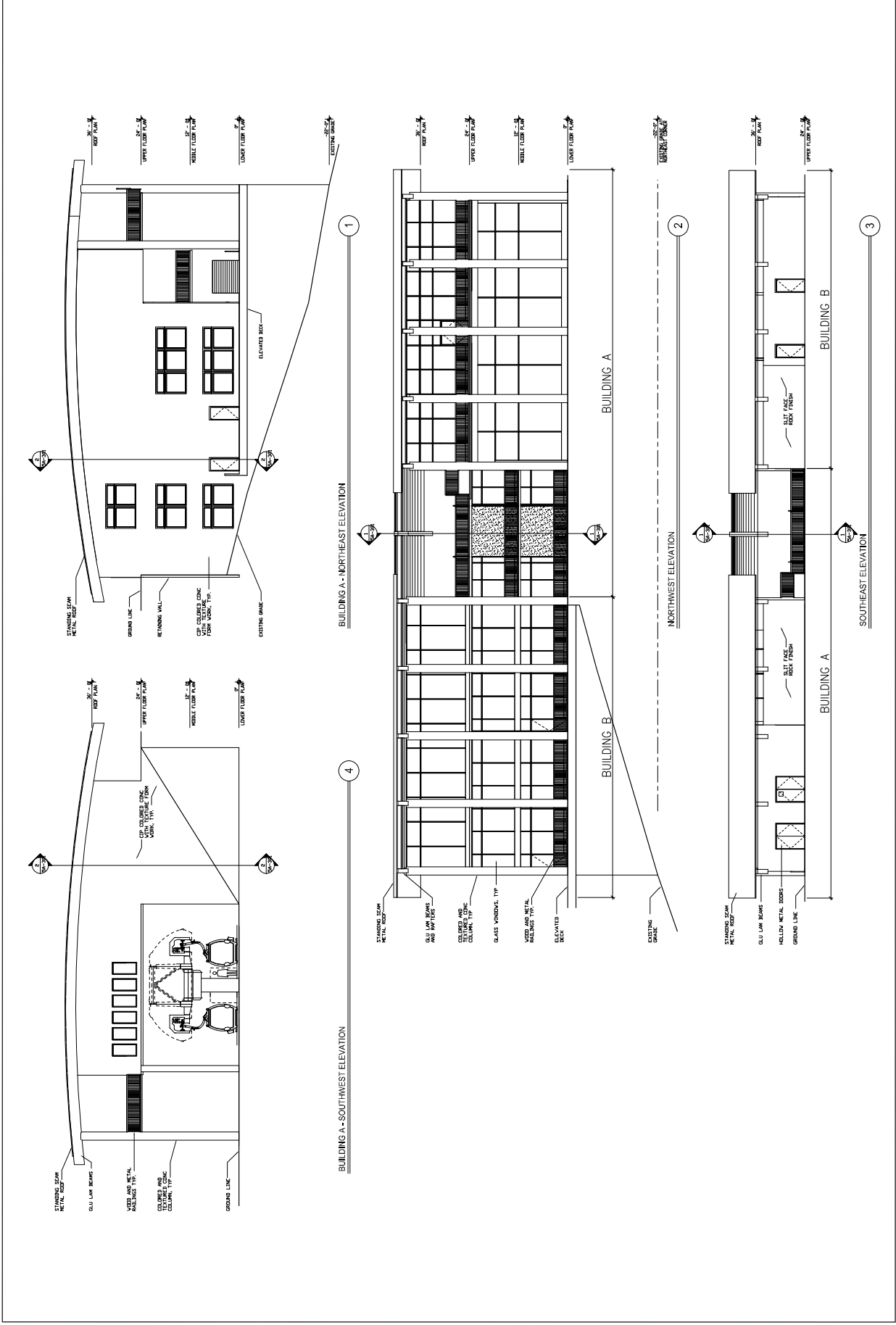
The boardwalk would be bisected by an approximately 3,000-square-foot wood structure that would overlook the eagle and condor aviaries. The overlook building would have rustic wood siding, a cedar shake roof, and operable screen windows and doors that allow natural ventilation. Glass view windows would be located on the south side of the structure.



SOURCE: PJA



**Figure 2-7a**  
 Proposed Master Plan Amendment:  
 California Interpretive Center – Elevations (Building A)



SOURCE: PJA

**Figure 2-7b**  
 Revise title as follows: Proposed Master Plan Amendment:  
 California Interpretive Center – Elevations (Buildings A and B)



The eagle enclosure would be approximately 6,240 square feet and the condor enclosure would be approximately 11,970 square feet. Both enclosures would be aviary structures covered with approximately four- by four-inch steel cable mesh.

#### **2.4.1.4 Beaver/Water Fowl Aviary and Restrooms**

Visitors exiting the boardwalk would cross the service road to reach the approximately 6,230-square-foot enclosed beaver and water fowl aviary. The aviary enclosure would be constructed of one-inch stainless steel coil mesh attached to a steel post frame. A path and boardwalk would meander through the inside of the aviary. An approximately 840-square-foot, 10-foot-high beaver holding facility of CMU construction would be hidden from view in the rockwork.

An approximately 420-square-foot composting toilet facility of CMU construction would also be located in the vicinity of the beaver and water fowl aviary. Another approximately 420-square-foot CMU enclosure housing support systems for the beaver and grizzly bear water features would be located just beyond and adjacent to the restrooms.

#### **2.4.1.5 Grizzly Bear Exhibit**

The grizzly bear exhibit would be located immediately east of the beaver and water fowl aviary. A glass viewing wall would provide underwater views into a pool where the bears would swim and catch fish.

A sod-covered roof would shade a viewing area from which visitors would have views of the adjacent approximately 42,640-square-foot grizzly bear habitat and the larger approximately 62,110-square-foot habitat beyond. A chain-link barrier fence separating the two grizzly bear habitats would be obscured by land formations.

An approximately 4,675-square-foot, 10-foot-high holding facility for the bears would be screened by land formations and rockwork. The holding facility would be a CMU and mesh enclosure, with a green roof and open mesh exterior walls to allow natural ventilation through the building. No mechanical ventilation would be used.

#### **2.4.1.6 Mountain Lion/Black Bear Exhibits**

The mountain lion and black bear exhibits would be located immediately south of the grizzly bear exhibit.

The mountain lions would be located in an approximately 9,910-square-foot aviary structure enclosed with two-by-two-inch stainless steel cable mesh. An approximately 27,500-square-foot night habitat for the mountain lions would be located beyond the enclosure. An approximately 2,270-square-foot, 15-foot-high holding facility would be located immediately west of these two

habitats, partially buried in the hillside and obscured by rockwork. The holding facility would be open on two sides with mesh walls to allow natural ventilation.

The black bear exhibit would be located west of the mountain lion area. The approximately 215,340-square-foot day enclosure for the bears would contain a moat, along with a heavy-duty chain-link barrier fence screened by vegetation and land forms. An approximately 37,050-square-foot secondary habitat would be located southwest of this enclosure. An approximately 2,640-square-foot, 12-foot-high holding facility would adjoin these two habitats, partially buried in the existing hillside and screened by additional rockwork. The holding facility would be of CMU construction, with a green roof and mesh openings for natural ventilation. **Figure 2-8** shows proposed building elevations for the black bear holding area, which are representative of the design of the animal holding buildings.

#### **2.4.1.7 Small Exhibit Activity Zone**

The “Small Exhibit Activity Zone” would contain an approximately 8,810-square-foot children’s play area located immediately north of the main black bear viewing area. The play area would contain a large shotcrete oak tree with a tree house and a climbing rock, along with a small “splash area” with pop jets.

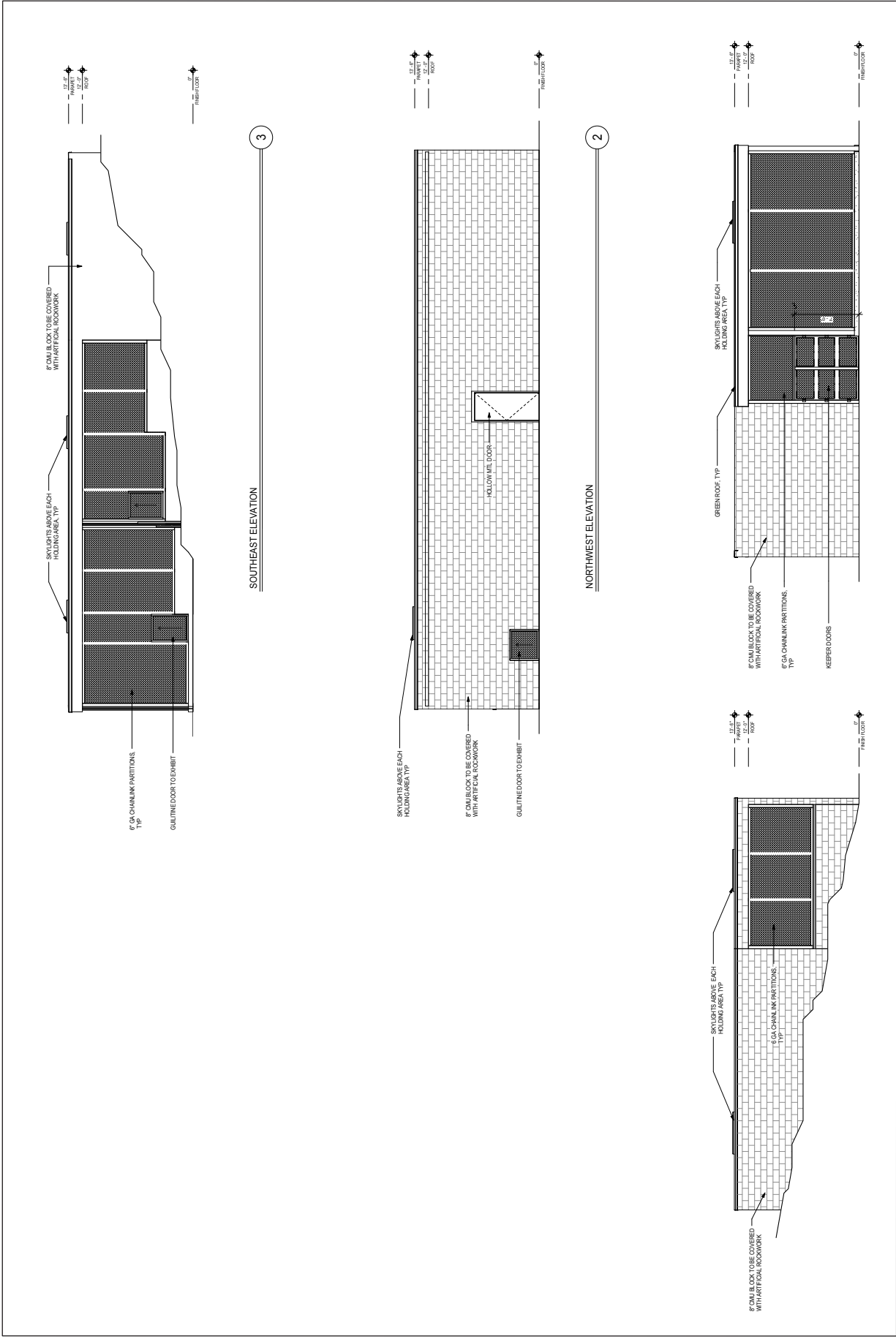
The Small Exhibit Activity Zone would also contain two additional views into the grizzly bear habitats, one with a moat separating visitors from the bears and the other containing a full-height window with a view to a nearby shallow pool for the bears.

An approximately 4,140-square-foot shotcrete cave would be located just beyond the children’s play area. The cave would contain view windows into a grizzly bear cave and two small exterior animal exhibits, as well as several small jewel-box exhibits in the cave walls.

#### **2.4.1.8 Interpretive Kiosk, Botanical Exhibit and Bison/Tule Elk Feeding Station**

An approximately 400-square-foot interpretive kiosk would be located southwest of the Small Exhibit Activity Zone. The kiosk would be a wooden, open-air shade structure with a sloping corrugated metal roof and wood deck floor. The structure’s pitched roof would be approximately 10 feet high on the path side and approximately 14 feet high on the view side. The structure would frame views of Oakland and San Francisco Bay and contain interactive exhibits, graphic displays, and artifacts related to these views. A glass wall on the south side of the interpretive kiosk would provide views into the black bear habitat.

Immediately north of the interpretive kiosk would be an approximately 4,500-square-foot botanical exhibit featuring native plants, along with a small overlook and feeding station for the existing tule elk and bison herds that graze on the slopes leading down to the main zoo grounds.



SOURCE: PJA



**Figure 2-8**  
 Proposed Master Plan Amendment:  
 Black Bear Holding Area

#### 2.4.1.9 Amphitheater

An approximately 11,850-square-foot, 250-seat concrete and stone open air amphitheater would be located west of the grizzly bear exhibit and south of the California Interpretive Center. The amphitheater would be used for scheduled animal shows during regular zoo operating hours, similar to the programs and events currently offered in the Children's Zoo. No special events would occur at the amphitheater.

#### 2.4.1.10 Overnight Experience

An existing, approximately 775-foot-long fire trail immediately south of the amphitheater would lead to an approximately 0.36-acre "Overnight Experience" (overnight camping area), located in a remote, wooded setting west of the main California Exhibit area.

The camping area would provide approximately 11 ten-by-twenty-foot canvas tents on wooden platforms, along with composting toilets. Overnight visitors to the camping area would arrive at the site by the gondola and a short walk on the existing fire trail.

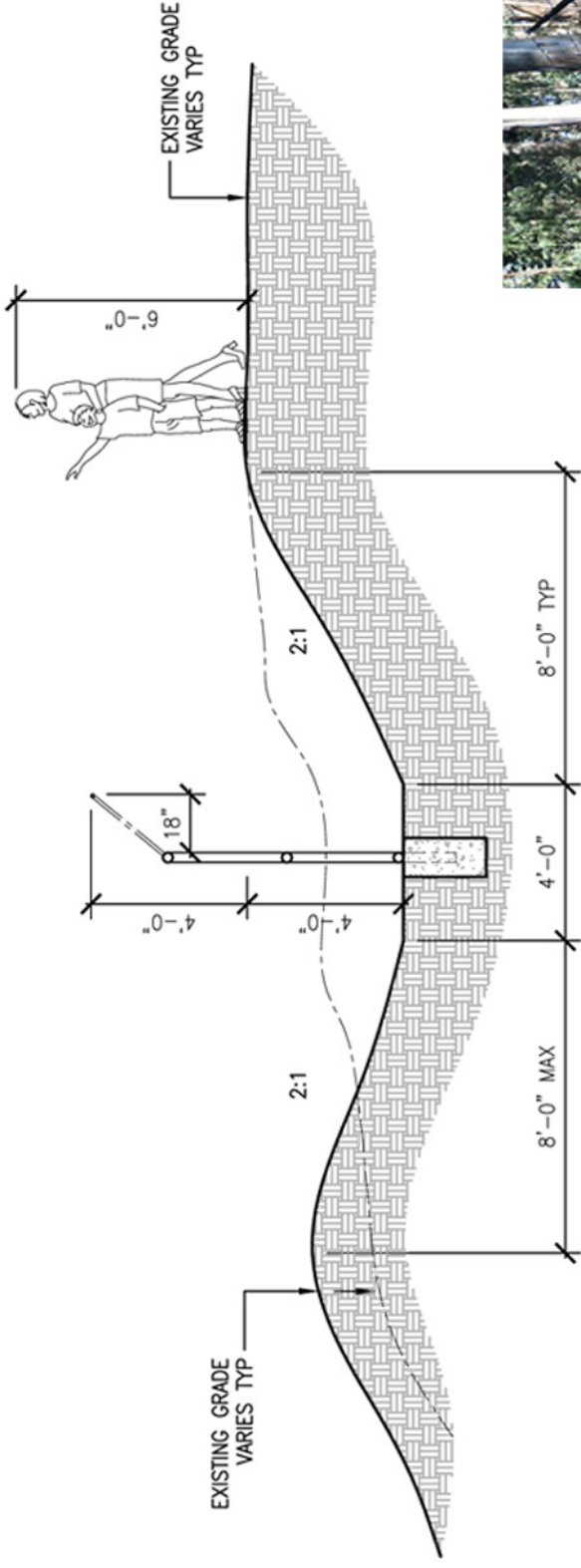
Camping activities would be for organized youth groups and other student or family groups attended and facilitated by Oakland Zoo staff. The overnight camping area would serve groups of approximately 60 to 100 people. Most of the camping activity would occur on weekends, particularly in summer.<sup>1</sup>

#### 2.4.1.11 Perimeter Fence

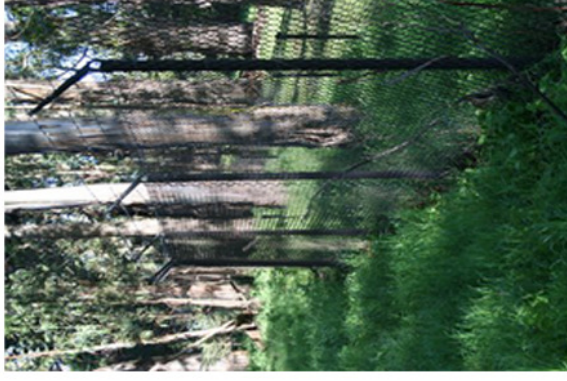
As shown on **Figure 2-4**, a fence would extend around the perimeter of the California Exhibit. The perimeter fence would be constructed of black-coated cyclone fencing material with barbed wire on top and would be approximately eight feet high. The entire length of the perimeter fence would be designed to allow for passage of Knowland Park wildlife along the base of the fence approximately every 300 feet. Approximately 225 feet of the perimeter fence (located to the south of the black bear and mountain lion exhibits and highlighted in red on **Figure 2-4**) would be constructed in an engineered swale that would lower the fence below eye level for park users walking along the existing fire road, permitting unobstructed views of the Oakland skyline and San Francisco Bay. **Figure 2-9** shows a section drawing of the proposed perimeter fence and engineered swale and photographs of typical fencing installed at the zoo. The fence would connect with the existing perimeter fence that currently surrounds the zoo. (The existing fence extends along the northern zoo boundary at Golf Links Road and along the southern zoo boundary near the zoo's main parking lot.)

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<sup>1</sup> The existing zoo camping activities consist of (1) "Family Sundown Safari," for ages Kindergarten through 12; and (2) "Bedtime with the Beasts," for ages 6 through 18. In 2009, two "Family Sundown Safari" overnights served a total of 134 people, and 47 "Bedtime with the Beasts" overnights served a total of 850 people.



**Engineered Swale**  
Referenced in red on site.



**Perimeter Fence**  
TYPICAL REPRESENTATIVE IMAGE OF PERIMETER FENCE

SOURCE: Aliquot and PJA



**Figure 2-9**  
Proposed Master Plan Amendment:  
Proposed Perimeter Fence and Fence Swale

### 2.4.1.12 Landscaping

**Figure 2-10** illustrates the proposed schematic planting plan for the California Exhibit. As the figure shows, preliminary plans for landscaping of the California Exhibit provide for the removal of non-native plant species and preservation and planting of native trees, shrubs, and grasses. Signage would highlight “local native” plants. Evapotranspiration-based irrigation controllers would be used to minimize water use.

## 2.4.2 PROPOSED RELOCATED VETERINARY MEDICAL HOSPITAL

The Master Plan amendment proposes to relocate the zoo’s existing veterinary medical hospital and construct a new Veterinary Medical Hospital on an approximately one-acre site within the approved California 1820 exhibit area, adjoining the existing overflow parking lot at the zoo.

### 2.4.2.1 Building Design and Features

**Figure 2-11** shows the site plan and **Figures 2-12a** and **2-12b** show building elevations for the proposed Veterinary Medical Hospital. The building would total approximately 17,065 square feet and would have an approximately 13,765-square-foot footprint. Half of the building would be two levels and half would be one level. The building would range in height from approximately 12 feet to 28 feet 4½ inches, with the elevator overrun extending to approximately 31 feet 6 inches in height.

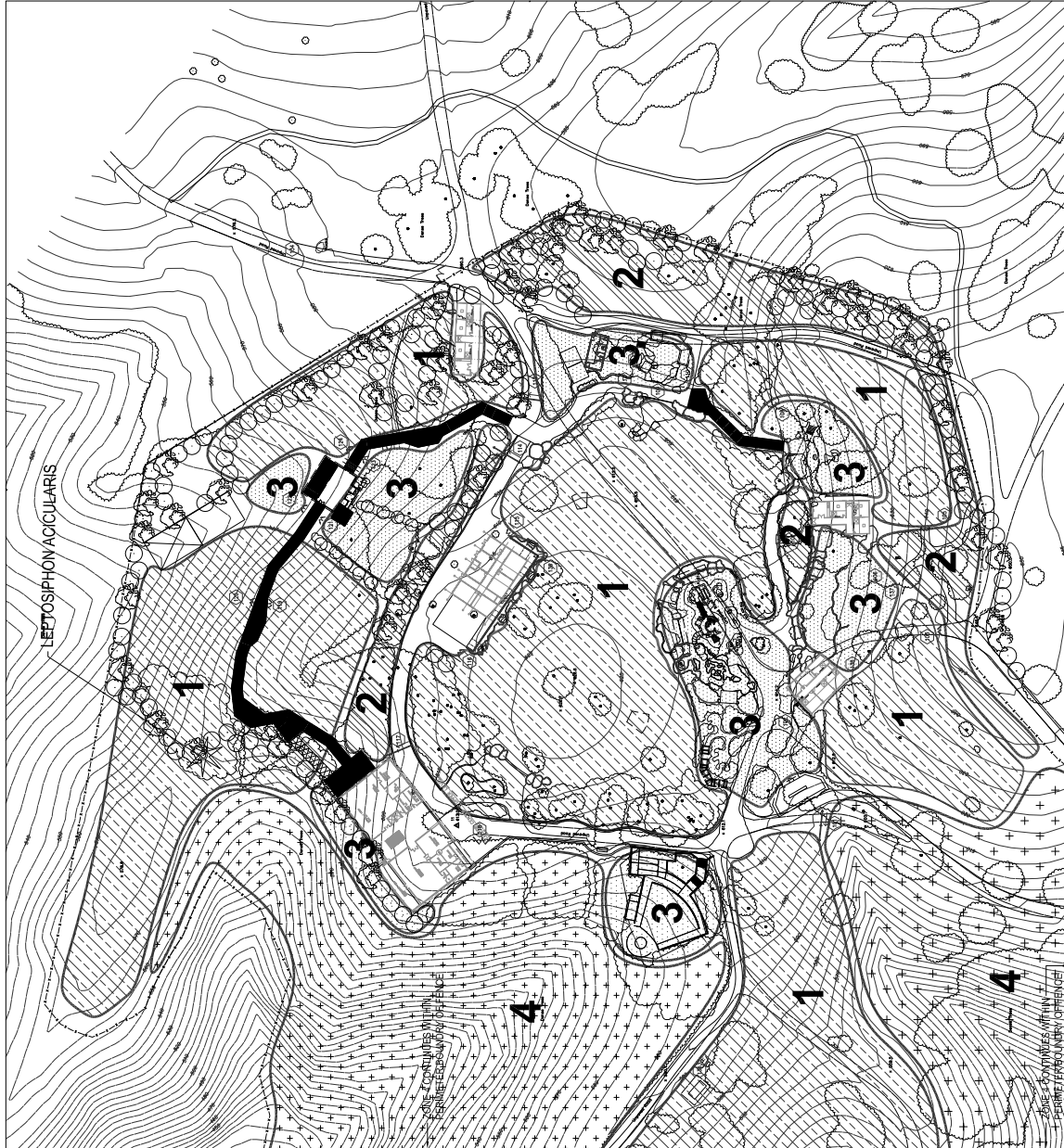
Building materials would include a mix of concrete masonry units, stained wood siding and roof eaves, and painted metal doors and window frames. The roof would be built with asphalt/composite shingles, with mechanical roof and elevator roof covered with a single-ply membrane roofing system. Exterior animal holding areas would be a wood and steel frame structure covered by a translucent polycarbonate panel system, providing both shelter and light for the recuperating animals. Earth tone colors would be used for the building.

Two split mechanical units – one approximately 10-ton unit and one approximately 15-ton external condensing unit – would be mounted on the ground on the northwest corner of the building, screened by concrete masonry unit walls to match the building. An emergency back-up generator would be located in the same area. Two mechanical units for treating the animal holding wing would be tucked into the roof and screened from view from the parking lot.

The new Veterinary Medical Hospital would be the first Leadership in Energy and Environmental Design (LEED)-certified facility of its kind in the state of California and would (1) be designed with multiple energy-saving and water conservation features (including dual flush toilets; high-efficiency lights, windows, and skylights; insulated masonry block walls; and exterior shading devices); (2) incorporate sustainable building materials; and (3) create a healthy indoor environment through use of recycled and natural materials, finishes with anti-microbial properties, daylight to

**LEGEND:**

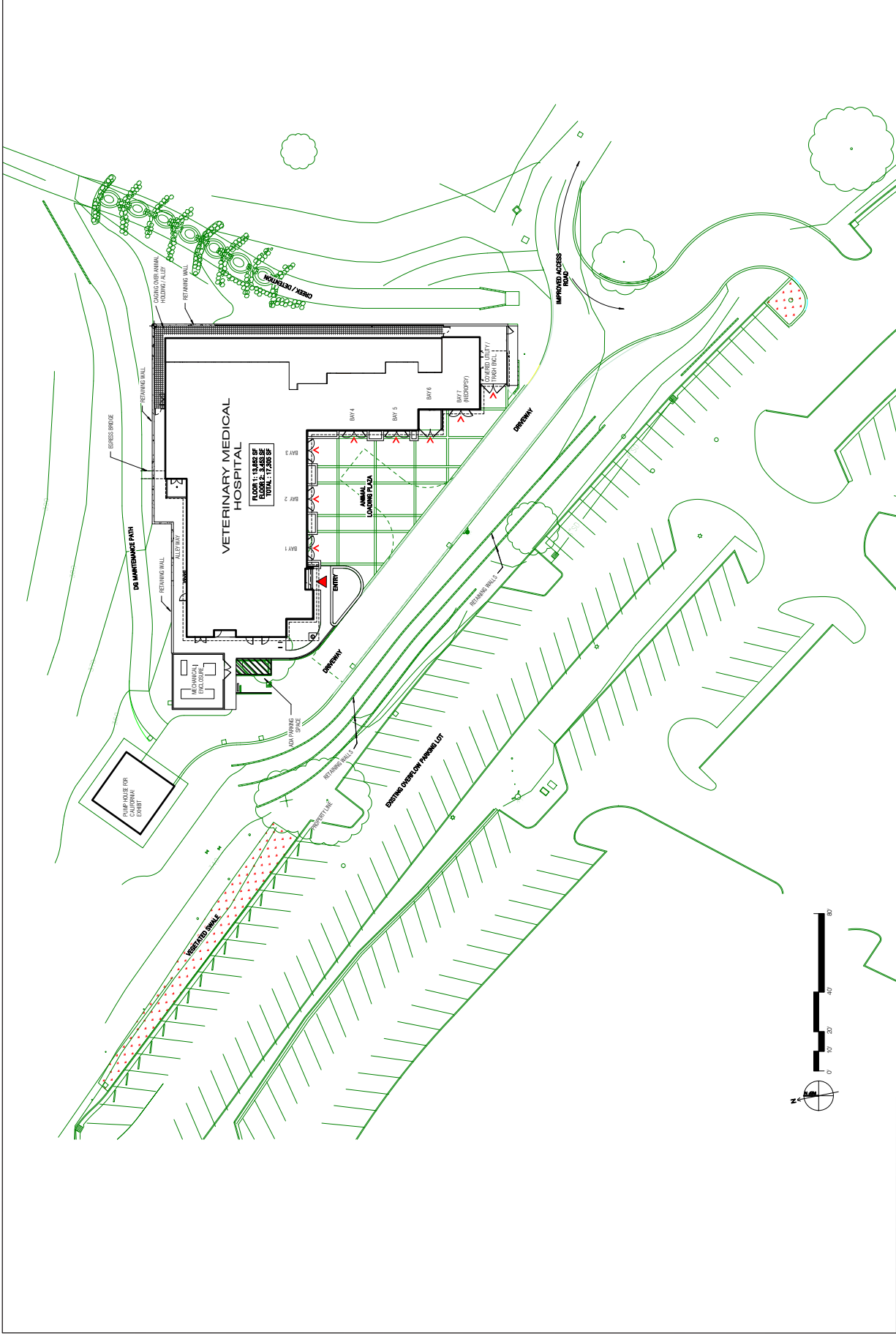
SYMBOL	DESCRIPTION
○	NEW NATIVE DECIDUOUS TREE
◐	NEW NATIVE BROADLEAF EVERGREEN TREE
○	EXISTING TREE & SHRUB CANOPY
✳	EXISTING PLANT SPECIES - PROTECTION AND MONITORING MEASURES TO BE IMPLEMENTED
▨	<b>PLANTING SCHEMATIC 1:</b> <ul style="list-style-type: none"> <li>RETAIN ALL NATIVE PLANT SPECIES</li> <li>REMOVE ALL HIGHLY INVASIVE NON-NATIVE PLANT SPECIES</li> <li>PROVIDE ADDITIONAL PLANTINGS OF NATIVE TREES, SHRUBS, &amp; GRASSES FOR HABITAT ENHANCEMENT.</li> <li>NO GRADING</li> <li>ANIMAL HABITAT</li> </ul>
▩	<b>PLANTING SCHEMATIC 2:</b> <ul style="list-style-type: none"> <li>RETAIN ALL NATIVE PLANT SPECIES</li> <li>REMOVE ALL HIGHLY INVASIVE NON-NATIVE PLANT SPECIES</li> <li>PROVIDE ADDITIONAL PLANTINGS OF NATIVE TREES, SHRUBS, &amp; GRASSES FOR HABITAT ENHANCEMENT.</li> <li>NO GRADING &amp; NO ANIMALS</li> </ul>
▧	<b>PLANTING SCHEMATIC 3:</b> <ul style="list-style-type: none"> <li>PRESERVE ALL NATIVE TREES</li> <li>REMOVE ALL HIGHLY INVASIVE NON-NATIVE PLANT SPECIES</li> <li>ENHANCEMENT BY REPLANTING DISTURBED AREAS WITH NATIVE TREES, SHRUBS, &amp; GRASSES.</li> <li>GRADING</li> <li>ANIMAL HABITAT</li> </ul>
⊕	<b>HABITAT PROTECTION AND ENHANCEMENT ZONE 4:</b> <ul style="list-style-type: none"> <li>NATURAL AREAS TO BE ENHANCED THROUGH INVASIVE SPECIES REMOVAL &amp; NATIVE ENHANCEMENT PLANTINGS.</li> <li>TREATMENT AREA FOR ENHANCEMENT WILL BE DEFINED AS PART OF THE HABITAT ENHANCEMENT PLAN.</li> <li>PROVIDE ADDITIONAL PLANTINGS OF NATIVE TREES, SHRUBS, &amp; GRASSES FOR HABITAT ENHANCEMENT.</li> </ul>



SOURCE: PJA



**Figure 2-10**  
Proposed Master Plan Amendment:  
Schematic Planting Plan for California Exhibit

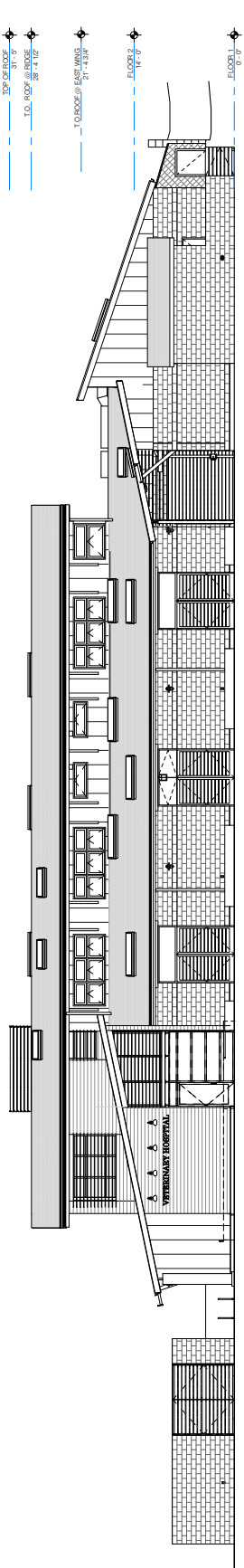


SOURCE: Noll & Tam Architects and Planners

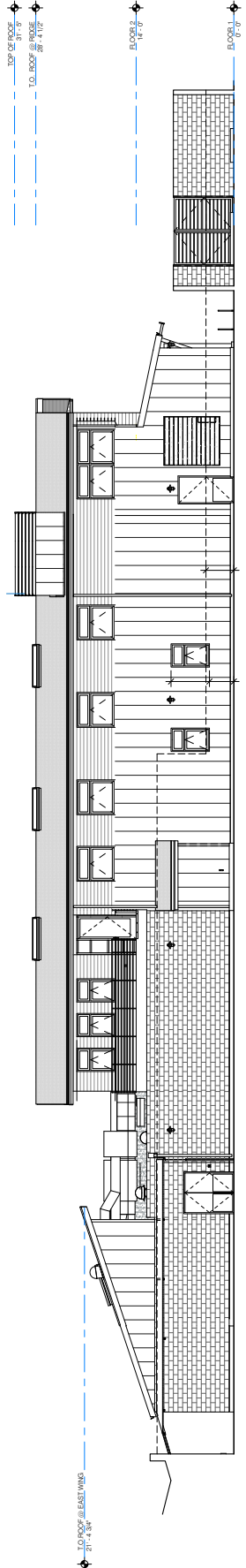


**Figure 2-11**  
Proposed Master Plan Amendment:  
Site Plan for Veterinary Medical Hospital





1 SOUTH ELEVATION  
33.0'

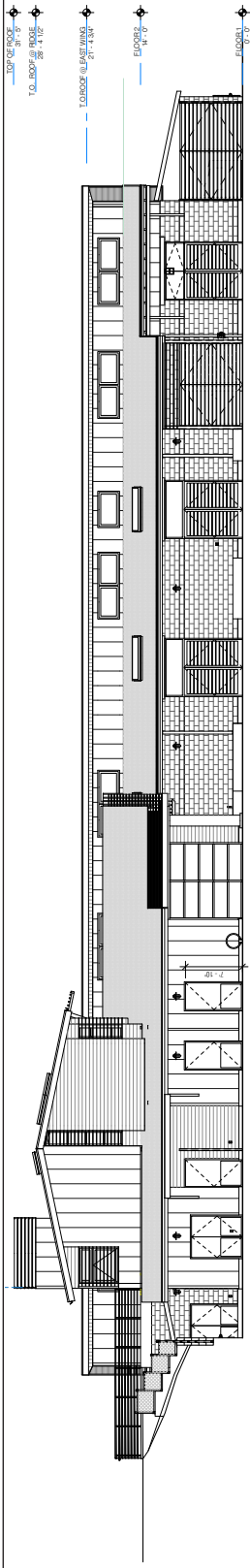


2 NORTH ELEVATION  
33.0'

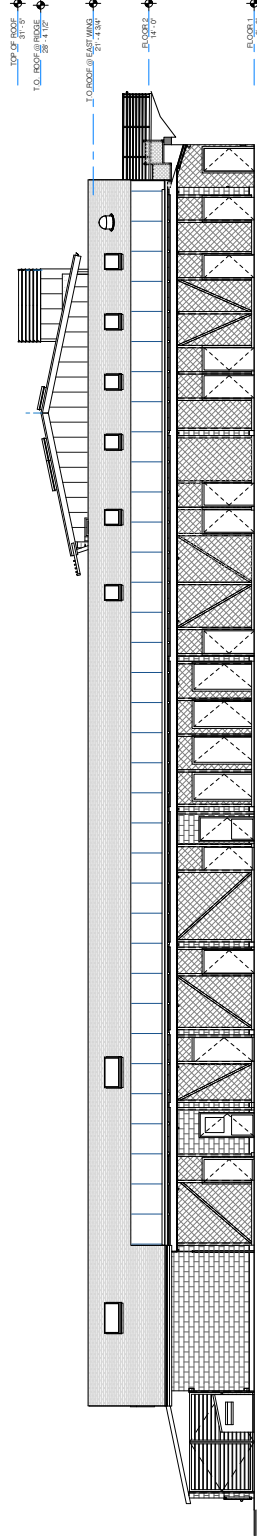
SOURCE: Noll & Tam Architects and Planners



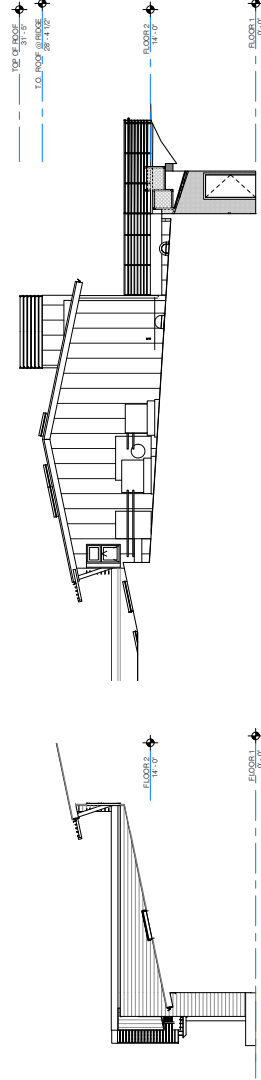
**Figure 2-12a**  
Proposed Master Plan Amendment:  
Veterinary Medical Hospital – South and North Elevations



1 WEST ELEVATION  
330



2 EAST ELEVATION  
330



4 PARTIAL EAST ELEVATION @ COL 4  
330

3 PARTIAL EAST ELEVATION @ COL 7  
330

SOURCE: Noll & Tam Architects and Planners



**Figure 2-12b**  
Proposed Master Plan Amendment:  
Veterinary Medical Hospital – West and East Elevations

internal circulation spaces, and controllable daylight to surgical spaces and animal healing spaces for the rehabilitating animal occupants.

#### 2.4.2.2 Landscaping Plan

**Figure 2-13** shows the proposed landscaping plan for the proposed new Veterinary Medical Hospital. As shown on the figure, the area around the new building would be planted with a variety of trees (red maple, madrone, valley oak, coast live oak, chapparal, blue oak, red cedar, western hemlock, redwood) and shrubs (service berry, toyon, monkey flower, wax myrtle, fenstemon, holly leaf cherry, Catalina cherry, coffeeberry, red berry, chapparal currant, blue elderberry). Regraded slopes would be stabilized with hydroseeding after grading and then planted with native grass plugs.

#### 2.4.2.3 Reuse of Existing Veterinary Care Center

With construction of the new facility, the existing Veterinary Care Center building located within the existing zoo would be used for existing zoo-related conservation/research and office uses.

### 2.4.3 PROPOSED ACCESS ROADS AND PATHS

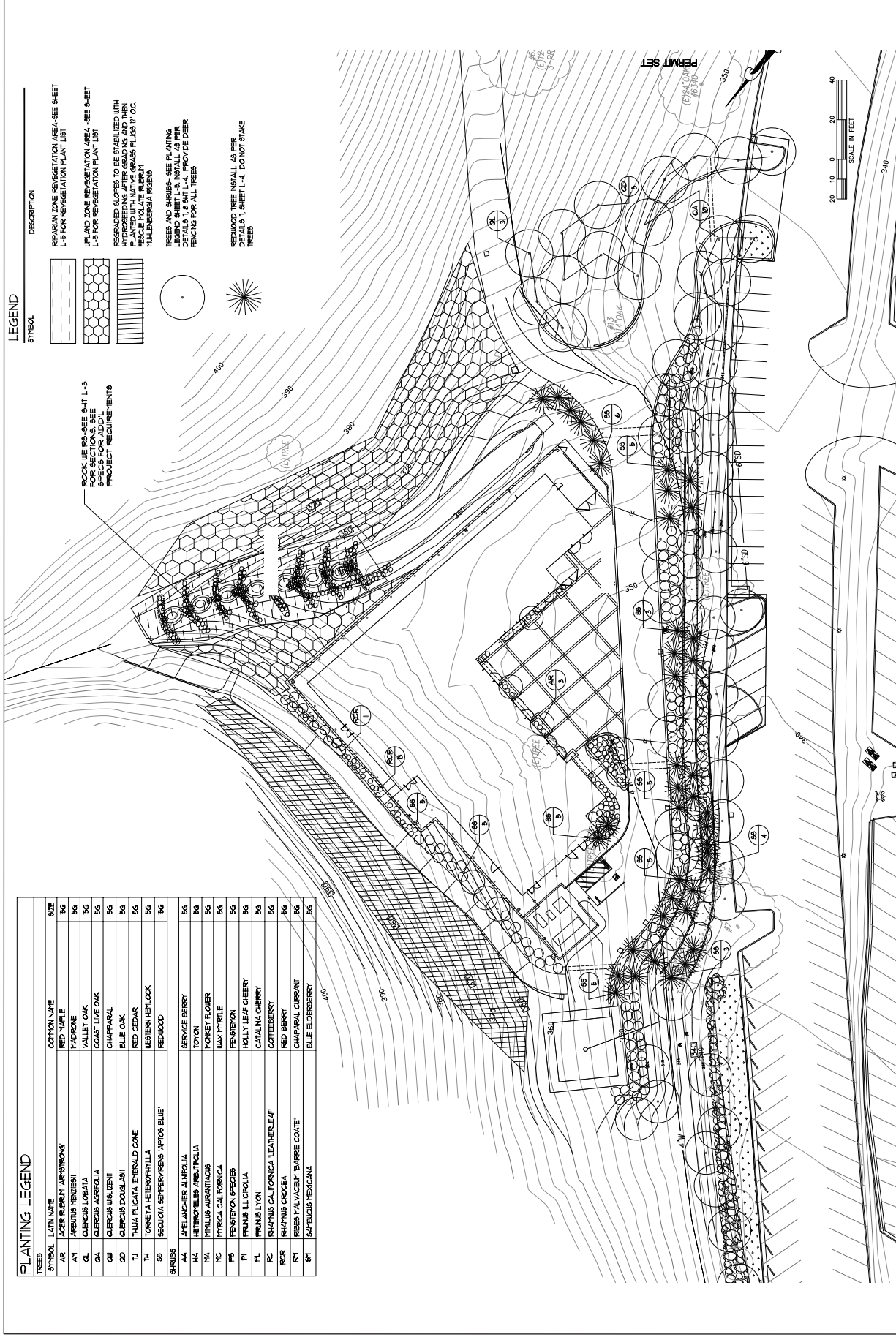
Because zoo patrons visiting the proposed California Exhibit would travel via the proposed aerial gondola people-moving system, roads included in the proposed Master Plan amendment are limited to a primary emergency vehicle access road, a service road/secondary emergency vehicle access road, a road extending through the California Exhibit, and a public access path.

#### 2.4.3.1 Primary Emergency Vehicle Access Road

The proposed Master Plan amendment includes provision of a primary emergency vehicle access road extending from the end of Snowdown Avenue to the proposed California Exhibit (see **Figure 2-4**). The road would follow the existing dirt road off Snowdown Avenue that is currently used by the Oakland Fire Department. The road would be widened to approximately 20 feet, with turnouts located approximately every 300 feet along the road's approximately 1,450-foot length. The road would be gravel.

#### 2.4.3.2 Service Road/Secondary Emergency Vehicle Access Road

A service road would be extended from the existing upper parking lots at the zoo to the proposed Veterinary Medical Hospital and to the California Exhibit (see **Figure 2-4**). This road would also serve as a secondary emergency vehicle access road. The road would be approximately 14 feet wide with an approximately three-foot ditch on the hill side of the road and an approximately two-foot dirt shoulder. The road would be expected to handle approximately 24 vehicle trips per day.



**PLANTING LEGEND**

SYMBOL	LATIN NAME	COMMON NAME	SIZE
AR	ACER RUBRUM 'ARMSTRONG'	RED MAPLE	BG
AT	ARELITUS PEZIZIENI	HYDRANGEA	BG
OL	QUERCUS LOBATA	VALLEY OAK	BG
GA	QUERCUS AGROBOLIA	COAST LIVE OAK	BG
OL	QUERCUS BILZINGII	CHAPARRAL	BG
OD	QUERCUS DOUGLASSII	BLUE OAK	BG
TJ	THUJA PLICATA 'BERNARD COE'	RED CEDAR	BG
TH	TORREYA LETERMOYNTILLIA	WESTERN HEMLOCK	BG
SS	SCALLOPA SEMPERVIRENS 'APTOS BLUE'	REDWOOD	BG
AA	ATELANCHER ALNIFOLIA	SERVICE BERRY	BG
HA	HETEROPHELES ARBUTIFOLIA	TOYON	BG
VA	NYCTAGINUS AURANTIACUS	MONKEY FLOWER	BG
YC	NYCTAGINUS CALIFORNICA	WAX TITMILE	BG
PS	FRAXINUS SPECIES	FRAXINUS	BG
PI	FRAXINUS ILLINOENSIS	HOLLY LEAF CHERRY	BG
PL	FRAXINUS CALIFORNICA	CATALINA CHERRY	BG
RC	RHAMNUS CALIFORNICA	LEATHERLEAF	BG
RDR	RHAMNUS CROCEA	RED BERRY	BG
BT	RIBES MALVACEUM 'BARRE COATE'	CHAPARRAL CARRANT	BG
BT	SAMBUCUS MEXICANA	BLUE ELDERBERRY	BG

**LEGEND**

**SYMBOL**

**DESCRIPTION**

RIPIARIAN ZONE REVEGETATION AREA - SEE SHEET L-9 FOR REVEGETATION PLANT LIST

UPLAND ZONE REVEGETATION AREA - SEE SHEET L-9 FOR REVEGETATION PLANT LIST

ROCK LINERS - SEE SHEET L-3 FOR REVEGETATION SPECIES FOR ADJACENT PROJECT REQUIREMENTS

REVEGETATION SLOPES TO BE STABILIZED WITH PLANTED WITH NATIVE GRASS PLUGS 1' OC. PLANTING WITH PLANTING SPECIES: HALDORSONIAN GREENS

TREES AND SHRUBS - SEE PLANTING LEGEND SHEET L-9. INSTALL AS PER DETAILS '1' SHEET L-4. DO NOT STAKE TREES

REDWOOD TREE INSTALL AS PER DETAILS '1' SHEET L-4. DO NOT STAKE TREES

SOURCE: RoseAnn Dal Bello Landscape Architect



**Figure 2-13**  
Proposed Master Plan Amendment:  
Landscape Plan for Veterinary Medical Hospital

### 2.4.3.3 Road through California Exhibit

An approximately 20-foot-wide road would extend through the proposed California Exhibit, passing by the California Interpretive Center and leading to the secondary emergency vehicle access road (see **Figure 2-5**). The road would widen to a minimum of approximately 30 feet in front of the California Interpretive Center.

### 2.4.3.4 Public Access Path

The Master Plan amendment proposes a path that would allow public access between existing fire roads to facilitate public access to two knolls located south of the California Exhibit that offer panoramic views of San Francisco Bay. The public access path would commence at the existing fire road located northeast of the California Exhibit and would generally follow the perimeter fence (see **Figure 2-4**), terminating at the existing fire road located to the south of the proposed mountain lion exhibit.

The public access path would be approximately four feet wide and approximately 1,315 feet long. The path would have a natural surface with cut slopes of approximately two to five percent. The path would be constructed by hand using non-mechanized tools or with small mechanized grading equipment. All regulatory protocols, including seasonal restrictions on construction activities, would be observed. The path would include signage at key intersections to indicate that it is a public pathway. The path would be for pedestrian use only and would not be designed for motorized traffic.

## 2.4.4 PROPOSED HABITAT ENHANCEMENT PLAN

The Oakland Zoo has prepared a Habitat Enhancement Plan (HEP) for the California Exhibit area and Upper Knowland Park that implements certain biological resources mitigation measures and Standard Conditions of Approval for the approved Master Plan and updated mitigation measures and Standard Conditions of Approval included in this Subsequent Mitigated Negative Declaration/Addendum. Habitat enhancement provided under the HEP would be achieved through the control and eradication of the target invasive species and through revegetation with native grassland, riparian, and woodland species where the native cover types have been displaced by non-native species. The HEP generally describes the habitat conditions in the HEP treatment area, defines goals, specifies performance standards, and identifies implementing actions related to habitat enhancement, invasive species removal, native revegetation, and sensitive resource protections. The HEP treatment area includes the Ecological Recovery Zone proposed by the Oakland Zoo as part of the Master Plan amendment. (See **Subsection 2.4.5** below for a description of the Ecological Recovery Zone.) See **Section 3.3, Biological Resources, Subsection 3.3.5.2 criterion b** for a detailed discussion of the HEP, and **Appendix H-2** for a copy of the HEP.

#### 2.4.5 PROPOSED ECOLOGICAL RECOVERY ZONE

The Ecological Recovery Zone, comprising approximately 20 acres, is located to the west and south of the California Exhibit animal exhibit area and is separated by the bison and tule elk animal exhibit (see **Figure 2-3**). This zone is comprised of a mix of habitat types including oak woodland, chamise chaparral, Diablan sage scrub, coyote brush scrub, and grasslands. The Ecological Recovery Zone will serve as an active educational resource for the community by engaging student groups, service organizations, and other leading Bay Area agencies in its cooperative care by furthering the removal of highly invasive non-native species and in developing habitat restoration efforts. Treatment methodologies to control invasive species and provide for revegetation with native species are discussed in detail in the Habitat Enhancement Plan (see **Appendix H-2**), which covers all of Upper Knowland Park, including the Ecological Recovery Zone.

#### 2.4.6 PROPOSED GRADING

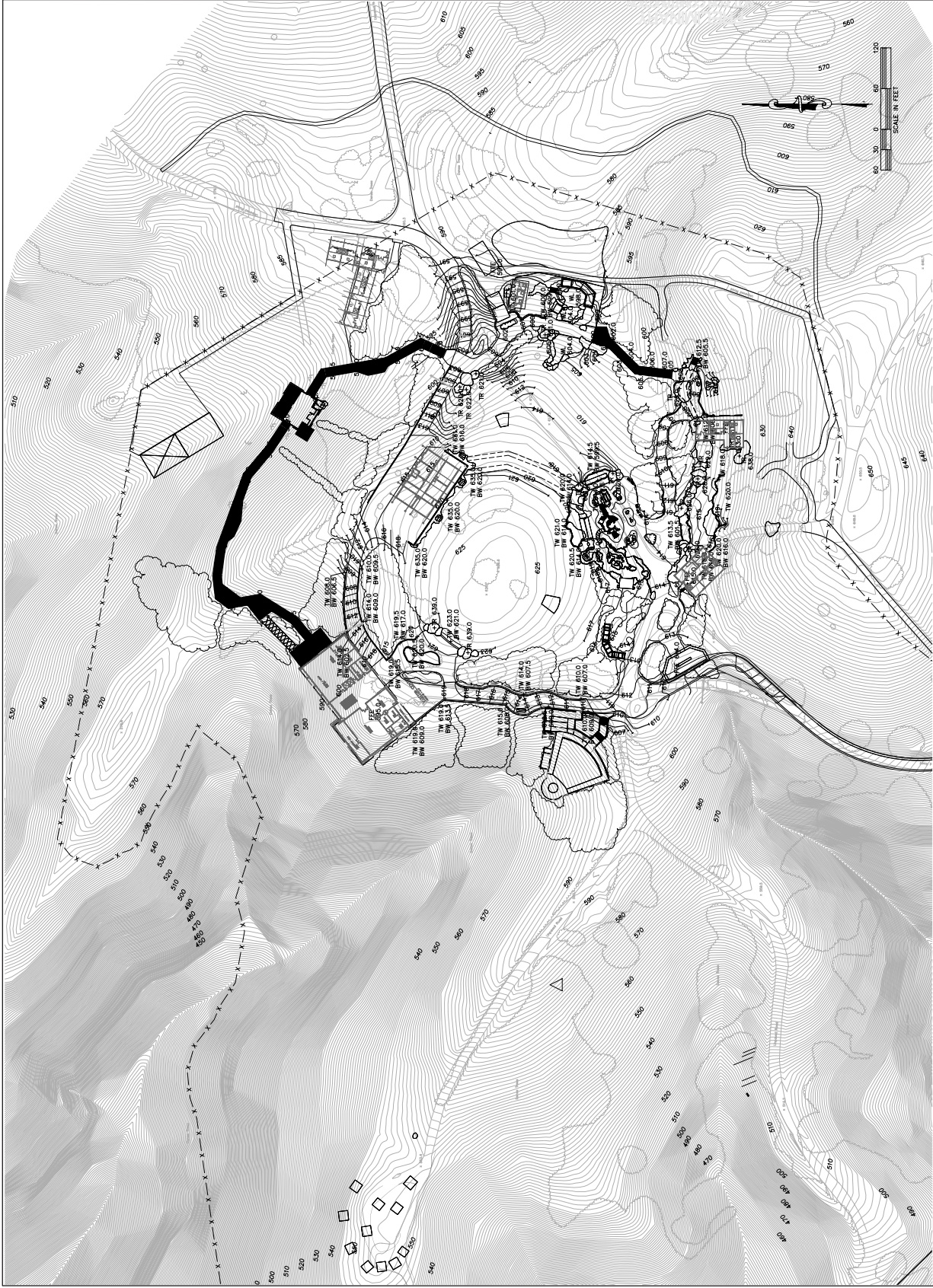
Under the proposed Master Plan amendment, proposed grading would result in approximately 14,000 cubic yards of excavation, which would be used on-site. About 1,200 cubic yards of existing undocumented fill containing construction debris, including asphalt and concrete, would be excavated, pulverized, and placed in the toe areas of fills within the Master Plan amendment area. Areas would be raised by minor filling up to three feet within the exhibit area. This would provide a balanced cut/fill project. **Figure 2-14** shows the preliminary grading plan for the proposed California Exhibit and **Figure 2-15** shows the grading and drainage plan for the proposed Veterinary Medical Hospital.

#### 2.4.7 PROPOSED UTILITIES

Utilities proposed for the proposed California Exhibit and new Veterinary Medical Hospital are discussed below. **Figure 2-16** shows the utility plan for the proposed California Exhibit and **Figure 2-17** shows the utility plan for the proposed Veterinary Medical Hospital.

##### 2.4.7.1 Water Facilities

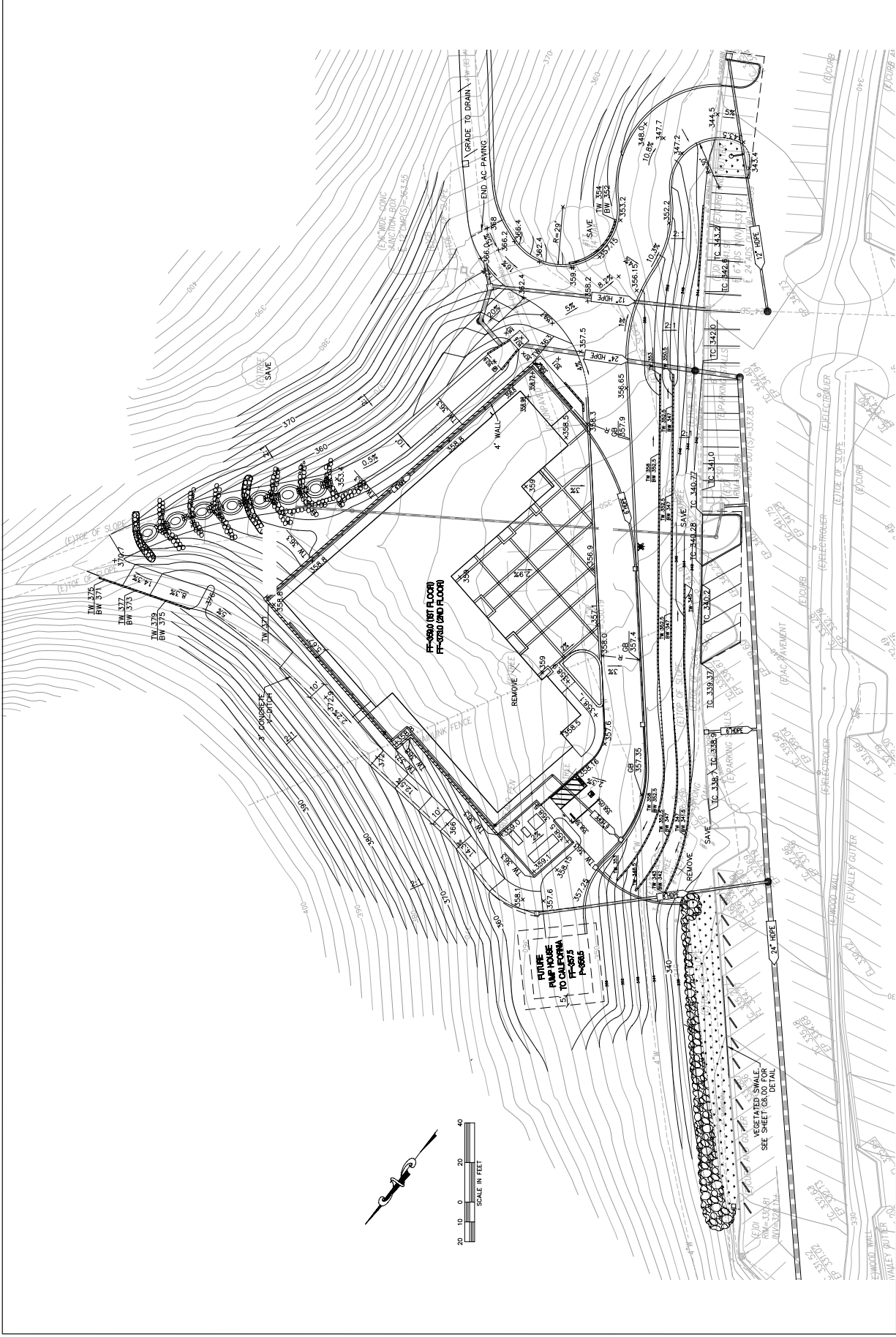
Water service would extend from the existing 16-inch water main in the upper parking lot above the existing Administration Building of the zoo. Water would be pumped by a pressurized pumping system to be located in a proposed pump house just north of the proposed Veterinary Medical Hospital. From the pump house, an emergency water line would be routed up the slope of the hill. Domestic water would be provided in a separate line that would connect to the existing 16-inch water main in the upper parking lot. (See further discussion in **Section 3.10, Public Services and Utilities**, of this Subsequent Mitigated Negative Declaration/Addendum.)



SOURCE: PJA



**Figure 2-14**  
 Proposed Master Plan Amendment:  
 Preliminary Grading Plan for California Exhibit

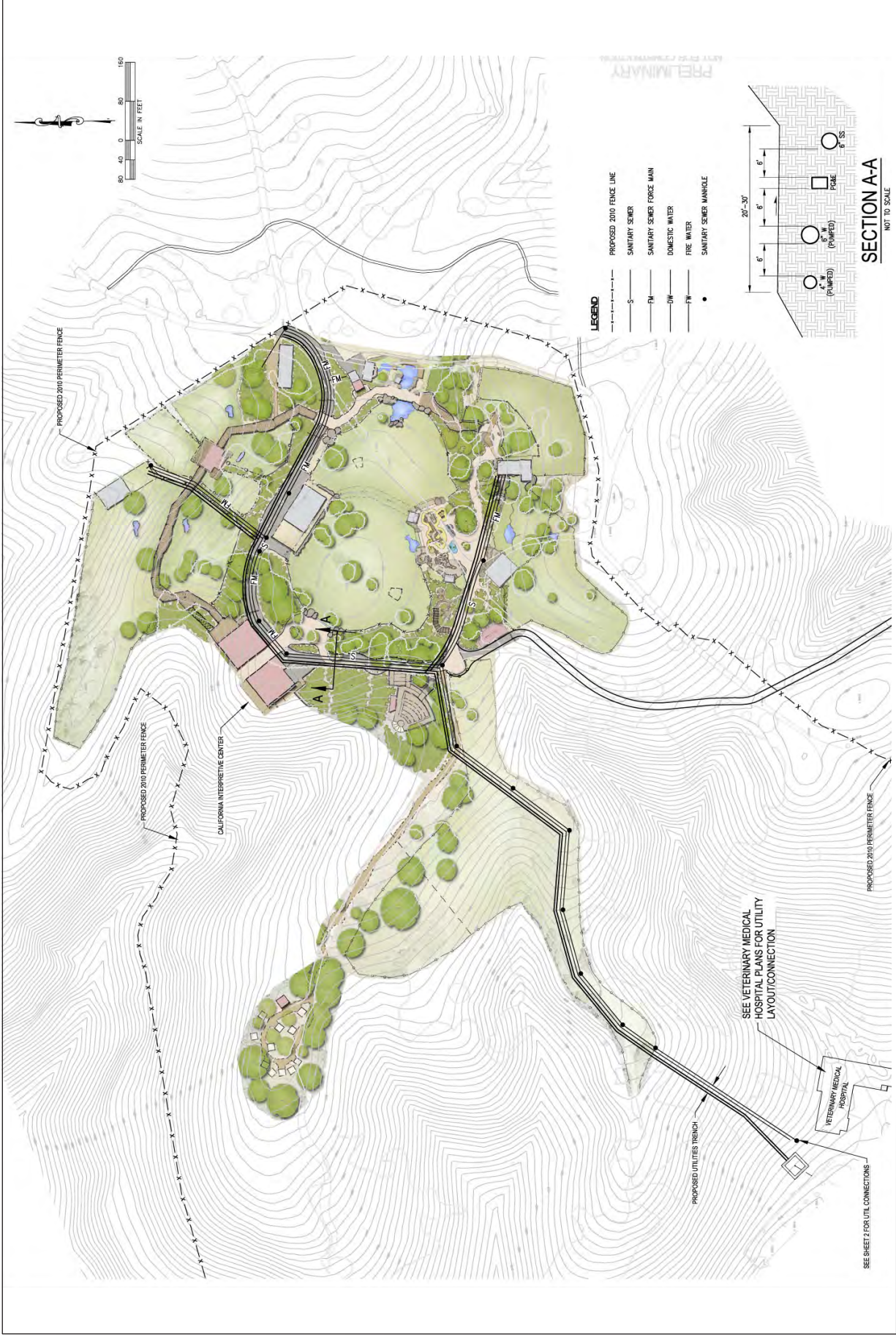


SOURCE: Aliquot and Noll & Tam Architects and Planners



**Figure 2-15**  
 Proposed Master Plan Amendment:  
 Grading and Drainage Plan for Veterinary Medical Hospital





SOURCE: Aliquot

**Figure 2-16**  
Proposed Master Plan Amendment:  
Utility Plan for California Exhibit

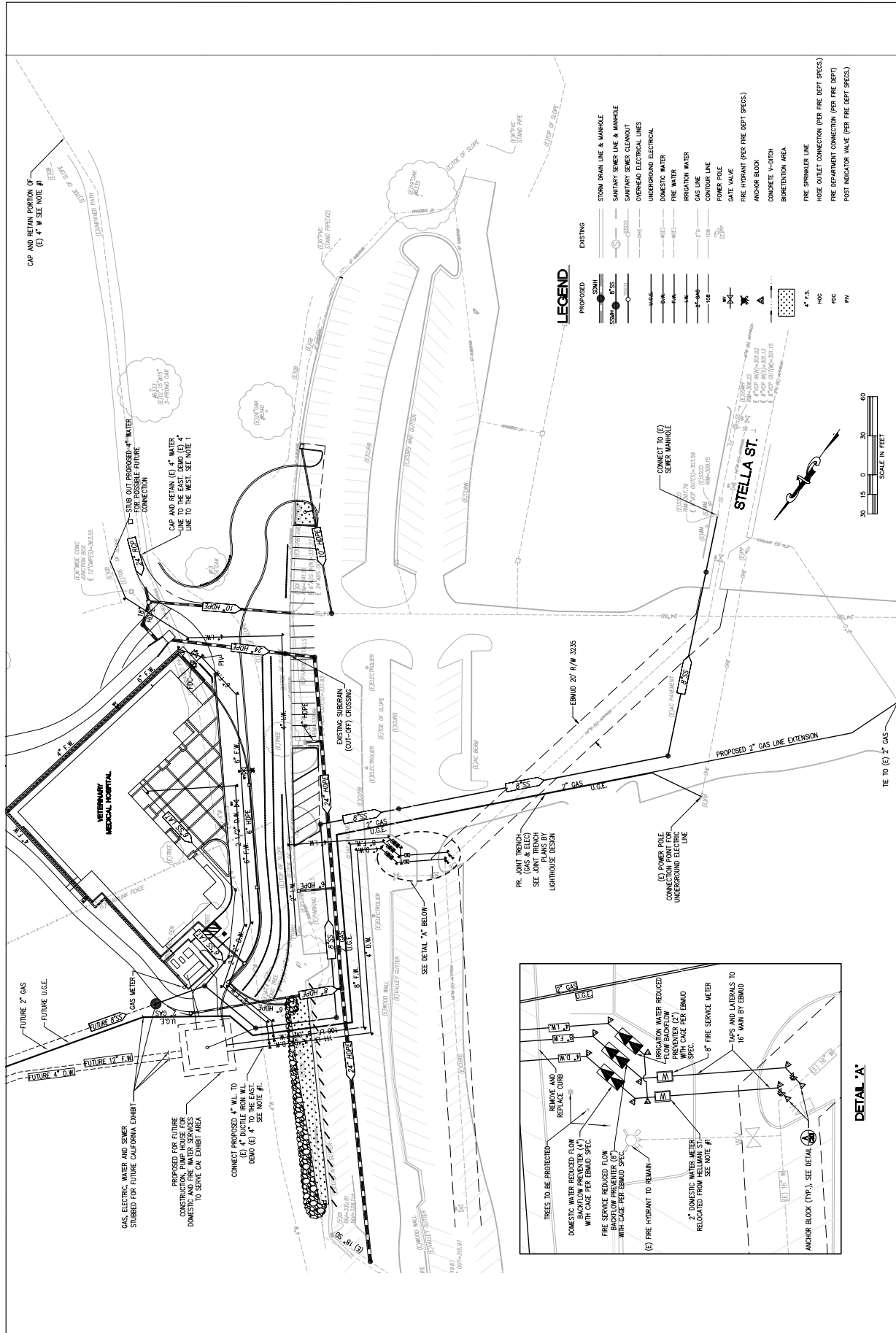


Figure 2-17  
Proposed Master Plan Amendment:  
Utility Plan for Veterinary Medical Hospital

SOURCE: Aliquot

### 2.4.7.2 Wastewater Facilities

The proposed California Exhibit and Veterinary Medical Hospital would be served by a new eight-inch private sanitary sewer main that would extend the existing eight-inch sewer main at the end of Stella Street at the zoo boundary. Some of the animal holding buildings in the California Exhibit would be served by a force main that would connect to the eight-inch gravity main. Low-flow fixtures would be installed in the Veterinary Medical Hospital, California Interpretive Center, and other proposed buildings. The proposed “Overnight Experience” (overnight camping area) would have composting toilets. (See further discussion in **Section 3.10, Public Services and Utilities**, of this Subsequent Mitigated Negative Declaration/Addendum.)

### 2.4.7.3 Storm Drain Facilities

A detention basin would be located east of the proposed Veterinary Medical Hospital. Storm drain pipelines would extend from the detention basin up the service road to the California Exhibit. Drainage from the California Exhibit would be piped to small detention areas and released into swales with energy dissipaters at pipe ends. (See further discussion in **Section 3.7, Hydrology and Water Quality**, of this Subsequent Mitigated Negative Declaration/Addendum.)

An existing storm drain outfall in Arroyo Viejo Creek is located just east of the main entrance to the zoo off Golf Links Road (see **Figure 2-18**) and is causing bank erosion by pipe flow originating within the Master Plan area.

The bank erosion at the outfall is aggravated by an undersized 18-inch pipe, causing increased velocity, and the position of this outfall in the creek bank. In its current state the 18-inch clay pipe protrudes from the bank at an opposing angle to the direction of creek flow. Judging by the age of this clay culvert and the near vertical slope of the bank, erosion has been occurring at the outlet for years. Its location at a bend in the creek exacerbates the opposing currents due to the creek flow velocity increase around the concave bed and bank. The bank has been sliding at the outfall location due to erosion caused by turbulence with no bank protection. As the toe of the bank recedes the pipe has been cracking and breaking off. Clay pipe was a poor choice for a storm drain outfall and its direction opposing the direction of creek flow was poor design.

The proposed outfall repair and replacement would relocate the pipe downstream of its current location and replace the pipe with a standard pipe type used for storm drainage conveyance. The proposed storm drain pipe construction would abandon or remove approximately 35 feet of the existing pipe, install a manhole, and install a 36-inch pipe directed to the northwest that would outlet to the creek onto an existing concrete apron at the bridge culvert. The 36-inch pipe would be angled to outlet with direction of creek flow.

To repair the bank at the location of the former existing outfall, a minimum of 10 feet of the existing clay culvert would be removed. A two-foot-diameter bank log would be keyed in across



SOURCE: Aliquot

◆

**Figure 2-18**  
 Location of Proposed Outfall  
 Modification at Arrojo Viejo Creek

the eroded bank at its toe. Recently planted willows exist at the toe of this bank. The bank excavation and fill would begin behind the willows to minimize disturbance; the bank would be graded at a 2:1 slope. The existing willows would remain and additional willows would be planted on the new slope intermittently to approximately five feet up the slope and placed eight feet on-center. Plug plantings with creeping rye would be installed one foot on-center above the willows to the top of the 2:1 slope. A broader area, from the concrete lining to the newly graded bank, would be broadcast with a seed mix containing California brome, meadow barley, California poppy, and lupine. These improvements would curtail future erosion and enhance existing habitat values in this area. **Figure 2-19** shows the proposed outfall modification.

#### 2.4.7.4 Electricity and Natural Gas Facilities

Electrical service would be provided through a connection to an existing electrical pole in the lower parking lot of the zoo. Electrical lines would be underground in a proposed joint trench, connecting to transformers serving the proposed Veterinary Medical Hospital and then extending to the proposed California Exhibit, where transformers would be installed to serve the gondola people-moving system, the California Interpretive Center, and other exhibit areas.

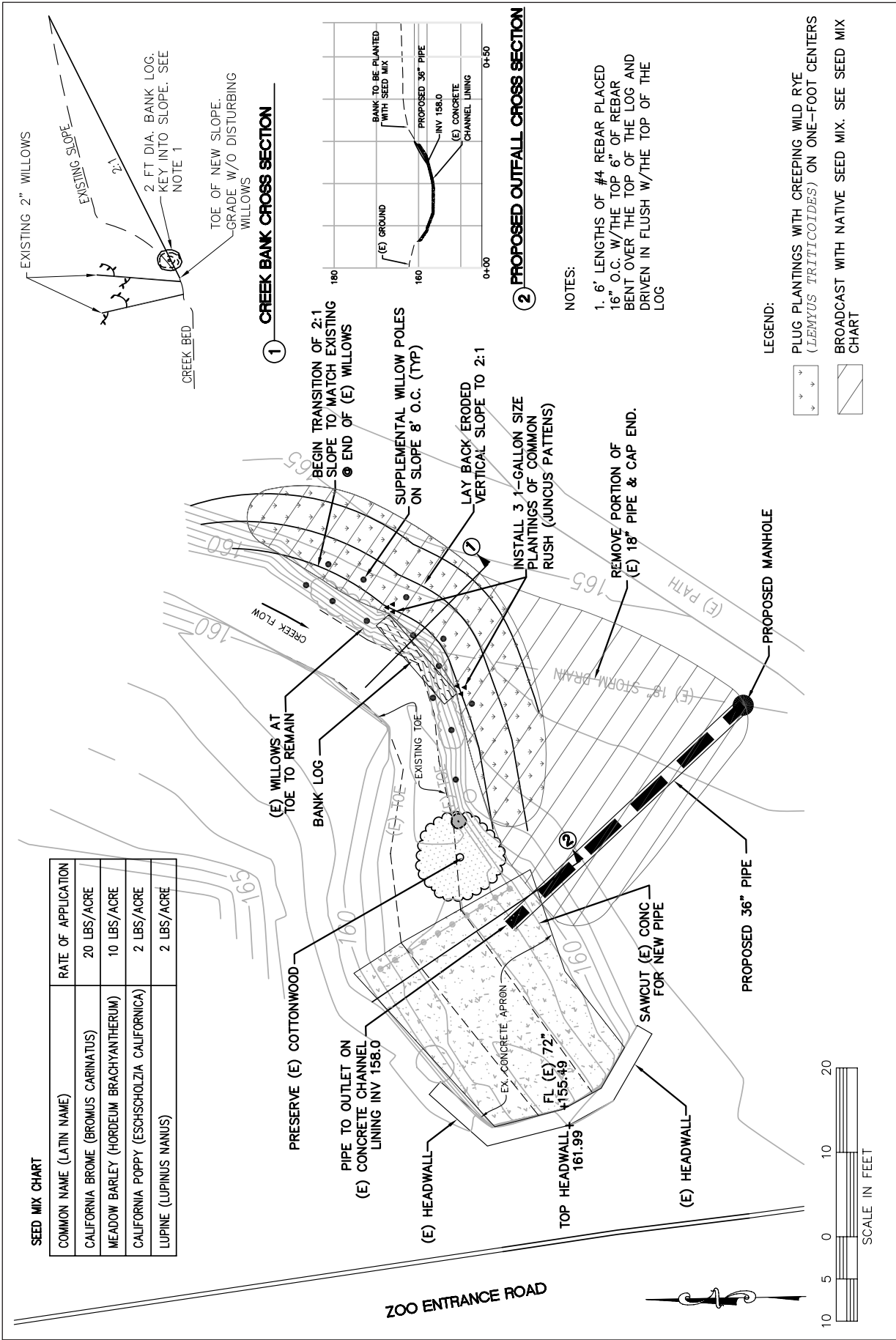
Gas service would be provided through an existing two-inch gas distribution line from Stella Street. A gas line would be installed in the proposed joint trench, extending to the proposed Veterinary Medical Hospital and California Exhibit. (See further discussion in **Section 3.10, Public Services and Utilities**, of this Subsequent Mitigated Negative Declaration/Addendum.)

#### 2.4.8 NEW EMPLOYEES RESULTING FROM MASTER PLAN AMENDMENT

The buildout of the amended Master Plan would result in a total of approximately 30 new employees at the Oakland Zoo. The proposed California Exhibit would employ approximately 29 new employees. The proposed Veterinary Medical Hospital would employ one new staff person. Professional staff at the existing Veterinary Care Center (two full-time veterinarians and two technicians) would move to the new facility. Reuse of the existing Veterinary Care Center building as zoo-related conservation/research and office uses would not bring any new employees to the site. To be conservative, the environmental analysis assumes that up to 30 new employees would be at the zoo at any one time.

#### 2.4.9 ESTIMATED ZOO ATTENDANCE INCREASE RESULTING FROM MASTER PLAN AMENDMENT

For 2010, estimated annual attendance at the zoo is approximately 630,000 visits. The zoo has been in a period of increasing attendance since 2005 due to a range of improvements and events, including the opening of the new Valley Children's Zoo, Baboon Cliffs exhibit, Wild Australia exhibit, renovations to existing animal exhibits, the addition of new animals and baby animals, new programming, and special events such as the Zoo Lights program. Over the next few years,



**Figure 2-19**  
Proposed Outfall Modification  
at Arrojo Viejo Creek

attendance is expected to remain near the relatively high levels reached in the 2006-2010 period but to decline slowly and stabilize at an average of approximately 600,000 visits per year (Hausrath Economics Group 2010).

With the buildout of the amended Master Plan, it is estimated the zoo would experience an annual increase in attendance of approximately 150,000 visitors in the first year of operation (2015-2016) of the California Exhibit, with an estimated total of 750,000 annual visitors. However, with the addition of the California Exhibit, over time, the zoo would experience a gradual decrease in annual attendance leading to an estimated stabilized attendance of approximately 700,000 visitors in 2035 (Hausrath Economics Group 2010). The estimated attendance numbers identified for 2015 and 2035 are used in this environmental analysis to evaluate 2015 and 2035 conditions. (See **Appendix D** for a report detailing these estimates.)

#### 2.4.10 PROPOSED CONSTRUCTION ACTIVITIES AND SCHEDULE

Construction of the amended Master Plan would be phased over a total of approximately 42 months.

##### 2.4.10.1 Construction Phasing

Construction would occur in five phases (see **Table 2-3**). Phase 1 would last a total of approximately 12 months and would include construction of the Veterinary Medical Hospital, perimeter fence, and service road. Phase 2 would last a total of approximately eight months and would include construction of the gondola people-moving system (including the portion of the California Interpretive Center building that would house the gondola terminal), overnight camping area, grizzly bear exhibit, bison/tule elk feeding station, Small Exhibit Activity Zone, and main site utilities. Phase 3 would last a total of approximately six months and would include construction of the wolf exhibit, eagle exhibit and viewing structures, black bear and mountain lion exhibits, and interpretive kiosk. Phase 4 would last a total of approximately eight months and would include construction of the remainder of the California Interpretive Center building along with the jaguar exhibit, and condor exhibit. Phase 5 would last a total of approximately eight months and would include construction of the amphitheater and beaver/water fowl aviary.

##### 2.4.10.2 Construction Workers

As shown in **Table 2-3**, the peak daily number of construction workers is expected to be approximately 32 workers during Phase 1, approximately 43 workers during Phase 2, approximately 31 workers during Phase 3, approximately 34 workers during Phase 4, and approximately 20 workers during Phase 5.

**TABLE 2-3: PROPOSED MASTER PLAN AMENDMENT: CONSTRUCTION PHASING AND NUMBER OF CONSTRUCTION WORKERS**

Phase	Duration	Construction Workers (peak daily number)
<b>Phase 1</b>	<b>12 months</b>	<b>32 workers</b>
Veterinary Medical Hospital	12 months	18
Perimeter Fence	3 months	6
Service Road	2-3 months	8
<b>Phase 2</b>	<b>8 months</b>	<b>43 workers</b>
Gondola People-Moving System (including portion of California Interpretive Center building)	8 months	11
Overnight Camping Area	3 months	3
Grizzly Bear Exhibit	8 months	8
Bison/Tule Elk Feeding Station	1 month	4
Small Exhibit Activity Zone	4 months	5
Main Site Utilities	3 months	12
<b>Phase 3</b>	<b>6 months</b>	<b>31 workers</b>
Wolf Exhibit	6 months	6
Eagle Exhibit and Viewing Structures	6 months	14
Black Bear and Mountain Lion Exhibits	4 months	3
Interpretive Kiosk	6 months	8
<b>Phase 4</b>	<b>8 months</b>	<b>34 workers</b>
California Interpretive Center	8 months	18
Jaguar Exhibit	6 months	8
Condor Exhibit	3 months	8
<b>Phase 5</b>	<b>8 months</b>	<b>20 workers</b>
Amphitheater	4 months	10
Beaver/Water Fowl Aviary	6-8 months	10

Note: Within each phase, individual construction activities would occur concurrently; therefore, the total number of months listed within each phase exceeds the total duration shown for that phase.

Source: Oakland Zoo, 2010.

### 2.4.10.3 Construction Equipment

Equipment used for construction of the California Exhibit and Veterinary Medical Hospital is expected to include dumpsters, truck cranes, a boom lift, a fork lift, scrapers, bulldozers, excavators, compactors, backhoes, front-end loaders, pavers, and other trucks (Swinerton 2009a; Swinerton 2009b).

The zoo has committed to using construction diesel equipment that meets United States Environmental Protection Agency Tier 4 interim particulate matter (PM) emission standards. This would be accomplished by either using a Tier 4 engine or applying a PM filter to the construction diesel equipment to achieve equivalent emission rates.



In addition, installation of one or more of the gondola towers is expected to require use of a helicopter. The helicopter would be used for up to one day.

#### 2.4.11 ONGOING MAINTENANCE AND UPGRADES

Consistent with the approved Master Plan, the project sponsor would continue performing maintenance activities and making minor upgrades to the existing and proposed exhibits and zoo facilities.

## 2.5 COMPARISON OF APPROVED MASTER PLAN AND PROPOSED MASTER PLAN AMENDMENT

The Master Plan amendment proposes the following changes to the approved Master Plan:

- 1) Replacement of the previously approved loop road and shuttle bus system to transport zoo visitors from the existing zoo to the California Exhibit with an electric aerial gondola people-moving system;
- 2) Reconfiguration of the previously approved animal exhibits within the California Exhibit;
- 3) Relocation of the previously approved California Interpretive Center within the California Exhibit area to a site approximately 300 feet northwest of the previously approved location, and redesign of the center;
- 4) Elimination of previously approved off-site breeding activity, with incorporation of this area into the California Exhibit;
- 5) Replacement of the existing veterinary medical hospital with the construction of a proposed new Veterinary Medical Hospital located immediately to the east of the existing zoo parking lot on a portion of the previously approved California Exhibit area;
- 6) Overnight camping area located to the northwest of the California Exhibit area;
- 7) Establishment of the specific location of the proposed perimeter fence with modifications from the previously approved general location;
- 8) Improvement of the existing emergency vehicle access road off Snowdown Avenue; and
- 9) Provision of a public walking path located to the southeast and outside of the California Exhibit to provide public access between existing fire roads and knolls in Knowland Park;

Other key aspects of the originally approved California 1820 exhibit would remain. Exhibits of animals native to California such as tule elk, grizzly bear, bison, eagle, black bear, mountain lion, jaguar, wolf, and California water fowl would be incorporated into the California Exhibit.

As shown in **Table 2-4**, the proposed Master Plan amendment would reduce the area of the approved California 1820 exhibit (now identified as the California Exhibit) by approximately

**TABLE 2-4: ACREAGE OF APPROVED CALIFORNIA 1820 EXHIBIT VS. PROPOSED CALIFORNIA EXHIBIT**

Approved California 1820 Exhibit (Approved Master Plan)	Number of Acres	Proposed California Exhibit (Proposed Master Plan Amendment)	Number of Acres
Animal Exhibits (Canyon, River, Woodland, and Grizzly Bear Exhibits)	16.23	Animal Exhibits	18.07
Existing Bison/Tule Elk Exhibit	14.44	Existing Bison/Tule Elk Exhibit	14.44
California Interpretive Center	0.23	California Interpretive Center	0.36
Off-Site Breeding Activity	0.54	(Off-site breeding activity eliminated; area incorporated into animal exhibits – see above.)	0
Paving of Existing Service Road	1.35	Paving of Existing Service Road	3.25
Loop Road and Shuttle Bus System	5.70	Gondola People-Moving System	0.02
---		Veterinary Medical Hospital <sup>1</sup>	1.00
---		Public Access Path	0.26
---		Overnight Experience and Path	0.72
Other (includes undeveloped area, emergency vehicle access road)	23.05	Other (includes undeveloped area, emergency vehicle access road)	18.14
<b>Total</b>	61.54	<b>Total</b>	56.26
		<b>Change</b>	-5.28

<sup>1</sup> The proposed Veterinary Medical Hospital site adjoins (i.e., is located outside of) the proposed California Exhibit area but is included in the approved California 1820 exhibit area.

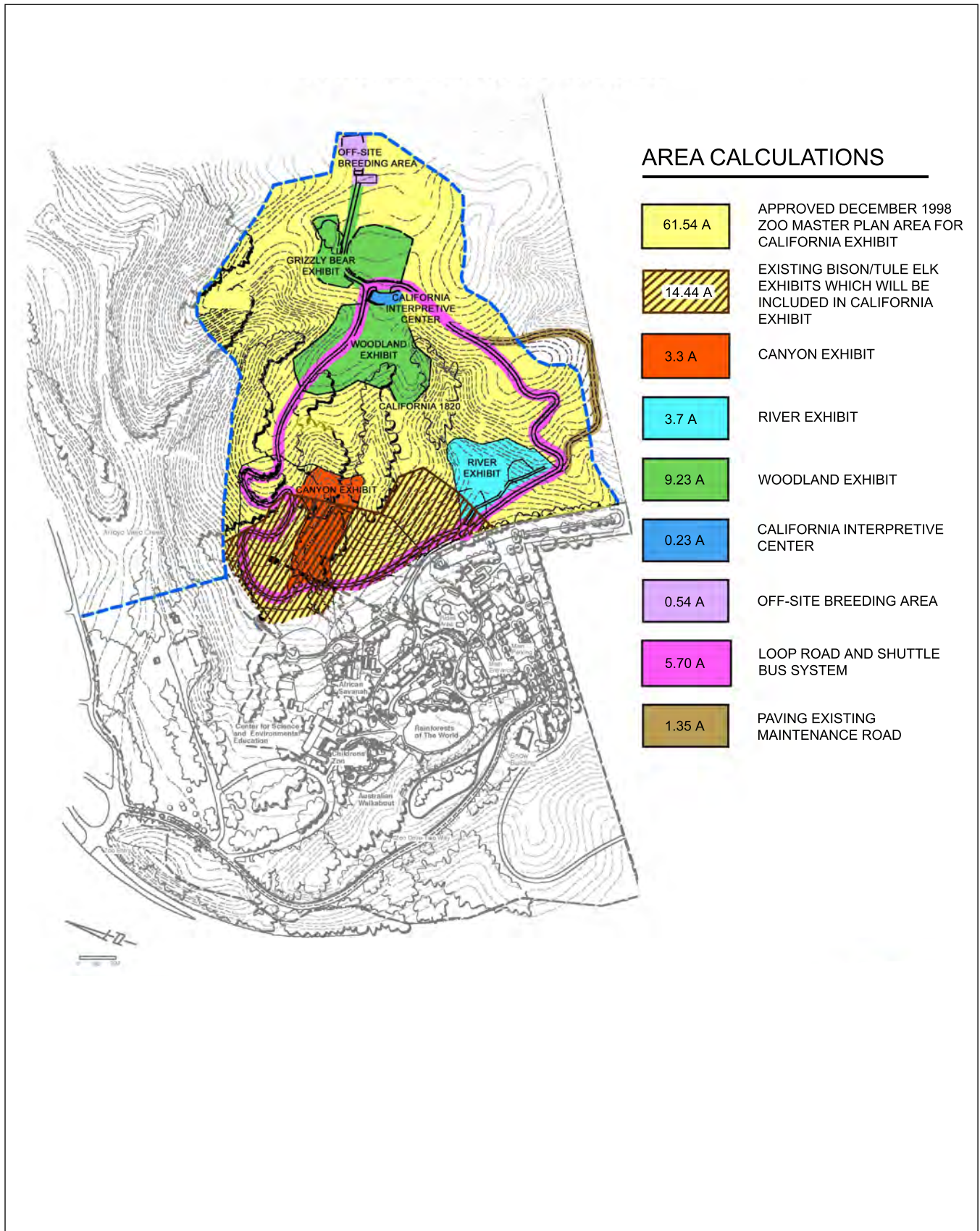
Source: PJA Architects, 2010.

5.28 acres, from approximately 61.54 acres to approximately 56.26 acres. **Figure 2-20** shows the approved Master Plan for the California Exhibit and **Figure 2-21** show the modifications to the California Exhibit currently proposed by the Master Plan amendment.

The proposed changes to the approved Master Plan are described in more detail below.

#### 2.5.1 REPLACEMENT OF APPROVED LOOP ROAD AND SHUTTLE BUS SYSTEM WITH PROPOSED GONDOLA PEOPLE-MOVING SYSTEM

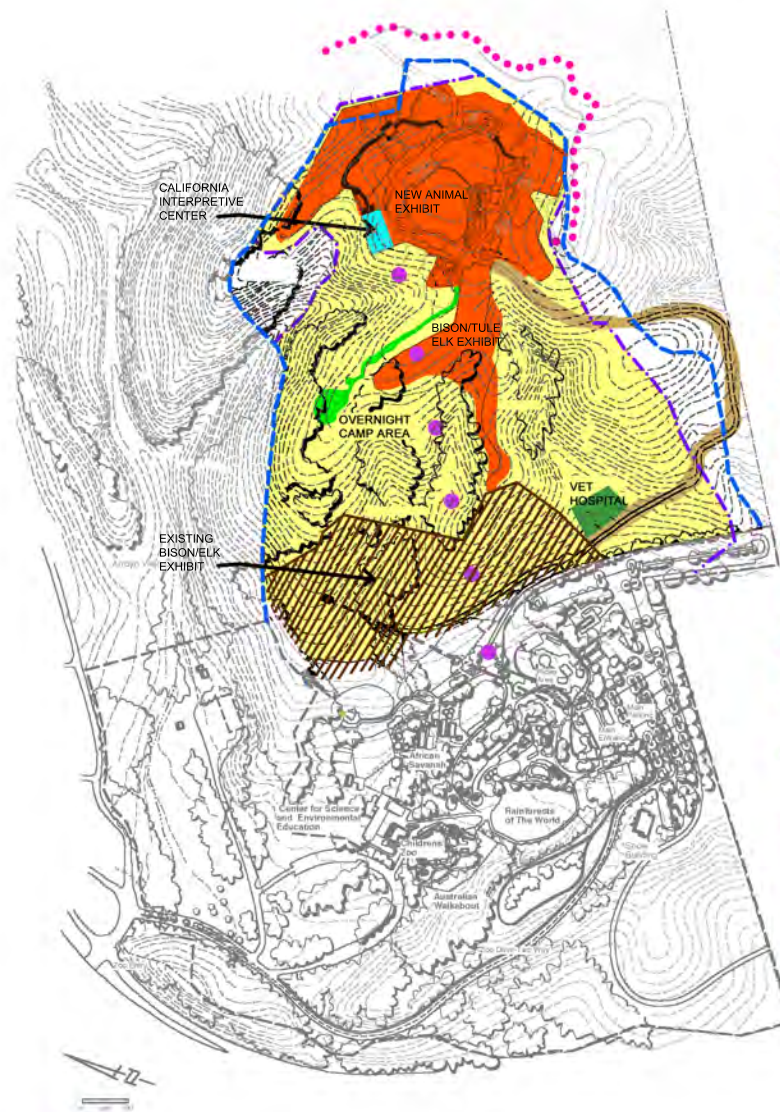
The approved loop road and shuttle bus system are proposed for deletion from the Master Plan. The loop road would cover approximately 5.7 acres (see **Figure 2-20**). Due to the steepness of the terrain, construction of the loop road would require significant vegetation disturbance, soils excavation, grading, tree removal, and construction of hard surfaces and retaining walls. The approved loop road and shuttle bus system would be replaced with an electric aerial gondola people-moving system.



SOURCE: PJA

❖

**Figure 2-20**  
1998 Oakland City Council Approved  
Master Plan for California Exhibit



### AREA CALCULATIONS

56.26 A	MODIFICATIONS TO 2010 MASTER PLAN AREA FOR CALIFORNIA EXHIBIT
14.44 A	EXISTING BISON/TULE ELK EXHIBITS WHICH WILL BE INCLUDED IN CALIFORNIA EXHIBIT
18.07 A	PROPOSED NEW ANIMAL EXHIBIT AREA
0.36 A	CALIFORNIA INTERPRETIVE CENTER
3.25 A	PAVING EXISTING MAINTENANCE ROAD
1.00 A	VETERINARY MEDICAL HOSPITAL
0.72 A	OVERNIGHT CAMPING AREA AND PATH
0.02 A	PROPOSED GONDOLA ALIGNMENT (NOT TO SCALE)
0.26 A	PROPOSED ACCESS PATH
	PROPOSED PERIMETER FENCE RE-ALIGNED FOR 2010 PLAN
	1998 APPROVED MASTER PLAN BOUNDARY AND PERIMETER FENCE

SOURCE: PJA

❖

**Figure 2-21**  
2011 Proposed Master Plan Amendment  
Modifications to California Exhibit

### 2.5.2 RECONFIGURATION OF APPROVED ANIMAL EXHIBITS

Under the proposed Master Plan amendment, the approved Woodland and Grizzly Bear exhibits would be reconfigured as part of the animal exhibit area of the California Exhibit (see **Figure 2-21**).

The approved Canyon Exhibit area contains a portion of the existing bison/tule elk exhibit. Under the proposed Master Plan amendment, the bison/tule elk exhibit would remain and the rest of the approved Canyon Exhibit area would not be developed.

Under the proposed Master Plan amendment, an approximately one-acre portion of the approved River Exhibit area would be occupied by the relocated Veterinary Medical Hospital (see **Subsection 2.5.5** below). The remainder of the approved River Exhibit area would not be developed.

### 2.5.3 RELOCATION AND REDESIGN OF APPROVED CALIFORNIA INTERPRETIVE CENTER

The Master Plan amendment proposes to relocate the California Interpretive Center approximately 300 feet northwest of its approved location (see **Figure 2-21**). The proposed relocation is intended to allow the existing topography to reduce the visibility of the facility from residences southeast of the zoo and from the main zoo parking lot.

The approved California Interpretive Center would contain approximately 7,500 square feet and would be a single-story structure. The proposed California Interpretive Center would contain approximately 34,305 square feet and would be recessed into the hillside with the full three stories (approximately 36 feet in height) visible at the northwest elevation.

### 2.5.4 ELIMINATION OF APPROVED OFF-SITE BREEDING ACTIVITY

Under the proposed Master Plan amendment, the approved off-site breeding activity would be eliminated and this area would be incorporated into the proposed wolf exhibit (see **Figure 2-21**).

### 2.5.5 CONSTRUCTION OF PROPOSED VETERINARY MEDICAL HOSPITAL

Under the proposed Master Plan amendment, the existing veterinary medical hospital would be replaced with construction of a proposed new Veterinary Medical Hospital. The new Veterinary Medical Hospital would be located immediately to the east of the existing zoo parking lot on approximately one acre of the originally approved (approximately 3.7-acre) River Exhibit site. The remainder of the approved River Exhibit area would not be developed (see **Figure 2-20**).

### 2.5.6 OVERNIGHT CAMPING AREA

The proposed Master Plan amendment includes an “Overnight Experience” (overnight camping area) as part of the California Exhibit (see **Figure 2-21**). The approved Master Plan does not expressly provide for a new overnight camping area; however, overnight camping activities currently take place at the zoo.

### 2.5.7 PERIMETER FENCE MODIFICATIONS

The proposed Master Plan amendment would establish the specific location of the proposed perimeter fence with modifications to the locations of portions of the approved perimeter fence. These modifications are intended to reduce potential impacts on wildlife habitat, improve public access, and follow the City of Oakland’s Open Space (Special Use) zone boundary. **Figure 2-22** shows the location of the perimeter fence allowed by the approved Master Plan and the location of the perimeter fence proposed by the Master Plan amendment.

Under the proposed Master Plan amendment, the northwest portion of the perimeter fence, near the proposed wolf exhibit, would be pulled back to the existing oak trees to minimize incursion in the chaparral and avoid removal of oak trees. The southeast portion of the perimeter fence, near the proposed black bear and mountain lion exhibits, would be pulled back to allow for the proposed public access path.

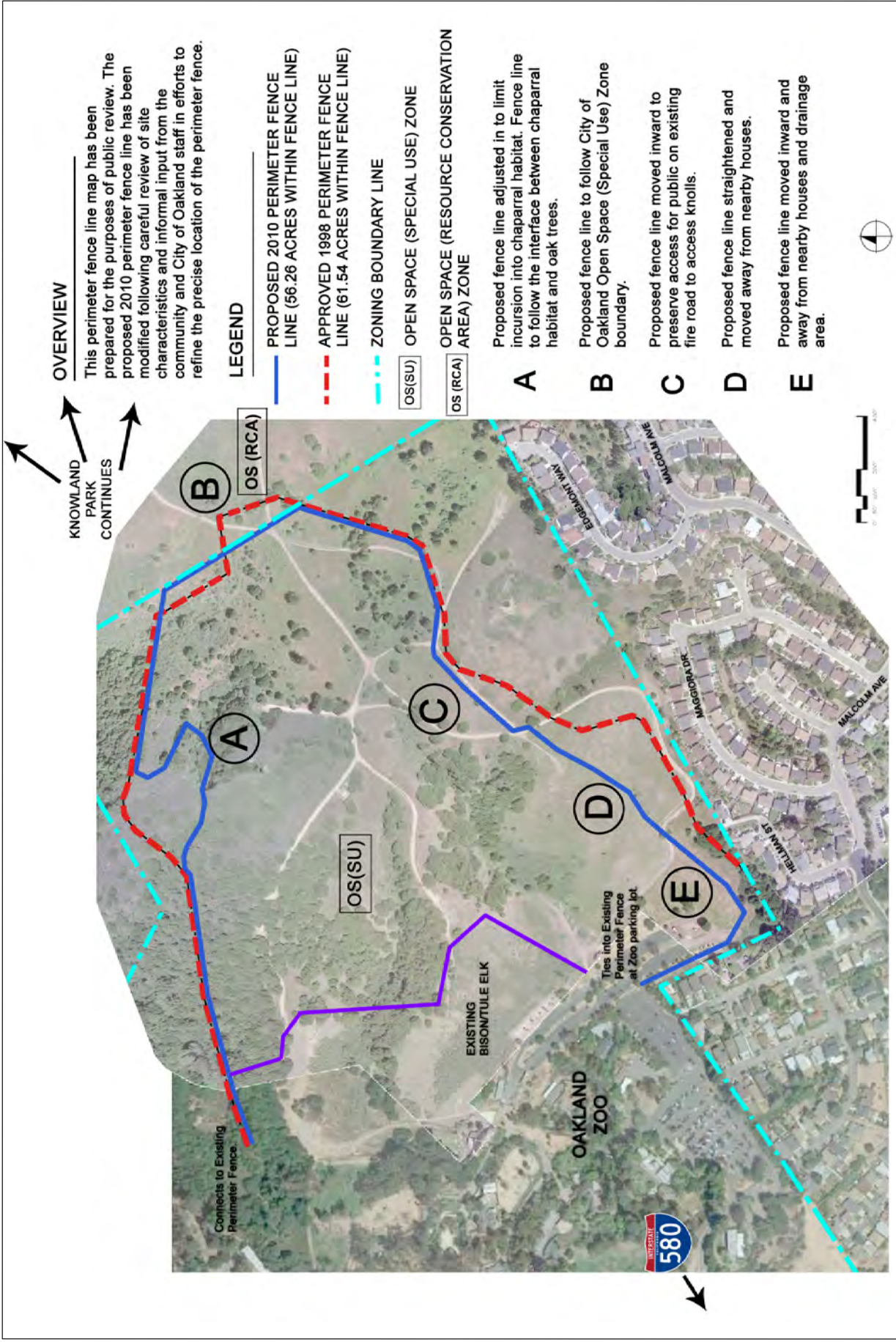
In a small portion of the most northern part of the proposed wolf exhibit, the perimeter fence would be realigned to reflect the Open Space (Special Use) zone boundary.

The proposed Master Plan amendment would also pull back the perimeter fence so that it is farther away from the houses to the south (on Hellman Street, Maggiora Drive, and Edgemont Way).

With these proposed changes, the perimeter fence would enclose approximately 56.26 acres. In comparison, the perimeter fence allowed by the approved Master Plan would enclose approximately 61.54 acres.

### 2.5.8 IMPROVEMENT OF EXISTING EMERGENCY VEHICLE ACCESS ROAD

In accordance with Oakland Fire Department requirements, the Master Plan amendment includes provision of an emergency vehicle access road off Snowdown Avenue to the California Exhibit. The road would follow the existing fire road to minimize disturbance to grassland areas. As noted earlier (see **Subsection 2.4.3.1**), the existing road would be widened to approximately 20 feet, with turnouts located approximately every 300 feet along the road’s approximately 1,450-foot length. The road would be gravel.



SOURCE: PJA

**Figure 2-22**  
 Perimeter Fence Location Allowed by 1998 Approved Master Plan and Proposed Master Plan Amendment

### 2.5.9 PROVISION OF PUBLIC ACCESS PATH

The Master Plan amendment proposes a path outside of the fenced California Exhibit area that would allow public access between existing fire roads. As noted earlier (see **Subsection 2.4.3.4**), the public access path would be approximately four feet wide and approximately 1,315 feet long. The path would have a natural surface with cut slopes of approximately two to five percent.

### 2.5.10 CLARIFICATION REGARDING PREVIOUSLY PROPOSED PEDESTRIAN HIKING TRAIL

The original application for the approved Master Plan contained a pedestrian hiking trail that would follow the general alignment of Arroyo Viejo Creek and connect the meadow picnic area with the hiking trails near the proposed California Interpretive Center and throughout the rest of Upper Knowland Park. The project description in the 1998 MND included this trail. During the review of the application for the approved Master Plan, the trail was removed from the project and not included in the final approval. Consistent with the approved Master Plan, the trail is not included in the proposed Master Plan amendment.

## 2.6 REFERENCES

- Amphion Environmental, Inc. 1996. *The Oakland Zoo in Knowland Park Master Plan*. October 1996.
- Association of Zoos and Aquariums. 2010. *2010 Accreditation Standards and Related Policies*. Section 11.8 Perimeter Fence. <http://www.aza.org/accred-materials/>.
- Hausrath Economics Group. 2010. *Analysis of Oakland Zoo Attendance Related to New California Exhibit*. Prepared for City of Oakland and Oakland Zoo. November 2010.
- Swinerton. 2009a. "Oakland Zoo – CA! Project – Estimated Large Equipment, Heavy Machinery & Trucking" table. June 26, 2009.
- Swinerton. 2009b. "Oakland Zoo – Veterinary Hospital – Estimated Large Equipment, Heavy Machinery & Trucking" table. May 28, 2009.
- United States Department of Agriculture (USDA). 2001. Animal and Plant Health Inspection Service. *Facility Inspection Guide*. Section 10. April 2001. [http://www.aphis.usda.gov/animal\\_welfare/rig.shtml](http://www.aphis.usda.gov/animal_welfare/rig.shtml).



## ENVIRONMENTAL TOPICS REQUIRING UPDATED DISCUSSION

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This chapter provides an update of existing site conditions, an update of applicable policies and regulations, and an environmental assessment of the buildout of the amended Master Plan. For each environmental topic, the chapter summarizes the 1998 MND analysis and conclusions, identifies currently applicable Standard Conditions of Approval, updates the regulatory setting, summarizes existing conditions, and analyzes the effects the buildout of the amended Master Plan and compares that with the information contained in the 1998 MND. Also, previously imposed mitigation measures from the 1998 MND are identified, and, where appropriate, are clarified, refined, revised, or deleted. This chapter also identifies any new mitigation measures that are required.

The following environmental topics are discussed: Aesthetics; Air Quality; Biological Resources; Geology and Soils; Global Climate Change; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use, Recreation and Planning; Noise; Public Services and Utilities; and Transportation and Circulation.

### 3.1 AESTHETICS

This section evaluates potential aesthetic impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant aesthetic impacts not identified in the 1998 MND or a substantial increase in the severity of the previously identified aesthetic impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant aesthetic impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. The section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required.

### 3.1.1 PRIOR MND ANALYSIS AND CONCLUSIONS

#### 3.1.1.1 1998 Prior MND Impact Findings

The 1998 MND concluded that development proposed by the approved Master Plan would have no significant adverse aesthetic impacts and no mitigation measures were necessary. In particular, the 1998 MND found that the approved Master Plan would have no impact on scenic vistas or views open to the public, no aesthetic impact related to building height, and a less-than-significant impact related to light and glare. The 1998 MND noted that development would be sited to minimize visibility from adjacent properties and would not obstruct any scenic vistas or views open to the public. The 1998 MND noted that the proposed development would not result in construction of any structure with an increase in height of 100 feet or more over adjacent structures on- or off-site.

With respect to the California Exhibit, the 1998 MND noted that it would not include night lighting, and that new facilities would be sited to minimize their visibility to adjacent residences.

The 1998 MND concluded that the California Exhibit would have no shade or shadow impacts, as it would consist of low-rise, small-scale buildings and animal exhibits that would not affect the sunlight or solar access available to nearby residences.

#### 3.1.1.2 1998 MND Mitigation Measures

Since the 1998 MND concluded that the Master Plan would not have significant aesthetic impacts, no mitigation measures were identified.

### 3.1.2 STANDARD CONDITIONS OF APPROVAL

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that relate to aesthetics and that would apply to the proposed Master Plan amendment are listed below. If the City approves the Master Plan amendment, these Standard Conditions of Approval would be adopted as requirements of the Master Plan amendment and would ensure no significant impacts on aesthetics occur. As a result, the Standard Conditions of Approval are not listed as mitigation measures.

#### **SCA-AES-1: Landscape Maintenance**

##### ***Ongoing***

All required planting shall be permanently maintained in good growing condition and, whenever necessary, replaced with new plant materials to ensure continued compliance with applicable landscaping requirements. All required irrigation systems shall be permanently maintained in good condition and, whenever necessary, repaired or replaced.

**SCA-AES-2: Lighting Plan*****Prior to issuance of an electrical or building permit***

The proposed lighting fixtures shall be adequately shielded to a point below the light bulb and reflector and that prevent unnecessary glare onto adjacent properties. Plans shall be submitted to the Planning and Zoning Division and the Electrical Services Division of Public Works Agency for review and approval. All lighting shall be architecturally integrated into the site.

**SCA-BIO-2: Tree Removal Permit**

(Please refer to **Section 3.3, Biological Resources.**)

**SCA-BIO-3: Tree Replacement Plantings**

(Please refer to **Section 3.3, Biological Resources.**)

**SCA-BIO-4: Tree Protection During Construction**

(Please refer to **Section 3.3, Biological Resources.**)

**3.1.3 UPDATED REGULATORY SETTING**

The following discussion reviews aesthetic provisions of the City of Oakland General Plan and Municipal Code that are relevant to the buildout of the amended Master Plan.

**3.1.3.1 City of Oakland General Plan**

Key applicable aesthetics policies of the Oakland General Plan are listed below. These policies, along with other applicable aesthetics-related General Plan policies, are discussed in **Section 3.8, Land Use, Recreation and Planning**. These policies were adopted prior to the adoption of the 1998 MND.

**Scenic Highways Element Policies.** The Scenic Highways Element of the Oakland General Plan was adopted in September 1974. Interstate 580 is identified as a scenic route in the Scenic Highways Element. The Scenic Highways Element contains the following policies relevant to the proposed Master Plan amendment (City of Oakland 1974):

***General Policies***

*Policy 3:* Urban development should be related sensitively to the natural setting.

*Policy 4:* High standards for preserving and enhancing natural landforms and vegetation should be established and maintained to regulate all activities related to earthwork and the removal of trees, shrubs or ground cover.

*Specific Policies Related to Macarthur Freeway (I-580)*

*Policy 2:* Visual intrusions within the scenic corridor should be removed, converted, buffered or screened from the motorist's view.

*Policy 3:* Panoramic vistas and interesting views now available to the motorist should not be obliterated by new structures.

*Policy 4:* New construction within the scenic corridor should demonstrate architectural merit and a harmonious relationship with the surrounding landscape.

**Open Space, Conservation and Recreation (OSCAR) Element Objectives and Policies.**

The Open Space, Conservation and Recreation (OSCAR) Element of the Oakland General Plan was adopted in June 1996. The OSCAR Element contains the following aesthetics-related policies relevant to the proposed Master Plan amendment (City of Oakland 1996):

*Policy OS-10.1: View Protection.* Protect the character of existing scenic views in Oakland, paying particular attention to: (a) views of the Oakland Hills from the flatlands; (b) views of downtown and Lake Merritt; (c) views of the shoreline; and (d) panoramic views from Skyline Boulevard, Grizzly Peak Road, and other hillside locations.

*Policy OS-10.2: Minimizing Adverse Visual Impacts.* Encourage site planning for new development which minimizes adverse visual impacts and takes advantage of opportunities for new vistas and scenic enhancement.

**Land Use and Transportation Element and Objectives and Policies.** The Land Use and Transportation Element of the Oakland General Plan was adopted in March 1998. The Land Use and Transportation Element contains the following scenic routes policy relevant to the buildout of the amended Master Plan (City of Oakland 1998):

*Policy T6.5 Protecting Scenic Routes.* The City should protect and encourage enhancement of the distinctive character of scenic routes within the city, through prohibition of billboards, design review and other means.

**3.1.3.2 City of Oakland Tree Protection Ordinance**

Title 12, Chapter 12.36 (Protected Trees) of the City of Oakland Municipal Code defines "protected trees" and requires that a permit be obtained for their removal. A protected tree consists of any coast live oak measuring four inches in diameter at breast height (dbh) or any other tree species measuring nine inches dbh or larger, except non-native eucalyptus and Monterey pine (*Pinus radiata*). Monterey pine trees must be protected only on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed. Except as noted in the ordinance, eucalyptus and Monterey pine are not protected by the ordinance. Replacement tree plantings are typically required where native tree species are removed. Adequate protection must also be provided during the construction period for any trees that are to remain in the vicinity of proposed development. The City of Oakland has developed Standard Conditions of Approval for projects affecting tree resources (see **Subsection 3.1.2** above).

### 3.1.4 EXISTING CONDITIONS

The proposed California Exhibit would be developed in an approximately 56-acre portion of Knowland Park that is characterized by grasslands, chaparral, and oak woodlands. Fire roads and informal trails of barren earth traverse the area. Site topography is hilly, with elevations ranging from about 350 feet to about 650 feet. Panoramic views of the San Francisco Bay are available from the site. The site of the California Exhibit is undeveloped with the exception of a cellular phone tower located in the northwestern portion of the site near the location of the proposed amphitheater. Generally, aesthetic conditions at the site have not changed since 1998.

**Figure 3.1-1** shows the predominant aesthetic conditions at Knowland Park.

To identify potential viewpoints from which the buildout of the amended Master Plan could be visible, a survey was conducted in the vicinity in March 2009. Particular attention was paid to public areas such as Interstate 580, busy roadways, Knowland Park, and surrounding residential areas. Twelve potential viewpoints were identified during the survey as potentially offering views of the proposed California Exhibit and Veterinary Medical Hospital. Candidate photos were taken from these 12 viewpoints. The 12 viewpoints are:

1. Interstate 580 southbound looking southeast
2. Bishop O'Dowd High School looking east
3. 106th Avenue at MacArthur Boulevard looking northeast
4. Hood Street looking north
5. Knowland Park fire road looking west
6. Knowland Park fire road looking west
7. Knowland Park fire road looking southwest
8. Bemis Street looking northwest
9. Royal Oak Road looking southeast
10. Golf Links Road looking southwest
11. Knowland Park Looking West – Upper Knoll
12. Knowland Park Looking West – Lower Knoll

**Appendix E** shows the location of the 12 viewpoints and the 12 candidate photos taken from these viewpoints. In coordination with City of Oakland staff, seven viewpoints were selected from the 12 candidate photos because it was determined they offered good visibility of the site:<sup>1</sup>

Viewpoint 1: Knowland Park Fire Road Looking West

Viewpoint 2: Hood Street Looking North

Viewpoint 3: Royal Oak Road Looking Southwest

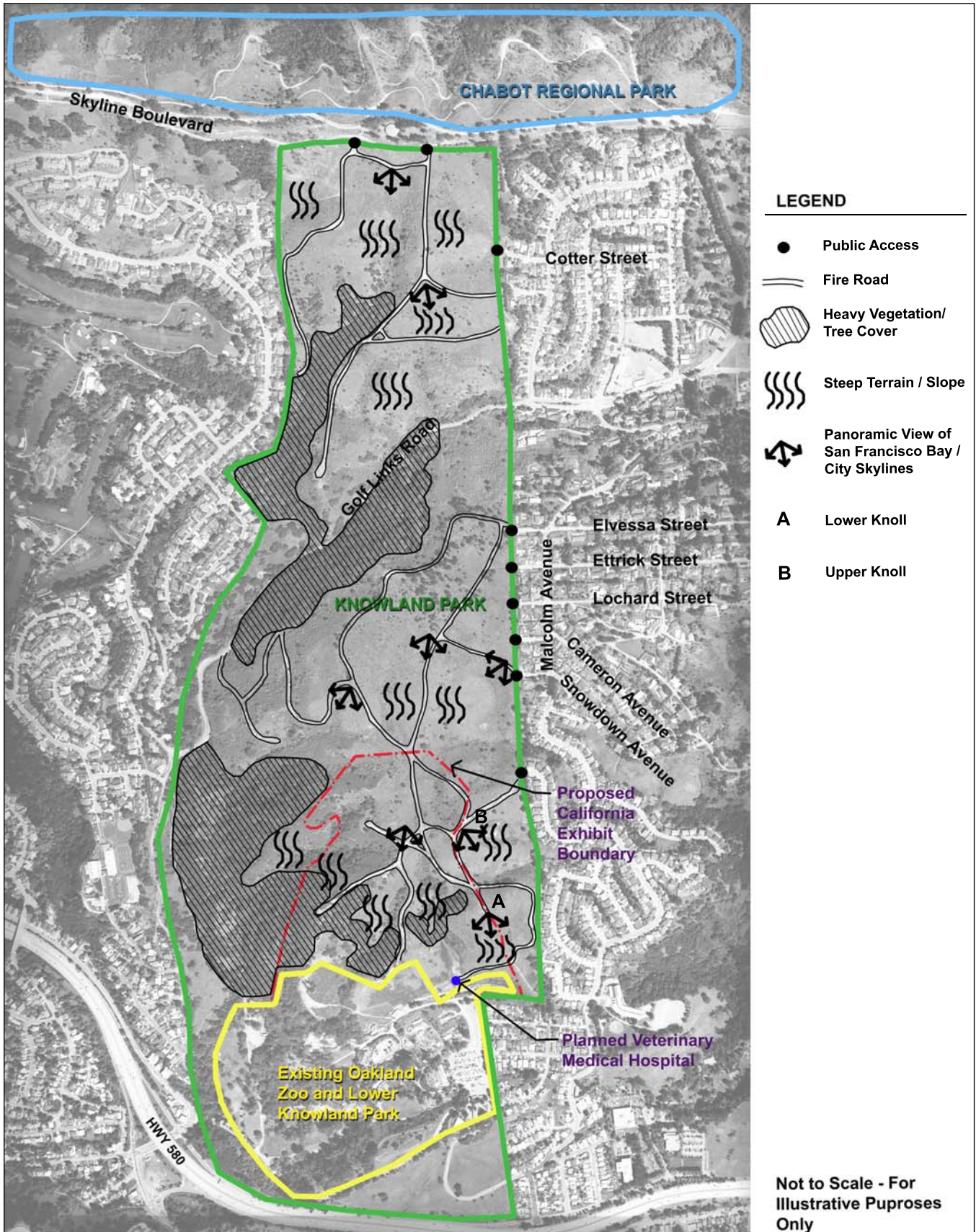
Viewpoint 4: Golf Links Road Looking Southeast

Viewpoint 5: I-580 Looking Southeast

Viewpoint 6: Knowland Park Looking West – Upper Knoll

Viewpoint 7: Knowland Park Looking West – Lower Knoll

<sup>1</sup> A review of the 12 candidate photos by City of Oakland staff and PLACEMAKERS determined that of the 12 candidate photographs, the sites of the California Exhibit and Veterinary Medical Hospital are not visible in five of the photographs, and proposed development would not be visible in visual simulations. Therefore, visual simulations were not prepared for these additional five photographs.



SOURCE: PLACEMAKERS

Figure 3.1-1  
Knowland Park Aesthetic Conditions Map

Visual simulations for Viewpoints 1 through 5 include a view of existing conditions (March 2009), a view of the facilities comprising the buildout of the amended Master Plan, and a view of the facilities comprising the buildout of the amended Master Plan at seven years with mature landscaping. Visual simulations for Viewpoints 6 and 7 include a view of existing conditions (May 2010) and a view of the facilities comprising the buildout of the amended Master Plan. A view at seven years after the buildout of the amended Master Plan was not included for Viewpoints 6 and 7 because no additional landscaping is proposed in these views. **Figure 3.1-2** shows the simulation viewpoint locations.

### 3.1.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

The project would have a significant impact on the environment if it would:

- a) Have a substantial adverse effect on a scenic vista;
- b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state or locally designated scenic highway;
- c) Substantially degrade the existing visual character or quality of the site and its surroundings;  
or
- d) Create a new source of substantial light and glare which would substantially and adversely affect day or nighttime views in the area?

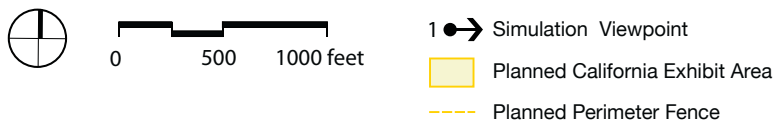
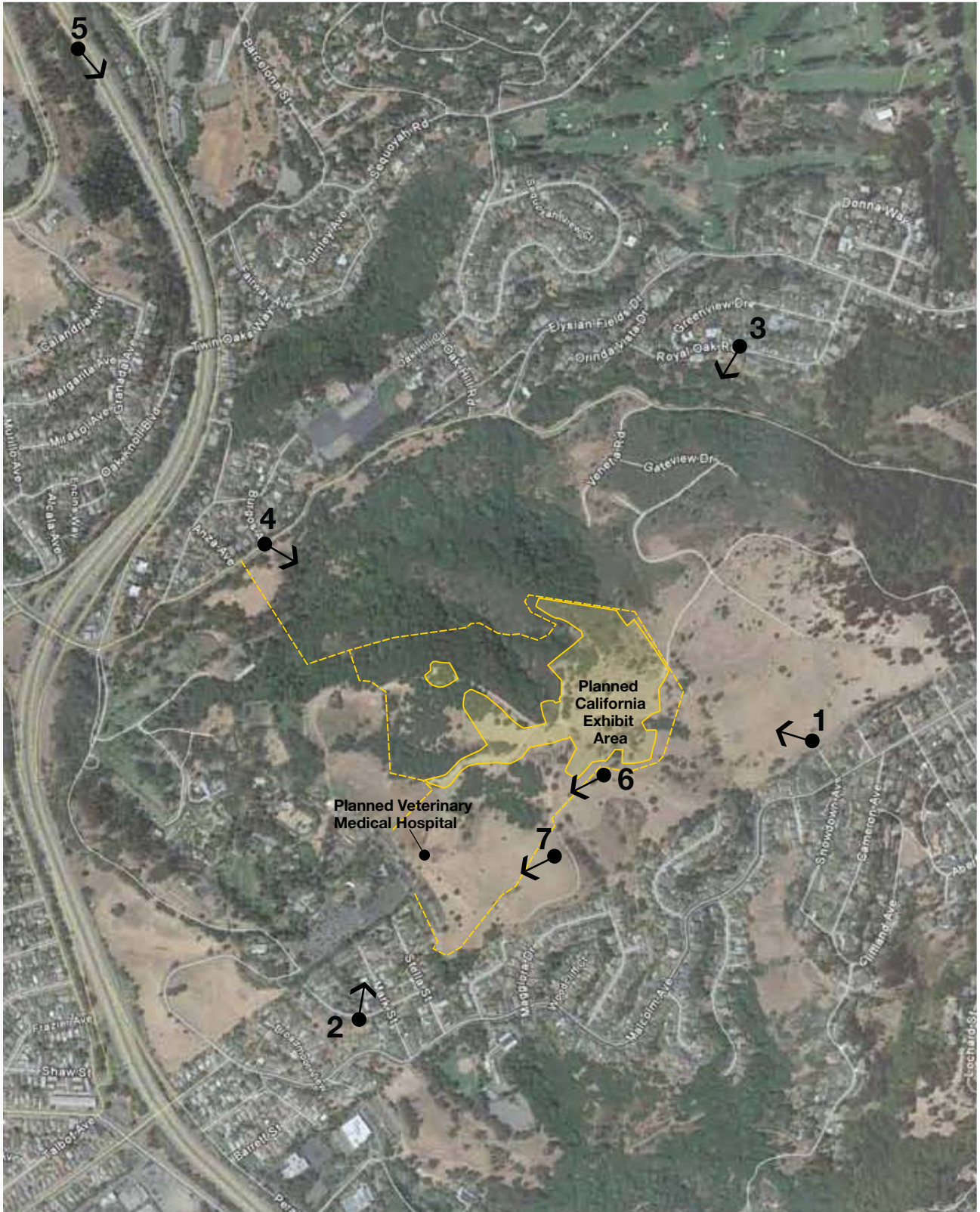
These criteria are discussed below.

#### a) **Would the project have a substantial adverse effect on a scenic vista?**

The buildout of the amended Master Plan would not have a substantial adverse effect on any scenic vista. Potential visual impacts on scenic vistas are described below and illustrated with visual simulations of the seven selected viewpoints.

#### ***Viewpoint 1: Knowland Park Fire Road Looking West***

**Figure 3.1-3a** shows a view of the California Exhibit from a fire road in Knowland Park. The upper photo shows the view as it currently exists and the lower photo shows a view of the proposed California Exhibit at completion. Background views offer a panoramic view of San Francisco Bay, the Marin Headlands, and the Oakland and San Francisco skylines. Middle ground views are of oak woodlands, grasslands, and fire roads, and foreground views are of grasslands. The lower photo shows a section of the perimeter fence and portions of the California Exhibit, including animal exhibits, the California Interpretive Center, and the Small Exhibit Activity Zone, appearing in the middle ground view; these elements would reduce the extent of visible open grasslands. Animal exhibit fencing would extend above the tree tops in some instances but would not obstruct the panoramic view of San Francisco Bay and urban skyline. The California



SOURCE: ENVIRONMENTAL VISION, May 18, 2010

  
**Figure 3.1-2**  
 Simulation Viewpoint Locations





Existing view from Knowland Park fire road (at Snowdown Ave.) looking west



Visual simulation of proposed Master Plan amendment at buildout

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-3a**  
Viewpoint 1: Visual Simulation from Knowland Park Fire Road Looking West –  
Proposed Master Plan Amendment at Buildout

Interpretive Center would extend slightly above the tree tops but would not obstruct panoramic views. None of the other proposed changes would be visible in this view.

**Figure 3.1-3b** shows the view as it currently exists (upper photo) and a view of the site with the proposed landscaping after seven years of growth (lower photo). The proposed landscaping would provide limited screening of the California Exhibit in this view. With landscaping, visibility of the California Exhibit from the fire road would continue to be noticeable in middle ground views.

Compared to the approved Master Plan, the proposed Master Plan amendment would result in reduced visibility of the California Interpretive Center from this viewpoint because it would shift the building approximately 300 feet northwest of the location specified in the approved Master Plan. The California Exhibit would represent a noticeable change in middle ground views with both the approved Master Plan and the proposed Master Plan amendment; however, the California Exhibit would not obstruct panoramic views of the San Francisco Bay and city skylines and thus would not have a substantial adverse effect on a scenic vista.<sup>2</sup> The proposed Master Plan amendment would not obstruct panoramic views of San Francisco Bay and the city skylines and would continue to result in less-than significant impacts on scenic vistas.

### ***Viewpoint 2: Hood Street Looking North***

**Figure 3.1-4a** shows a view of the Master Plan amendment area from Hood Street, a residential street located to the south of the Master Plan area. The upper photo shows the site as it currently exists. Background views are of hillsides comprising a portion of Knowland Park and show grasslands, oak woodlands, and the fence enclosing the existing bison/tule elk exhibits. Middle ground and foreground views are of single-family residences and trees. The lower photo shows a segment of the gondola people-moving system including two support structures and gondola cars at the far left of the photo, the upper portion of a gondola support structure along the ridgeline above the tree line in the middle of the photo, and a very small portion of the proposed new Veterinary Medical Hospital roof and upper level behind existing trees. None of the other proposed elements of the amended Master Plan would be visible in this view.

Seven of the gondola support structures would range in height from 22 to 39 feet and one 62-foot structure would be located in a 15-foot-deep ravine, resulting in the visibility of the upper 47 feet of the support structure. The gondola support structures would run parallel with the existing fire road and, with the exception of one gondola support structure, would not extend above the top of oak woodlands that appear along the ridgeline in background views. The gondola cars would be below the top of the structures. The support structures would be painted an earth-tone color with a matte finish to reduce their visibility in the middle ground and background views of hillsides and

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<sup>2</sup> A vista is a distant view.



Existing view from Knowland Park fire road (at Snowdown Ave.) looking west



Visual simulation of proposed Master Plan amendment at seven years

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-3b**  
Viewpoint 1: Visual Simulation from Knowland Park Fire Road Looking West –  
Landscaping at Seven-Year Maturity



Existing view from Hood Street looking north



Visual simulation of proposed Master Plan amendment at buildout

SOURCE: Environmental Vision



**Figure 3.1-4a**  
Viewpoint 2: Visual Simulation from Hood Street Looking North –  
Proposed Master Plan Amendment at Buildout

trees. While some portions of the gondola people-moving system would be visible from Hood Street and nearby residences, the system would not obstruct views of the hillsides. The upper portion of one support structure would extend above the top of the oak woodlands and would be visible in background views. While one gondola support structure would extend above the tree line, it would not represent an intrusive element on the ridgeline because it would be a single vertical element that extends above a small portion of the ridgeline and the majority of the ridgeline view would remain uninterrupted. Views of the proposed new Veterinary Medical Hospital roof would be barely perceptible and would not obstruct views of the hillsides.

**Figure 3.1-4b** shows the view of the Master Plan amendment area from Hood Street as it currently exists (upper photo) and a view of the site with the proposed landscaping after seven years of growth (lower photo). The proposed landscaping would not be noticeable in this view because of existing trees in the middle ground views.

California Exhibit visibility from Hood Street would be limited and would not obstruct views of the hillside and ridgeline. Consequently, the buildout of the amended Master Plan would not have a substantial adverse effect on a scenic vista from this vantage point.

Under the approved Master Plan, a segment of the loop road and retaining walls would be visible to the west of the location of the gondola system where trees exist (which would have been removed to construct the loop road); a portion of the River Exhibit would likely be visible. The California Interpretive Center would be visible from this viewpoint because the approved location is about 300 feet closer to the residences.

Compared to the approved Master Plan, the amended Master Plan would replace nearby views of a segment of the loop road and retaining walls with two gondola support structures and the upper portion of a support structure extending above the ridgeline; views of a portion of the River Exhibit with views of a portion of the roof and upper level of the Veterinary Medical Center; and views of the California Interpretive Center along the ridgeline with views of existing trees along the ridgeline. The amended Master Plan would be moderately less visible in comparison with the approved Master Plan and would result in a less-than-significant impact on a scenic vista.

### ***Viewpoint 3: Royal Oak Road Looking Southwest***

**Figure 3.1-5a** shows a view of the proposed California Exhibit from Royal Oak Road, which is located to the northeast of the Master Plan area. The upper photo shows the site as it currently exists and the lower photo shows a view of the proposed California Exhibit. Background views are of the sky, forested land (including two prominent eucalyptus trees) comprises the middle ground view, and rooftops of single-family residences dominate foreground views. The lower photo shows a portion of the proposed California Interpretive Center roof slightly extending above the tree tops, the upper portion of animal exhibit fencing, and the two eucalyptus trees



Existing view from Hood Street looking north



Visual simulation of proposed Master Plan amendment at seven years

SOURCE: Environmental Vision



**Figure 3.1-4b**  
Viewpoint 2: Visual Simulation from Hood Street Looking North –  
Landscaping at Seven-Year Maturity



Existing view from Royal Oak Road looking southeast



Visual simulation of proposed Master Plan amendment at buildout

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-5a**  
Viewpoint 3: Visual Simulation from Royal Oak Road Looking Southeast –  
Proposed Master Plan Amendment at Buildout

removed. In this view, the proposed California Exhibit would result in limited extension of the California Interpretive Center and animal exhibit fencing above the tree line and thus minimal encroachment into the horizon. None of the other elements of the amended Master Plan would be visible in this viewpoint.

**Figure 3.1-5b** shows the view as it currently exists (upper photo) and a view of the site with the proposed landscaping after seven years of growth (lower photo). With landscaping, the California Interpretive Center roof, as well as the upper portion of the animal exhibit fencing, would continue to be visible. The animal exhibit fencing would extend above the existing tree line but would be visually permeable and would not block views of the sky. The rooftop area of the California Interpretive Center, while slightly extending above the tree line, would represent a minor change in the natural tree line from this viewpoint.

Under the approved Master Plan, the California Interpretive Center would most likely not be visible in this view. Under the approved Master Plan, animal exhibit fencing would be visible. The amended Master Plan would not obstruct scenic views of the ridgeline and, similar to the approved Master Plan, would result in a less-than-significant impact on scenic vistas.

***Viewpoint 4: Golf Links Road Looking Southeast***

**Figure 3.1-6a** shows a view of the proposed California Exhibit from Golf Links Road, which is located to the north of the Master Plan area and is well-traveled. The upper photo shows the site as it currently exists. Background views are of the sky and ridgeline, forested land (including one of the tall eucalyptus trees) comprises the middle ground views, and the roadway and roadway vegetation are in the foreground. The lower photo shows the westerly and southerly facades of the proposed California Interpretive Center and one of the gondola support structures and cable. The tall eucalyptus tree would be removed. The California Interpretive Center would appear on a portion of the ridgeline. The gondola support structure would be visible, but would not be a dominant vertical element on the ridgeline as existing trees form a backdrop and are as tall as or taller than the support structure. The California Interpretive Center would result in a noticeable change along the ridgeline because it would introduce a building into a landscape of uninterrupted tree coverage. However, tree-covered hillsides would continue to be the dominant view and the California Exhibit would represent a moderate change in the ridgeline view. The amended Master Plan would have a less-than-significant impact on the scenic vista.

**Figure 3.1-6b** shows the view as it currently exists (upper photo) and the view of the California Exhibit with the proposed landscaping at seven years of growth (lower photo). The proposed landscaping would screen much of the westerly façade of the California Interpretive Center from view, although the roof line would be clearly visible. While the California Interpretive Center and the gondola support structure and cable would be visible from this viewpoint, the existing tree cover in middle ground views would continue to be the dominant feature.





Existing view from Royal Oaks Road looking southeast



Visual simulation of proposed Master Plan amendment at seven years

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-5b**  
Viewpoint 3: Visual Simulation from Royal Oak Road Looking Southeast –  
Landscaping at Seven-year Maturity



Existing view from Golf Links Road looking southwest



Visual simulation of proposed Master Plan amendment at buildout

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-6a**  
Viewpoint 4: Visual Simulation from Golf Links Road Looking Southeast –  
Proposed Master Plan Amendment at Buildout



Existing view from Golf Links Road looking southwest



Visual simulation of proposed Master Plan amendment at seven years

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-6b**  
Viewpoint 4: Visual Simulation from Golf Links Road Looking Southeast –  
Landscaping at Seven-Year Maturity

The California Interpretive Center and a portion of the gondola people-moving system would be observed briefly when traveling along Golf Links Road. Under the approved Master Plan, the California Exhibit would not be visible from this viewpoint. Under the amended Master Plan, while the California Exhibit would be visible along Golf Links Road, it would not represent the dominant element in this view and would not significantly disrupt the visual integrity of the ridgeline; similar to the approved Master Plan, it would result in a less-than-significant impact on scenic vistas.

***Viewpoint: 5: I-580 Looking Southeast***

Interstate 580 is identified as a scenic route in the Scenic Highways Element of the Oakland General Plan (City of Oakland 1974). Viewpoint 5 is within the Interstate 580 scenic corridor identified in the Scenic Highways Element. Currently, upper portions of Knowland Park are visible from Interstate 580 and comprise background views of the ridgeline. **Figure 3.1-7a** shows views of the upper portions of Knowland Park when driving south on Interstate 580. The upper photo shows the site as it currently exists. Two tall eucalyptus trees (about 50 feet in height) are a prominent feature on the ridgeline extending well above the oak woodlands that cover the hillsides. The ridgeline forms the background view, with the forested hillsides and urban development comprising the middle ground and the Interstate 580 roadway the foreground. The lower photo shows a visual simulation with the proposed California Exhibit at completion. In this view, the two eucalyptus trees are removed and the westerly facades of the California Interpretive Center are visible in the background. The building roof line of the California Interpretive Center would extend slightly above the ridgeline but would not represent a significant visual disruption of the ridgeline. In this view, the California Interpretive Center would appear as a component of the background views available from Interstate 580 and would be observed briefly when traveling on Interstate 580. None of the other proposed changes would be visible in this view. The amended Master Plan would not obstruct panoramic vistas currently available to the motorist, would minimize disturbance to natural landforms and vegetation, and would result in a less-than-significant impact on scenic vistas.

**Figure 3.1-7b** shows the California Exhibit site as it currently exists (upper photo) and a view of the site with the proposed landscaping after seven years of growth (lower photo). The proposed landscaping for the California Interpretive Center would partially screen the lower portions of the California Interpretive Center, and a cluster of planted trees to the right of the California Interpretive would further enhance vegetation coverage.

While the upper portions of the California Interpretive Center would be visible from Interstate 580, they would not represent the dominant element in this view. Under the approved Master Plan, upper portions of the California Interpretive Center would also be visible from Interstate 580 but again would not represent the dominant element in this view. The California Interpretive Center would not significantly disrupt the visual integrity of the ridgeline and, similar to the approved Master Plan, would result in a less-than-significant impact on scenic vistas.



Existing view from I-580 looking southeast



Visual simulation of proposed Master Plan amendment at buildout

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-7a**  
Viewpoint 5: Visual Simulation from I-580 Looking Southeast –  
Proposed Master Plan Amendment at Buildout



Existing view from I-580 looking southeast



Visual simulation of proposed Master Plan amendment at seven years

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-7b**  
Viewpoint 5: Visual Simulation from I-580 Looking Southeast –  
Landscaping at Seven-Year Maturity

### ***Viewpoint 6: Knowland Park Looking West – Upper Knoll***

The upper knoll location (see **Figure 3.1-1**) currently offers park users panoramic views of San Francisco Bay and the Oakland and San Francisco skylines. It is accessible from an existing fire road. **Figure 3.1-8** shows the panoramic view offered at Viewpoint 6, which is located south of an existing fire road. The upper photo shows the site as it currently exists. The lower photo shows the proposed perimeter fence which, at this location, would be constructed in an engineered swale to keep the top of the fence below the sight line of park users. While visible in middle ground views, the perimeter fence would not obstruct the panoramic background views of San Francisco Bay and city skylines.

### ***Viewpoint 7: Knowland Park Looking West – Lower Knoll***

The lower knoll location (see **Figure 3.1-1**) also offers park users panoramic views of San Francisco Bay and the Oakland and San Francisco skylines in addition to an extensive view of urban development. **Figure 3.1-9** shows the panoramic view offered at Viewpoint 7, which is located south of the terminus of an existing fire road. The upper photo shows the site as it currently exists and the lower photo shows the proposed perimeter fence at the far right of the photo. Views of the perimeter fence would be very limited and would not obstruct views of grasslands, middle ground views of urban development, or the panoramic background views of San Francisco Bay and city skylines. With the approved Master Plan, the perimeter fence would prevent park user access to the lower knoll. By providing public access to the scenic vista at the lower knoll, where public access was not provided in the approved Master Plan, the proposed Master Plan amendment reduces the already less-than-significant impact of the approved Master Plan.

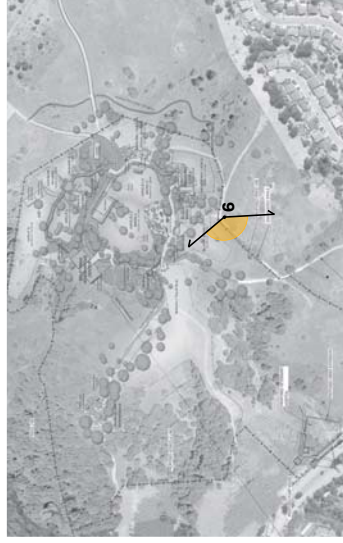
During Phase 1 of the amended Master Plan construction schedule, it may be necessary to construct temporary sound barriers to reduce construction noise associated with the construction of the Veterinary Medical Hospital and the paving of the existing service road (see **Section 3.9, Noise**). To reduce noise levels during the construction of the Veterinary Medical Hospital, a 15-foot high temporary sound barrier of 230 feet in length would be installed between the building site and the southern and eastern residences. The temporary sound barrier would be in place for approximately three to four weeks. To reduce noise levels during the paving of the existing service road, a 12-foot high temporary sound barrier of 475 feet in length would be installed along the edge of the service road segment where the road bends and is oriented nearest the southern residences. The temporary sound barrier would be in place for approximately two and one-half to three weeks. The sound barriers would be designed in earth-tone colors to soften their appearance and blend in with the natural landscape. While the temporary sound barriers would be visible to park users and the southern and eastern residences, they would be in place for less than eight weeks during the 12-month construction period for Phase 1 and are considered to represent a less-than-significant visual impact.



Panoramic view looking west from Knowland Park



Visual simulation of proposed perimeter fence



Viewpoint Location

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-8**  
Viewpoint 6: Knowland Park Looking West – Upper Knoll

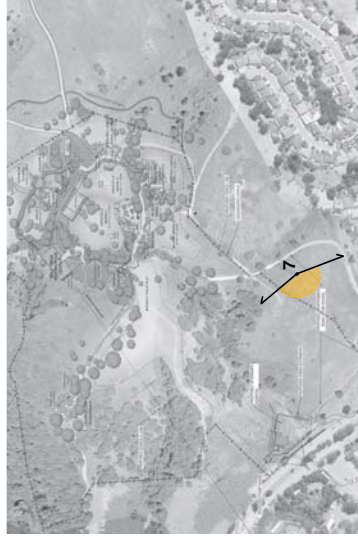




Panoramic View looking west from Knowland Park



Visual simulation of proposed perimeter fence



Viewpoint Location

SOURCE: ENVIRONMENTAL VISION



**Figure 3.1-9**  
Viewpoint 7: Knowland Park Looking West – Lower Knoll

In sum, the buildout of the amended Master Plan would not create new significant aesthetic impacts or increase the severity of impacts compared to the approved Master Plan.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state or locally designated scenic highway?**

The buildout of the amended Master Plan would not substantially damage scenic resources within a scenic highway. As discussed under **Criterion a** above, Knowland Park is within the view corridor of Interstate 580, a designated scenic highway. Development of the California Exhibit would not substantially damage scenic views of the ridgeline and hillsides available from Interstate 580. The proposed California Exhibit would not affect any rock outcroppings present on the site. There are no historic buildings present on the site. The buildout of the amended Master Plan would result in the removal of approximately 51 protected trees, in comparison with the 98 protected trees that would be removed under the approved Master Plan, and 110 protected trees within ten feet of ten feet of construction. Protected trees would be replaced pursuant to the Oakland Tree Protection Ordinance. The amended Master Plan would result in an approximate 48 percent reduction in tree removal compared to the approved Master Plan.

In sum, the amended Master Plan would not create new aesthetic impacts or increase the severity of impacts compared to the approved Master Plan. Impacts would be similar to those addressed in the 1998 MND and would continue to be less-than- significant.

**Impact:** Less-than-significant

**Mitigation:** None required

**c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?**

The buildout of the amended Master Plan would alter the visual character of the site but, as discussed under **Criterion a** and **Criterion b**, would not substantially degrade the visual character of the site or the surrounding area. As with the 1998 MND, no significant impacts on scenic vistas or views open to the public have been identified, and impacts would continue to be less than significant.

The proposed shifting of the California Interpretive Center approximately 300 feet to the northwest would result in this building not being visible from residences to the southeast; in contrast, under the approved Master Plan, this building would be visible from these residences.

The proposed location of the California Interpretive Center would make the building visible in views from Golf Links Road; in contrast, under the approved Master Plan, the building would not be visible along Golf Links Road. Because views of the California Interpretive Center from the residences would be ongoing and views of the California Interpretive Center along Golf Links Road would be observed briefly from vehicles traveling along this road, the proposed shifting of the location of the California Interpretive Center is considered to represent a modest improvement for neighboring residences.

The amended Master Plan would result in a decrease (of about five acres) in the overall area enclosed by the perimeter fence, compared to the approved Master Plan. The California Exhibit would shift some of the animal exhibits to the north and locate them closer to the perimeter fence than would be the case under the approved Master Plan. However, moving the animal exhibits closer to the perimeter fence would not obstruct panoramic views of San Francisco Bay and the city skylines nor block views of the oak woodlands and grasslands. The proposed Overnight Experience would be screened by existing trees and vegetation. The tent cabins and toilet facilities would be sited between existing trees; no trees would be removed. The proposed public access path would be four feet wide, have a natural surface, and would follow the natural contours. While the path may be visible to park users and adjacent residences to the east, it would appear as another trail that traverses Knowland Park.

The proposed Veterinary Medical Hospital would be sited to the north of the zoo's overflow parking lot. Much of the building would be screened by the existing topography. The building is proposed for LEED certification and would include earth-tone colors and landscaping to blend with the natural landscape.

Portions of the proposed aerial gondola people-moving system would be visible from residences located to the south and southeast and from Golf Links Road. Likewise, the loop road and shuttle bus system included in the approved Master Plan would also be visible from residences located to the south and southeast. While portions of the gondola people-moving system would be visible from some residences and along Golf Links Road, the gondola cars and support structures would be matte-finish and forest green color or other earth-tone color intended to blend into the landscape.

The proposed Master Plan amendment would include landscape plans for the California Exhibit and the Veterinary Medical Hospital. Protected trees proposed for removal would be replaced. Extensive landscaping would be used throughout the California Exhibit to screen structures and soften the appearance of the development. Trees and other plantings would be installed along the Veterinary Medical Hospital's south and east elevations to screen the building from the zoo and adjacent residents located to the east.

In sum, the amended Master Plan would not create new impacts or increase the severity of impacts compared to the approved Master Plan. Impacts would be similar to those addressed in the 1998 MND and would continue to be less than significant.

**Impact:** Less-than-significant

**Mitigation:** None required

**d) Would the project create a new source of substantial light and glare which would substantially and adversely affect day or nighttime views in the area?**

Light and glare impacts would continue to be less-than-significant as identified in the 1998 MND. The amended Master Plan would include limited night lighting for safety and security purposes at the Veterinary Medical Hospital and the California Exhibit. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be directed downward and shielded to focus illumination on the desired areas and minimize light trespass. The animal exhibits and gondola support structures would not include night lighting. Additionally, **SCA-AES-2** requires that lighting fixtures be adequately shielded to prevent unnecessary glare on adjacent properties.

The gondola cars would be matte-finish and forest green color or other earth-tone color intended to blend into the landscape. The gondola support structures would be matte-finish to avoid any potential for glare. Animal exhibits would use existing vegetation, and landscaping would be installed to screen the exhibit areas. Landscaping would not cause any glare. Window glazing for the Veterinary Medical Hospital and California Interpretive Center would be non-reflective glass.

In sum, the amended Master Plan would not create new impacts or increase the severity of impacts compared to the approved Master Plan. Impacts would be similar to those addressed in the 1998 MND and would continue to be less than significant.

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.1.6 CUMULATIVE IMPACTS

The geographic scope for assessing the potential for cumulative aesthetic impacts is the immediately surrounding area including Knowland Park, the existing zoo facilities, and the immediately surrounding residential communities. **Section 3.8, Land Use, Recreation and Planning**, describes the past and present development in this area.

The buildout of the amended Master Plan is the only reasonably foreseeable future project in this area. The Knowland Park area outside of the Master Plan boundary is zoned Open Space (Resource Conservation Area) and no future development is expected at this time. The zoo and its related support facilities have been a part of Knowland Park for more than 60 years. The immediate surrounding residential areas are largely built out, and future improvements to existing homes or the potential construction of homes on any vacant parcels would be minor elements in the scenic vistas available to the public and would not be close enough to the California Exhibit area to combine with the amended Master Plan to create a cumulative impact.

The two development projects anticipated elsewhere in southeast Oakland – the Leona Quarry and Oak Knoll projects – are located too far from the Master Plan area for the aesthetic impacts of these projects to combine with the amended Master Plan.

Consequently, there are no potential significant aesthetic cumulative impacts in the relevant geographic area. Additionally, neither the original Master Plan reviewed in the 1998 MND nor the amended Master Plan reviewed in this SMND/Addendum would result in any significant adverse aesthetic impacts. Thus, the buildout of the amended Master Plan would not result in, or contribute to, any significant cumulative aesthetic impacts.

### 3.1.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new aesthetics impacts or a substantial increase in the severity of previously identified aesthetics impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less than significant. This section identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.

### 3.1.8 REFERENCES

City of Oakland. 1974. *Oakland General Plan, Scenic Highways Element*. September 1974.

City of Oakland. 1996. *Oakland General Plan, Open Space, Conservation, and Recreation (OSCAR) Element*. June 1996.

City of Oakland. 1998. *Oakland General Plan, Land Use and Transportation Element*. March 1998.

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## 3.2 AIR QUALITY

This section evaluates the potential air quality impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant air quality impacts not identified in the 1998 MND or a substantial increase in the severity of the previously identified impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant air quality impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. This section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required. An analysis of greenhouse gas emissions and global climate change is contained in **Section 3.5, Global Climate Change**.

### 3.2.1 PRIOR MND ANALYSIS AND CONCLUSIONS

#### 3.2.1.1 1998 Prior MND Impact Findings

The 1998 MND concluded that the approved Master Plan could result in potentially significant air quality impacts. The 1998 MND found that the approved Master Plan would generate dust due to earthmoving activities and vehicle travel over unpaved roads. Construction activities would also generate short-term emissions of criteria pollutants associated with equipment exhaust emissions. The proposed phased construction activities would not result in construction sites greater than four acres. No operational air quality impacts were identified.

#### 3.2.1.2 1998 MND Mitigation Measures

The 1998 MND identified the following mitigation measure to reduce impacts associated with short-term emissions of dust (during the construction period) to a less-than-significant level:

8a) The following Basic Dust Control Measures shall be implemented at all construction sites:

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose debris or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

*(NOTE: This mitigation measure is not applicable to the proposed Master Plan amendment because it is replaced by **SCA-AIR-1**; see **Subsection 3.2.2** below.)*

### 3.2.2 STANDARD CONDITIONS OF APPROVAL

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that relate to air quality and that would apply to the proposed Master Plan amendment are listed below. If the City approves the proposed Master Plan amendment, the Conditions of Approval will be adopted as requirements of the Master Plan amendment and would ensure that no significant air quality impacts occur. As a result, the Conditions of Approval are not listed as mitigation measures.

#### **SCA-AIR-1: Dust Control**

##### **Construction-Related Air Pollution Controls (Dust and Equipment Emissions)**

###### ***Ongoing throughout demolition, grading, and/or construction***

During construction, the project applicant shall require the construction contractor to implement all of the following applicable measures recommended by the Bay Area Air Quality Management District (BAAQMD):

- a) Water all exposed surfaces of active construction areas at least twice daily (using reclaimed water if possible). Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.
- b) Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
- c) All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- d) Pave all roadways, driveways, sidewalks, etc. as soon as feasible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.
- e) Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).
- f) Limit vehicle speeds on unpaved roads to 15 miles per hour.
- g) Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations. Clear signage to this effect shall be provided for construction workers at all access points.
- h) All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.



- i) Post a publicly visible sign that includes the contractor's name and telephone number to contact regarding dust complaints. When contacted, the contractor shall respond and take corrective action within 48 hours. The telephone numbers of contacts at the City and BAAQMD shall also be visible. This information may be posted on other required on-site signage.

The enhanced measures below apply to construction projects involving 1) land uses that exceed the BAAQMD construction screening criteria (e.g., 240 or more multi-family residential units); 2) a demolition permit; 3) simultaneous occurrence of more than two construction phases (e.g., grading and building construction occurring simultaneously); 4) extension site preparation (i.e., over four acres in size); or 5) extensive soil transport (i.e., 10,000 or more cubic yards of soil import/export).

- a) All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
- b) All excavation, grading, and demolition activities shall be suspended when average wind speeds exceed 20 mph.
- c) Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- d) Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more).
- e) Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress.
- f) Install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of the construction site to minimize windblown dust. Wind breaks must have a maximum 50 percent air porosity.
- g) Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- h) The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- i) All trucks and equipment, including tires, shall be washed off prior to leaving the site.
- j) Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
- k) Minimize the idling time of diesel-powered construction equipment to two minutes.
- l) The project applicant shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20 percent NO<sub>x</sub> reduction and 45 percent particulate matter (PM) reduction compared to the most recent

California Air Resources Board (CARB) fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as they become available.

- m) Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings).
- n) All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of NO<sub>x</sub> and PM.
- o) Off-road heavy diesel engines shall meet the CARB's most recent certification standard.

### 3.2.3 UPDATED REGULATORY SETTING

Air quality within the Bay Area is addressed through the efforts of various federal, State, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, certain regulatory requirements have changed and the buildout of the amended Master Plan must comply with current regulations. Presented below is a summary of applicable regulations with an emphasis on those that have changed since the 1998 MND was adopted.

#### 3.2.3.1 Federal Air Quality Regulations

The federal government is continually updating and revising air quality regulations. The United States Environmental Protection Agency (EPA) is responsible for setting and enforcing the National Ambient Air Quality Standards for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives.

As part of its enforcement responsibilities, the U.S. EPA requires each State with federal nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the national standards. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the SIP.

Title III of the federal Clean Air Act Amendments required the U.S. EPA to promulgate national emissions standards for certain Toxic Air Contaminants (TACs). At first, the U.S. EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable, generally referred to as Maximum Achievable Control Technology (MACT) standards. Then the U.S. EPA developed health risk-based emissions standards necessary to address risks remaining after implementation of MACT. Consequently,

performance criteria were established to limit mobile source emissions of certain TACs, including benzene, formaldehyde, and 1,3-butadiene.

Notable changes in federal air quality regulations that would affect the buildout of the amended Master Plan include cleaner fuel standards (e.g. ultra low sulfur diesel), diesel engine emission limits, and more stringent ozone, SO<sub>2</sub> and PM<sub>2.5</sub> limits.

### 3.2.3.2 State Air Quality Regulations

Like the U.S. EPA, the California Air Resources Board (California ARB) is continually updating and revising regulations. The California ARB, a part of the California EPA, is responsible for the coordination and administration of both federal and State air pollution control programs within California. In this capacity, California ARB conducts research, sets California Ambient Air Quality Standards, compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the SIP. The California ARB establishes emissions standards for motor vehicles sold in California, consumer products (e.g., hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

In 1978 the California Energy Commission (CEC) established the Energy Efficient Standards for Residential and Nonresidential Buildings (commonly known as Title 24), in response to a legislative mandate to reduce California's energy consumption. The State's Title 24 energy-efficiency standards require the design of new buildings to conserve energy. The standards are updated periodically to allow consideration and possible incorporation of new energy-efficiency technologies and methods. Since air pollutant emissions are closely linked to the combustion of fuel for energy production, mandated increases in energy efficiency will have air quality benefits.

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588). AB 1807 sets procedures for the designation of TACs and control measures for sources that emit particular TACs. If there is a safe emission threshold for a substance, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must require all feasible control measures to minimize emissions. To date, none of the TACs identified under AB 1807 has a safe threshold. AB 2588 requires all facilities emitting TACs above specified levels to prepare emission inventories and risk assessments (the latter, if TAC emissions are found to be significant), and then to notify the public of the any significant risk and implement necessary reduction measures.

The California ARB has adopted TAC control measures and more stringent emission standards for various on-road vehicles and off-road diesel equipment. Over time, the replacement of older vehicles is expected to result in a vehicle fleet that emits substantially less of the associated TACs (i.e., diesel particulate matter (DPM), benzene, and 1,3-butadiene). With implementation of these

measures, it is expected that DPM concentrations will be reduced by 85 percent in 2020 relative to year 2000 levels. Adopted regulations are also expected to reduce formaldehyde emissions from cars and light-duty trucks.

The California ARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (2005) provides recommendations for the siting of new sensitive land uses (i.e., residences, schools, daycare centers, playgrounds, and medical facilities) near certain recognized major sources of TACs, including freeways, large warehouses/distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners and large gasoline-dispensing facilities.

### **3.2.3.3 Regional Air Quality Regulations**

The Bay Area Air Quality Management District (BAAQMD) is the primary agency responsible for comprehensive air pollution control in the San Francisco Bay Area Air Basin, including Alameda County. To that end, BAAQMD, a regional agency, works directly with the Association of Bay Area Governments (ABAG), the Metropolitan Transportation Commission (MTC), and local governments and cooperates actively with all federal and State government agencies. BAAQMD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emissions sources, and enforces such measures through educational programs or fines, when necessary.

BAAQMD is directly responsible for reducing emissions from stationary sources and for assuring that State controls on mobile sources are effectively implemented. It has responded to this requirement by preparing a sequence of Ozone Attainment Plans and Clean Air Plans that comply with the federal Clean Air Act and the California Clean Air Act to accommodate growth, reduce the pollutant levels in the Bay Area, meet federal and State ambient air quality standards, and minimize the fiscal impact that pollution control measures have on the local economy. The Ozone Attainment Plans are prepared to address the federal ozone standard and the Clean Air Plans are prepared to address the State ozone standard.

The most recent Ozone Attainment Plan was adopted by the BAAQMD Board of Directors on October 2001 and demonstrates attainment of the federal ozone standard in the Bay Area by 2006. In January 2006, BAAQMD adopted the 2005 Ozone Strategy to identify additional steps needed to continue reducing ozone levels. The current regional Clean Air Plan was adopted by the Board of Directors on September 15, 2010. The 2010 Plan identifies the emissions control measures that would be adopted and/or implemented through 2012 to reduce major sources of pollutants. The 2010 Plan includes control measures to reduce air pollution in the Bay Area, called: "Land Use and Local Impact" measures, and "Energy and Climate" measures. These planning efforts are expected to substantially decrease the population's exposure to unhealthy ozone levels, even while substantial population growth has occurred within the Bay Area.

In 2003, the California Legislature passed Senate Bill 656 (SB 656) to reduce public exposure to PM<sub>10</sub> and PM<sub>2.5</sub>. SB 656 required the California ARB, in consultation with local air districts, to develop and adopt, by January 1, 2005, a list of the most readily available, feasible, and cost-effective control measures to reduce PM<sub>10</sub> and PM<sub>2.5</sub>. In November 2005, BAAQMD adopted a Particulate Matter Implementation Strategy focusing on those measures most applicable and cost effective for the Bay Area.

Although BAAQMD is responsible for regional air quality planning efforts, it does not have direct authority over plans formulated by other local agencies or governments, or over new development projects within the Bay Area. Instead, BAAQMD uses its expertise to offer advice on the air quality implications of such plans and projects through the BAAQMD CEQA Thresholds of Significance (BAAQMD Thresholds), which were adopted on June 2, 2010. Attendant with the BAAQMD Thresholds were the BAAQMD CEQA Guidelines, which were also released in June 2010. The BAAQMD Thresholds and CEQA Guidelines, together, provide guidance on how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. The objective of providing this guidance is to ensure that the air quality impacts of plans and development proposals will be analyzed accurately and consistently, and that adverse impacts will be minimized.

#### **3.2.3.4 City of Oakland General Plan and Municipal Code**

Local jurisdictions, such as the City of Oakland, have the authority and responsibility to reduce air pollution through their police power and decision-making authority. Specifically, the City is responsible for assessing the potential for and mitigating air quality problems that result from its land use decisions. The Oakland General Plan includes polices related to air quality. Applicable air quality policies are listed below and discussed in **Section 3.8, Land Use, Recreation and Planning**.

The Open Space, Conservation, and Recreation (OSCAR) Element of the Oakland General Plan contains the following air quality-related policies relevant to the buildout of the amended Master Plan (City of Oakland 1996):

*Policy CO-12.1: Land Use Patterns Which Promote Air Quality.* Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis.

*Policy CO-12.6: Control of Dust Emissions.* Require construction, demolition and grading practices which minimize dust emissions.

The Safety Element of the Oakland General Plan contains the following policy relevant to the buildout of the amended Master Plan (City of Oakland 2004):

*Policy HM-2:* Reduce the public’s exposure to toxic air contaminants through appropriate land use and transportation strategies.

Per the City of Oakland Municipal Code, Title 15 Buildings and Construction, Chapter 15.36 Demolition Permits, 15.36.100 Dust Control Measures:

“Best Management Practices” shall be used throughout all phases of work, including suspension of work, to alleviate or prevent fugitive dust nuisance and the discharge of smoke or any other air contaminants into the atmosphere in such quantity as will violate any city or regional air pollution control rule, regulations, ordinances or statutes. Water or dust palliatives or combinations of both shall be applied continuously and in sufficient quantity during the performance of work and at other times as required. Dust nuisance shall also be abated by cleaning and sweeping or other means as necessary. A dust control plan may be required as a condition of permit issuance or at other times as may be deemed necessary to assure compliance with this section. Failure to control effectively or abate fugitive dust nuisance or the discharge of smoke or any other air contaminants into the atmosphere may result in suspension or revocation of the permit, in addition to any other applicable enforcement actions or remedies.

### 3.2.4 EXISTING CONDITIONS

The Oakland Zoo and Knowland Park are located in the City of Oakland, which is in Alameda County, an area within the San Francisco Bay Area Air Basin (air basin). The air basin also comprises all of San Francisco, Contra Costa, Marin, Napa, San Mateo, and Santa Clara Counties, the southern half of Sonoma County, and the southwestern portion of Solano County.

Ambient air quality is influenced by climatological conditions, topography, and the quantity and type of pollutants released in an area. The major determinants of transport and dilution of a given pollutant are wind, atmospheric stability (presence or absence of inversions) and terrain. These factors are discussed below.

#### 3.2.4.1 Climate, Terrain and Meteorology

The regional climate in the air basin is considered Mediterranean. The climate is dominated by a strong, semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the moderating effects of the adjacent oceanic heat reservoir. In summer, when the high-pressure cell is strongest and farthest north, fog forms in the morning, and temperatures are mild. In winter, when the high-pressure cell is weakest and farthest south, occasional rainstorms occur. About 90 percent of the annual total rainfall is received in the November-April period. The area experiences moderate daytime onshore breezes and moderate humidity.

The City of Oakland is located in the climatological subregion that includes northern Alameda and western Contra Costa counties. BAAQMD describes the region as follows (BAAQMD 2010):

The western boundary of this subregion is defined by the Bay and its eastern boundary by the Oakland-Berkeley Hills. The Oakland-Berkeley Hills have a ridge line height of approximately 1,500 feet, a significant barrier to air flow. The most densely populated area of the subregion lies in a strip of land between the Bay and the lower hills.

In this area, marine air traveling through the Golden Gate, as well as across San Francisco and through the San Bruno Gap is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The prevailing winds for most of this subregion are from the west. At the northern end, near Richmond, prevailing winds are from the south-southwest.

Temperatures in this subregion have a narrow range due to the proximity of the moderating marine air. Maximum temperatures during summer average in the mid-70's, with minimums in the mid-50's. Winter highs are in the mid- to high-50's, with lows in the low- to mid-40's. The air pollution potential is lowest for the parts of the subregion that are closest to the Bay, due largely to good ventilation and less influx of pollutants from upwind sources. The occurrence of light winds in the evenings and early mornings occasionally causes elevated pollutant levels. The air pollution potential at the northern (Richmond) and southern (Oakland, San Leandro) parts of this subregion is marginally higher than communities directly east of the Golden Gate because of the lower frequency of strong winds.

This subregion contains a variety of industrial air pollution sources. Some industries are quite close to residential areas. Another major source is the aggregate emissions from hundreds of thousands of vehicles travelling on the area's major freeways. Motor vehicle emissions are projected to decrease substantially due to fuel and engine standards being implemented over the next 25 years. In particular, Assembly Bill 1493 (AB 1493, Pavely), enacted in 2002, required the California ARB to establish greenhouse gas emission standards for passenger vehicles and light duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent years. The California ARB adopted these standards in September 2004. When fully phased-in, the near-term (2009 to 2012) standards would result in a reduction in greenhouse gas emissions of approximately 22 percent compared to the emissions from the 2002 fleet, while the mid-term (2013 to 2016) standards would result in a reduction of approximately 30 percent (California ARB 2010).

#### **3.2.4.2 Existing Air Quality Conditions**

Air pollutant emissions within the Bay Area are generated by stationary, area-wide and mobile sources. Stationary sources are usually associated with specific large manufacturing and industrial facilities. Examples include fossil-fuel power plants or large industrial boilers. Area sources emit small amounts of pollutants individually, but there are often many of them, and the sum of their emissions amounts to a large total quantity. Examples of area sources include residential and

commercial water heaters, painting/coating operations, power lawn mower use, farming, and consumer products such as barbecue lighter fluid and hair spray. Mobile sources include on-road motor vehicles, aircraft, ships, trains, and self-propelled construction equipment. Air pollutants can also be generated by natural sources such as wild fires.

### 3.2.4.3 Criteria Pollutants

Criteria pollutants are as follows:

- **Ozone** ( $O_3$ ) is the primary component of smog. It is not directly emitted into the air but formed when reactive organic gases (ROG) and nitrogen oxides ( $NO_x$ ) undergo chemical changes in the presence of sunlight. Ozone concentrations are generally highest during the summer months when higher solar radiation and warm temperatures are conducive to ozone formation. Because of the reaction time involved in forming ozone, peak ozone concentrations are often found downwind of precursor emissions. Therefore, ozone is seen as a regional pollutant that occurs over large areas.

Emissions of the ozone precursors ROG and  $NO_x$  from both mobile (vehicle) and stationary sources have decreased across California since 1975 and are projected to continue declining through 2020. Reasons include the implementation of strict motor vehicle emissions controls, new controls on oil refinery fugitive emissions, and new rules for control of ROG from industrial coating and solvent operations (California ARB 2009). Peak 1-hour and 8-hour ozone concentrations have declined by nearly 18 percent during the last 20 years (California ARB 2009) and this trend is projected to continue.

- **Carbon Monoxide** (CO) is a colorless, odorless gas produced by incomplete fuel combustion. CO concentrations tend to be the highest during the winter during periods of low wind speeds and surface-based inversions that trap the pollutant at ground levels. In contrast to regional ozone, high CO levels tend to be localized. Because CO is emitted directly from internal combustion engines, motor vehicles operating at slow speeds are a primary source of CO in the Bay Area. Woodstoves and fireplaces also contribute CO during colder months. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections and highly populated areas. Increasingly stringent regulations on motor vehicle exhaust and oxygenated gasoline have substantially decreased ambient CO concentrations near roadways.
- **Nitrogen Dioxide** ( $NO_2$ ) is a brownish, highly reactive gas that is present in all urban environments. The major human-created  $NO_2$  sources are combustion devices, such as boilers, turbines, and vehicle and equipment engines. Combustion devices emit primarily nitrogen oxide (NO), which reacts through oxidation in the atmosphere to form  $NO_2$ . NO,  $NO_2$  and related compounds are collectively referred to as  $NO_x$ . As  $NO_2$  is formed and depleted by reactions associated with photochemical smog, the  $NO_2$  concentrations in a particular geographical area may not be representative of the local  $NO_x$  emissions sources.
- **Sulfur dioxide** ( $SO_2$ ) is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant primarily from burning high sulfur-content fuel oils and coal, and to a lesser degree from processes occurring at chemical plants and refineries.



- **Respirable Particulate Matter** (PM<sub>10</sub>) and **Fine Particulate Matter** (PM<sub>2.5</sub>) consist of extremely small, suspended particles or droplets ten microns and 2.5 microns or smaller in diameter, respectively. Some sources of particulate matter, like pollen, forest fires, and windblown dust, are naturally occurring. However, in populated areas, most particulate matter is caused by road dust, combustion products, abrasion of tires and brakes, and construction activities. Particulate matter can also be formed in the atmosphere by the condensation of SO<sub>2</sub> and ROG. PM<sub>2.5</sub> is a complex mixture of substances that includes elements such as carbon and metals; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and wood smoke.

When PM concentrations are forecast to be unhealthy, BAAQMD issues a Winter Spare the Air Alert. When a Winter Spare the Air Alert is in effect, it is illegal for Bay Area residents to burn wood, pellets, or other solid fuels in woodstoves, fireplaces or other wood-burning devices. PM<sub>2.5</sub> can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants, such as NO<sub>x</sub> or SO<sub>2</sub>. The discussion and analysis in this section only address direct PM<sub>2.5</sub> emissions, not those formed in the atmosphere. BAAQMD recommends characterizing potential health effects from exposure to direct PM<sub>2.5</sub> emissions using the applicable Thresholds of Significance.

The federal and State governments have established ambient air quality standards. These standards are intended to protect the health of individuals most sensitive to a given pollutant's effects. These pollutant standards are listed in **Table 3.2-1** below, and known health effects are listed in **Table 3.2-2**.

**TABLE 3.2-1: STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	Concentration <sup>c</sup>	Primary <sup>c,e,i</sup>	Secondary <sup>c,f</sup>
Ozone (O <sub>3</sub> )	1-Hour	0.09 ppm (180 µg/m <sup>3</sup> )	No federal standard	Same as Primary Standard
	8-Hour	0.07 ppm (137 µg/m <sup>3</sup> )	0.075 ppm (147 µg/m <sup>3</sup> )	
Respirable Particulate Matter (PM <sub>10</sub> )	24-Hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m <sup>3</sup>	–	
Fine Particulate Matter (PM <sub>2.5</sub> )	24-Hour	No Separate State Standard	35 µg/m <sup>3</sup>	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	None
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m <sup>3</sup> )	9 ppm (10 mg/m <sup>3</sup> )	None
	1-Hour	20 ppm (23 mg/m <sup>3</sup> )	35 ppm (40 mg/m <sup>3</sup> )	
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m <sup>3</sup> )	–	

**TABLE 3.2-1: STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS (continued)**

Pollutant	Averaging Time	Concentration <sup>c</sup>	Primary <sup>c,e,i</sup>	Secondary <sup>c,f</sup>
Nitrogen Dioxide (NO <sub>2</sub> )	Annual Arithmetic Mean	0.03 ppm (57 µg/m <sup>3</sup> )	0.053 ppm (100 µg/m <sup>3</sup> )	Same as Primary Standard
	1-Hour	0.18 ppm (339 µg/m <sup>3</sup> )	0.100 ppm	None
Lead	Rolling 3-Month Average	–	0.15 µg/m <sup>3</sup>	Same as Primary Standard
	30-day average	1.5 µg/m <sup>3</sup>	–	
	Calendar Quarter	–	1.5 µg/m <sup>3</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	24-Hour	0.04 ppm (105 µg/m <sup>3</sup> )	–	
	3-Hour	–	–	0.5 ppm (1300 µg/m <sup>3</sup> )
	1-Hour	0.25 ppm (655 µg/m <sup>3</sup> )	75 ppb	–

- <sup>a</sup> California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter – PM<sub>10</sub>, PM<sub>2.5</sub>, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
- <sup>b</sup> National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM<sub>10</sub>, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m<sup>3</sup> is equal to or less than 1. For PM<sub>2.5</sub>, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.
- <sup>c</sup> Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
- <sup>d</sup> Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
- <sup>e</sup> National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
- <sup>f</sup> National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- <sup>g</sup> Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.
- <sup>h</sup> To attain this standard, the 3-year average of the 98<sup>th</sup> percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).
- <sup>i</sup> On June 2, 2010, the U.S. EPA established a new 1-hour SO<sub>2</sub> standard, effective August 23, 2010, which is based on the 3-year average of the annual 99<sup>th</sup> percentile of 1-hour daily maximum concentrations. EPA also proposed a new automated Federal Reference Method (FRM) using ultraviolet technology, but will retain the older pararosaniline methods until the new FRM has adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO<sub>2</sub> standard of 0.14 ppm and the annual primary SO<sub>2</sub> standard of 0.030 ppm, effective August 23, 2010. The secondary SO<sub>2</sub> standard was not revised at this time; however, the secondary standard is undergoing a separate review by EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
- <sup>j</sup> The ARB has identified lead and vinyl chloride as “toxic air contaminants” with no threshold level of exposure for adverse health effects. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
- <sup>k</sup> National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Source: California ARB, 2010.

**TABLE 3.2-2: HEALTH EFFECTS AND SOURCES OF AIR POLLUTANTS**

<b>Pollutants</b>	<b>Sources</b>	<b>Primary Effects</b>
Carbon Monoxide (CO)	<ul style="list-style-type: none"> <li>• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust.</li> <li>• Natural events, such as decomposition of organic matter.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced tolerance for exercise.</li> <li>• Impairment of mental function.</li> <li>• Impairment of fetal development.</li> <li>• Death at high levels of exposure.</li> <li>• Aggravation of some heart diseases (angina).</li> </ul>
Nitrogen Dioxide (NO <sub>2</sub> )	<ul style="list-style-type: none"> <li>• Motor vehicle exhaust.</li> <li>• High temperature stationary combustion.</li> <li>• Atmospheric reactions.</li> </ul>	<ul style="list-style-type: none"> <li>• Aggravation of respiratory illness.</li> <li>• Reduced visibility.</li> <li>• Reduced plant growth.</li> <li>• Formation of acid rain.</li> </ul>
Ozone (O <sub>3</sub> )	<ul style="list-style-type: none"> <li>• Atmospheric reaction of organic gases with nitrogen oxides in sunlight.</li> </ul>	<ul style="list-style-type: none"> <li>• Aggravation of respiratory and cardiovascular diseases.</li> <li>• Irritation of eyes.</li> <li>• Impairment of cardiopulmonary function.</li> <li>• Plant leaf injury.</li> </ul>
Lead (Pb)	<ul style="list-style-type: none"> <li>• Contaminated soil.</li> </ul>	<ul style="list-style-type: none"> <li>• Impairment of blood functions and nerve conduction.</li> <li>• Behavioral and hearing problems in children.</li> </ul>
Suspended Particulate Matter (PM <sub>2.5</sub> and PM <sub>10</sub> )	<ul style="list-style-type: none"> <li>• Stationary combustion of solid fuels.</li> <li>• Construction activities.</li> <li>• Industrial processes.</li> <li>• Atmospheric chemical reactions.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced lung function.</li> <li>• Aggravation of the effects of gaseous pollutants.</li> <li>• Aggravation of respiratory and cardio respiratory diseases.</li> <li>• Increased cough and chest discomfort.</li> <li>• Soiling.</li> <li>• Reduced visibility.</li> </ul>
Sulfur Dioxide (SO <sub>2</sub> )	<ul style="list-style-type: none"> <li>• Combustion of sulfur-containing fossil fuels.</li> <li>• Smelting of sulfur-bearing metal ores.</li> <li>• Industrial processes.</li> </ul>	<ul style="list-style-type: none"> <li>• Aggravation of respiratory diseases (asthma, emphysema).</li> <li>• Reduced lung function.</li> <li>• Irritation of eyes.</li> <li>• Reduced visibility.</li> <li>• Plant injury.</li> <li>• Deterioration of metals, textiles, leather, finishes, coatings, etc.</li> </ul>

Source: California ARB, 2008.

Measurements of ambient concentrations of the criteria pollutants are used by the U.S. EPA and the California ARB to assess and classify the air quality of each regional air basin, county, or, in some cases, a specific urbanized area. The classification is determined by comparing actual monitoring data with national and State standards. If a pollutant concentration in an area is lower than the standard, the area is classified as being in “attainment” for that pollutant. If the pollutant concentration exceeds the standard, the area is classified as a “nonattainment” area. If there are not enough data available to determine whether the standard is exceeded in an area, the area is designated “unclassified.” BAAQMD monitors criteria air pollutant concentrations at a number of monitoring stations throughout the Bay Area. The air quality in the Bay Area, including Oakland, has generally improved over the past 20 years, as motor vehicles have become cleaner, agricultural and residential burning has been curtailed, and consumer products containing ROG have been reformulated or replaced.

The U.S. EPA and the California ARB use different standards for determining whether the Bay Area is an attainment area. Under national standards, the Bay Area was designated as a marginal nonattainment area for ozone in 2004. The U.S. EPA has not yet issued final attainment designations based on the new 0.75 ppm 8-hour ozone standard. Therefore, the Bay Area is still designated as a marginal nonattainment area for the federal 8-hour ozone level. The Bay Area is designated nonattainment for PM<sub>2.5</sub>. The Bay Area is in attainment or designated as unclassified for all other pollutants under national standards.

Under State standards, the Bay Area is designated as a nonattainment area for all standards for ozone, PM<sub>10</sub>, and PM<sub>2.5</sub> and an attainment area for all other pollutants. Review of ozone and particulate matter data for the monitoring stations at San Leandro-County Hospital and Oakland-9925 International Blvd. shows that only two standards were violated in 2006 through 2009. Between these stations, there was a single violation of the State 1-hour ozone standard and the federal 24-hour PM<sub>2.5</sub> standard in 2008.

#### **3.2.4.4 Toxic Air Contaminants**

TACs are a regulatory designation that includes a diverse group of air pollutants which adversely affect human health. They are not fundamentally different from the criteria pollutants, but they have not had ambient air quality standards established for them for a variety of reasons (e.g., insufficient dose-response data, association with particular workplace exposures rather than general environmental exposure). The health effects of TACs can result from either acute or chronic exposure. Many types of cancer are associated with chronic TAC exposures, but TAC exposures can also cause other adverse health effects. Consequently, BAAQMD has established both a cancer and a non-cancer health risk threshold for TAC emissions.

Significant sources of TACs in the environment include industrial processes, such as petroleum refining, chemical manufacturing, electric utilities, metal mining/refining and chrome plating;

and commercial operations, gasoline stations, dry cleaners and buildings with boilers and/or emergency generators. Mobile sources are gasoline and diesel-powered vehicles of all types. The California ARB listed ten compounds that pose the greatest known health risk in California. Based primarily on ambient air quality data, these are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and Diesel Particulate Matter (DPM) (California ARB 2009).

**Diesel Particulate Matter.** DPM is found in engine exhaust and consists of a mixture of gases and fine particles (smoke or soot) that can penetrate deeply into the lungs where it can contribute to a range of health problems. In 1998, the California ARB identified particulate matter from diesel-powered engines as a TAC based on its potential to cause cancer and other adverse health effects (California ARB 2009). Diesel exhaust is a complex mixture that includes hundreds of individual constituents and is identified by the State of California as a known carcinogen (California ARB 1998). However, under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole (California Environmental Protection Agency 1998).

Based on receptor modeling techniques, the California ARB estimated the background DPM health risk in the Bay Area in 2000 to be approximately 500 cancer cases per million people. This reflects a drop of approximately 36 percent from estimates for 1990 (California ARB 2009). In 2000, the California ARB approved a new regulation for existing heavy duty diesel vehicles that requires retrofitting and replacement of vehicles or their engines over time such that by 2023 all vehicles must have a 2010 model year engine or equivalent. This regulation is anticipated to result in an 85 percent decrease in statewide diesel health risk in 2020 from the 2000 risk levels (California ARB, 2000).

**Community Air Risk Evaluation (CARE) Program.** Under the Community Air Risk Evaluation (CARE) program, BAAQMD began identifying areas with high TAC emissions and sensitive populations that could be affected by such emissions, and using this information to establish policies and programs to reduce TAC emissions and exposures. During Phase I of CARE, BAAQMD developed a preliminary Bay Area-wide TAC emissions inventory (for the Year 2000) and compiled demographic and health-statistics data to identify sensitive populations. Five TACs (DPM, 1,3-butadiene, benzene, hexavalent chromium, and formaldehyde) were estimated to be responsible for about 97 percent of the Bay Area's cumulative cancer risk, and DPM alone accounts for about 80 percent of this cancer risk. Major sources of DPM include on-road and off-road heavy-duty diesel trucks and construction equipment. The highest DPM emissions occur in the urban core areas of eastern San Francisco, western Alameda, and northwestern Santa Clara counties.

### 3.2.4.5 Odors

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The human nose is the sole sensing device for odors. The ability to detect odors varies considerably among the population and characterization of offensive odors is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to different odors. In addition, people may have different reactions to the same odor; an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. An unfamiliar odor is more easily detected and more likely to cause complaints than a familiar one because of the phenomenon known as "odor fatigue," in which a person can become desensitized to almost any odor so that recognition occurs only with an alteration in the intensity.

Quality and intensity are two properties of any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as "flowery" or "sweet," the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases, and the odor intensity weakens and eventually becomes so low that detection or recognition is difficult. At some point during dilution, the concentration of the odorant falls below a detection threshold for a given individual. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

## 3.2.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

### 3.2.5.1 CEQA Thresholds/Criteria of Significance

The project would have a significant impact on the environment if it would:

#### *Project-Level Impacts*

- a) During project construction result in average daily emissions of 54 pounds per day of ROG, NO<sub>x</sub>, or PM<sub>2.5</sub> or 82 pounds per day of PM<sub>10</sub>;
- b) During project operation result in average daily emissions of 54 pounds per day of ROG, NO<sub>x</sub>, or PM<sub>2.5</sub> or 82 pounds per day of PM<sub>10</sub>; or result in maximum annual emissions of ten tons per year of ROG, NO<sub>x</sub>, or PM<sub>2.5</sub> or 15 tons per year of PM<sub>10</sub>;
- c) Contribute to carbon monoxide (CO) concentrations exceeding the California Ambient Air Quality Standards (CAAQS) of nine parts per million (ppm) averaged over eight hours and

20 ppm for one hour; (NOTE: Pursuant to BAAQMD CEQA Guidelines, localized CO concentrations should be estimated for projects in which (1) project-generated traffic would conflict with an applicable congestion management program established by the county congestion management agency or (2) project-generated traffic would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour (or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited, such as tunnels, parking garages, bridge underpasses, natural or urban street canyons, and below-grade roadways). In Oakland, only the MacArthur Maze portion of Interstate 580 exceeds the 44,000 vehicles per hour screening criteria.)

- d) During either project operation or project construction expose persons by siting a new source or a new receptor to substantial levels of Toxic Air Contaminants (TACs) resulting in (a) a cancer risk level greater than ten in one million, (b) a non-cancer risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of greater than 0.3 micrograms per cubic meter of annual average PM<sub>2.5</sub>; or (NOTE: Pursuant to the BAAQMD CEQA Guidelines, when siting new TAC sources consider receptors located within 1,000 feet, and when siting new receptors consider TAC sources located within 1,000 feet including, but not limited to, stationary sources, freeways, major roadways (10,000 or greater vehicles per day), truck distribution centers, ports, and rail lines. The cumulative analysis should consider the combined risk from all existing and reasonably foreseeable future sources. For this threshold, receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers.)
- e) Frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people. (NOTE: For this threshold, sensitive receptors include residential uses, schools, daycare centers, nursing homes, and medical centers [but not parks].)

#### ***Project-Level Cumulative Impacts***

- f) During either project operation or project construction expose persons, by siting a new source or a new receptor, to substantial levels of TACs resulting in (a) a cancer risk level greater than 100 in a million, (b) a non-cancer risk (chronic or acute) hazard index greater than 10.0, or (c) an increase of greater than 0.8 micrograms per cubic meter of annual average PM<sub>2.5</sub>.

These criteria are discussed below. The analysis in this section is derived and summarized from an Air Quality Technical Report prepared by ENVIRON International Corporation dated January 2011. This report is included in **Appendix F**. The ENVIRON report includes an evaluation of criteria air pollutant mass emissions from construction activities, operational emissions, and project-related mobile sources and an evaluation of mass emissions of toxic air contaminants from construction activities and operational emissions. The ENVIRON report used methodologies described in the BAAQMD 2010 CEQA Guidelines.

The analysis below assesses the air quality impacts of the buildout of the amended Master Plan under the thresholds of significance listed above and in accordance with the BAAQMD 2010 CEQA Guidelines. There are no quantitative thresholds for construction dust emissions. These impacts are considered less than significant if best management practices are employed to control dust during construction. Except for the specific “Project-Level Cumulative Impact”

TAC threshold, the project-level thresholds of significance for emissions establish the level at which a project's contribution would be cumulatively considerable.

### 3.2.5.2 Impact Assessment

**a) Would the project construction result in average daily emissions of 54 pounds per day of ROG, NO<sub>x</sub>, or PM<sub>2.5</sub> or 82 pounds per day of PM<sub>10</sub>?**

The buildout of the amended Master Plan would create emissions from construction activities. Construction activities would be comprised of two main components: site grading and building construction. For construction-related emissions, the average daily criteria pollutant emissions were estimated. Emissions from construction would be largely attributable to fuel use from construction equipment, worker commuting, and vendor commuting. Exhaust emissions from on-site equipment, exhaust and evaporative emissions from mobile sources, and off-gas emissions from architectural painting and asphalt paving were calculated.

Construction equipment emissions calculations were based on the number and type of equipment, the duration of construction phases, and the total number of hours of use for each piece of equipment in each phase. Calculated emissions account for the use of construction equipment that meets the USEPA Tier 4 interim emission standards because this type of equipment is included in the proposed Master Plan amendment (see **Chapter 2, Project Description, Subsection 2.4.10.3**).

Construction mobile source emissions from material transporting, soil hauling, vendor trips and worker commuting were based on emission factors generated by the California ARB EMFAC2007 model. Off-gas emissions from architectural coatings for the Veterinary Medical Hospital and the Interpretive Center and from asphalt paving were calculated using URBEMIS methodology. Criteria pollutant emissions were also calculated for the one day a helicopter would be needed to construct the gondola.

As presented in **Table 3.2-3**, average daily emissions of ROG, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> associated with construction would be two pounds per day of ROG, four pounds per day of NO<sub>x</sub>, and less than one pound per day of PM<sub>10</sub> and PM<sub>2.5</sub>. These emissions would be far below the thresholds of 54 pounds per day for ROG, NO<sub>x</sub>, and PM<sub>2.5</sub> and the threshold of 82 pounds per day for PM<sub>10</sub>. Therefore, criteria pollutant emissions associated with proposed construction activity would be less than significant.

With respect to dust, a project's construction related dust impacts are considered to be less than significant if certain dust control measures are implemented.



**TABLE 3.2-3: CONSTRUCTION AND OPERATIONAL EMISSIONS**

Operational Source	Construction				Operational							
	Average Daily Emissions (lb/day)				Maximum Annual Emissions (tons/yr)				Average Daily Emissions (lb/day)			
	ROG	NOx	PM <sub>10</sub> (exhaust)	PM <sub>2.5</sub> (exhaust)	ROG	NOx	PM <sub>10</sub> (exhaust)	PM <sub>2.5</sub> (exhaust)	ROG	NOx	PM <sub>10</sub> (exhaust)	PM <sub>2.5</sub> (exhaust)
Construction	2	4	0	0	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Generators	NA	NA	NA	NA	1.5E-02	5.2E-02	1.5E-04	1.5E-04	8.4E-01	2.1E-01	6.3E-03	6.3E-03
Building Energy Use	NA	NA	NA	NA	7.4E-03	2.6E-01	1.0E-02	1.0E-02	4.1E-02	1.4E+00	5.6E-02	5.6E-02
Mobile	NA	NA	NA	NA	9.6E-01	1.4E+00	2.8E+00	5.4E-01	5.3E+00	7.5E+00	1.6E+01	3.00E+00
Animal Waste Composting	NA	NA	NA	NA	5.0E-03	NA	NA	NA	2.7E-02	NA	NA	NA
TOTAL	2	4	0	0	1	1.7	2.85	0.55	6	9	15.6	3
Threshold of Significance	54	54	82	54	10	10	15	10	54	54	82	54
Exceeds Threshold?	No	No	No	No	No	No	No	No	No	No	No	No

Notes:

- lb = pounds
- NA = not applicable
- NOx = oxides of nitrogen
- PM = particulate matter
- ROG = reactive organic compounds
- yr = year
- Source: ENVIRON, 2010.

The buildout of the amended Master Plan would be subject to **SCA-AIR-1**, which replaces the dust control measures in the 1998 MND Mitigation Measure 8a with current more stringent requirements for comprehensive dust control measures throughout the construction activities. These requirements are substantively consistent with BAAQMD's best management practices for dust abatement in the 2010 CEQA Guidelines. Therefore, construction dust-related impacts would be reduced to a less-than-significant level because **SCA-AIR-1** would be implemented to control dust emissions. Additionally, the project sponsor has committed to using construction diesel equipment that meets the USEPA Tier 4 Interim PM emission standards. Thus, the construction-related emissions associated with the buildout of the amended Master Plan would be similar to the impacts addressed in the 1998 MND and would remain less than significant. No additional mitigation measures would be required for construction activities.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) Would the project operation result in average daily emissions of 54 pounds per day of ROG, NO<sub>x</sub>, or PM<sub>2.5</sub> or 82 pounds per day of PM<sub>10</sub>; or result in maximum annual emissions of 10 tons per year of ROG, NO<sub>x</sub>, or PM<sub>2.5</sub> or 15 tons per year of PM<sub>10</sub>?**

Annual operational emissions would result from stationary diesel engines, building energy use, visitor and employee vehicular travel, and manure management. The buildout of the amended Master Plan would include four standby diesel engines: a fire service pump, a back-up generator for the Veterinary Medical Hospital, and an auxiliary engine and back-up emergency engine for the gondola. The proposed Master Plan amendment includes installation of diesel particulate filters on these engines to achieve an emission rate of 0.01 grams per brake horsepower hour or less (see **Chapter 2, Project Description, Subsection 2.4.10.3**). Emissions from these engines were calculated based on engine size and emission factors. Space and water heating for the proposed buildings (the Veterinary Medical Hospital and the California Interpretive Center) would be supplied through natural gas combustion on-site. The amount of gas combusted was determined based on the size and type of building and Title 24 requirements. Mobile source emissions were estimated based on the increase in vehicle trips associated with the buildout of the amended Master Plan using the URBEMIS model and methodology. Manure from the majority of animals would be treated off-site. Manure from the bison herd would be composted and used on site. VOC emissions from the management of bison manure were calculated using methodology approved for use in the San Joaquin Valley Air Pollution Control District.

As presented in **Table 3.2-3**, average daily operational emissions associated with the buildout of the amended Master Plan would be six pounds per day of ROG, nine pounds per day of NO<sub>x</sub>, 15.6 pounds per day of PM<sub>10</sub>, and three pounds per day of PM<sub>2.5</sub>. These operational emissions would be well below the thresholds of 54 pound per day for ROG, NO<sub>x</sub>, and PM<sub>2.5</sub>, and the threshold of 82 pounds per day for PM<sub>10</sub>. **Table 3.2.3** also presents the maximum annual

operational emissions: one ton per year of ROG; 1.7 tons per year of NO<sub>x</sub>; 2.9 tons per year of PM<sub>10</sub>; and 0.55 tons per year of PM<sub>2.5</sub>. These emissions would be below the thresholds of ten tons per year for ROG, NO<sub>x</sub>, and PM<sub>2.5</sub> and 15 tons per year for PM<sub>10</sub>. Therefore, criteria pollutant emissions associated with operational activities would be less than significant. Thus, the operational emissions associated with the buildout of the amended Master Plan would be similar to the impacts addressed in the 1998 MND and would remain less than significant. No additional mitigation measures would be required for operational activities.

**Impact:** Less-than-significant

**Mitigation:** None required

**c) Would the project contribute to carbon monoxide (CO) concentrations exceeding the California Ambient Air Quality Standards (CAAQS) of nine parts per million (ppm) averaged over eight hours and 20 ppm for one hour?**

According to the ENVIRON report, construction-phase CO emissions would be about three pounds per day and dispersed over a broad area from numerous sources. Such low emissions would not be measurable at the Master Plan area boundary. During operation, the buildout of the amended Master Plan is expected to produce 70 pounds per day from motor vehicles and from other sources (such as water heating).

CO levels are generally low now and are expected to continue on a downward trend due to improved motor vehicle technology, cleaner fuels and improved wood stove performance. Consequently, BAAQMD 2010 CEQA Guidelines and the City's significance criteria provide that localized CO concentrations should be estimated for projects in which (1) project-generated traffic would conflict with an applicable congestion management program established by the county congestion management agency or (2) project-generated traffic would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour (or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited, such as tunnels, parking garages, bridge underpasses, natural or urban street canyons, and below-grade roadways). In Oakland, only the MacArthur Maze portion of Interstate 580 exceeds the 44,000 vehicles per hour screening criteria.

The buildout of the amended Master Plan would not meet these screening criteria for evaluating localized CO concentrations. The screening criteria were developed by BAAQMD to conservatively indicate when a potential significant impact could occur. Consequently, CO emissions would be less than significant because project traffic would be substantially below the screening criteria. This finding is consistent with the 1998 MND which projected 2010 (then considered the buildout date) CO emissions of 59 pounds per day, which was less than the 1998 significance threshold of 550 pounds per day. Thus, the CO emissions associated with the buildout of the amended Master Plan would be similar to the impacts addressed in the 1998 MND and would remain less than significant. No additional mitigation measures would be required.

**Impact:** Less-than-significant

**Mitigation:** None required

- d) **During either project operation or project construction, would the project expose persons by siting a new source or a new receptor to substantial levels of Toxic Air Contaminants (TACs) resulting in (a) a cancer risk level greater than 10 in one million, (b) a non-cancer risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of greater than 0.3 micrograms per cubic meter of annual average PM<sub>2.5</sub>?**

The potential health risks (cancer and non-cancer) associated with TACs produced from the construction and operation of the buildout of the amended Master Plan were evaluated.

**Project Construction.** Emissions of DPM and ROG associated with proposed construction activities (from on-site construction equipment, on-road diesel trucks, and workers' vehicles) were evaluated and used to estimate concentrations of DPM and TACs using air dispersion modeling techniques. Based on BAAQMD regulations, DPM was used as a surrogate for all TAC emissions from diesel-fueled compression-ignition internal combustion engines. For the purposes of evaluating cancer risks and chronic non-cancer risks associated with diesel exhaust, it was conservatively assumed that 100 percent of the exhaust PM would be DPM.

Key sources of TACs during the construction period include (1) the use of diesel construction equipment and vehicles, and (2) helicopter emissions (from use of the helipad for one day to erect the gondola during Phase 2). Potential exposures to DPM and other chemicals from the proposed construction activities at the Point of Maximum Impact (PMI) were evaluated. The potential health impact to all exposed populations, including adult and child residents, on-site workers (other than construction workers who are protected by Cal/OSHA requirements), off-site workers, and a nearby school child at the PMI were estimated. This approach is conservative, because the PMI was located inside the proposed fence line rather than at an actual residential property, commercial property, or school. Based on the results of the exposure evaluation and air dispersion modeling, quantitative estimates of excess lifetime cancer risks and non-cancer hazard quotients associated with potential exposure to the construction-related emissions were evaluated. The estimated cancer risks and non-cancer hazards were compared to the thresholds of significance.

**Table 3.2-4** shows the cancer and non-cancer risk assessment results associated with construction activities. As presented in **Table 3.2-4**, the cancer risk for all three populations (2 in 1,000,000 for a child resident, 0.2 in 1,000,000 for an adult resident, 0.3 in 1,000,000 for workers, and 1 in 1,000,000 for a school child) was determined to be below the threshold of significance of ten excess cancers in one million persons. Additionally, for chronic non-cancer hazard, the construction TAC emissions would be 0.003, which is below the threshold of significance of one. The estimated acute non-cancer hazard index would be 0.3, which is below

**TABLE 3.2-4: CANCER AND NON-CANCER RISK ASSESSMENT RESULTS ASSOCIATED WITH CONSTRUCTION OF PROPOSED MASTER PLAN AMENDMENT**

Criteria	Units	Estimated Impact	Threshold	Exceed Threshold?
Excess lifetime cancer risk (child resident was maximum modeled)	Occurrences in a million	2	10	No
Chronic non-cancer hazard index	Hazard index	0.003	1	No
Acute non-cancer hazard index	Hazard index	0.3	1	No
Annual average PM <sub>2.5</sub> concentration	µg/m <sup>3</sup>	0.01	0.3	No

Note: The maxima for chronic and acute hazard indexes would occur during the construction phase.

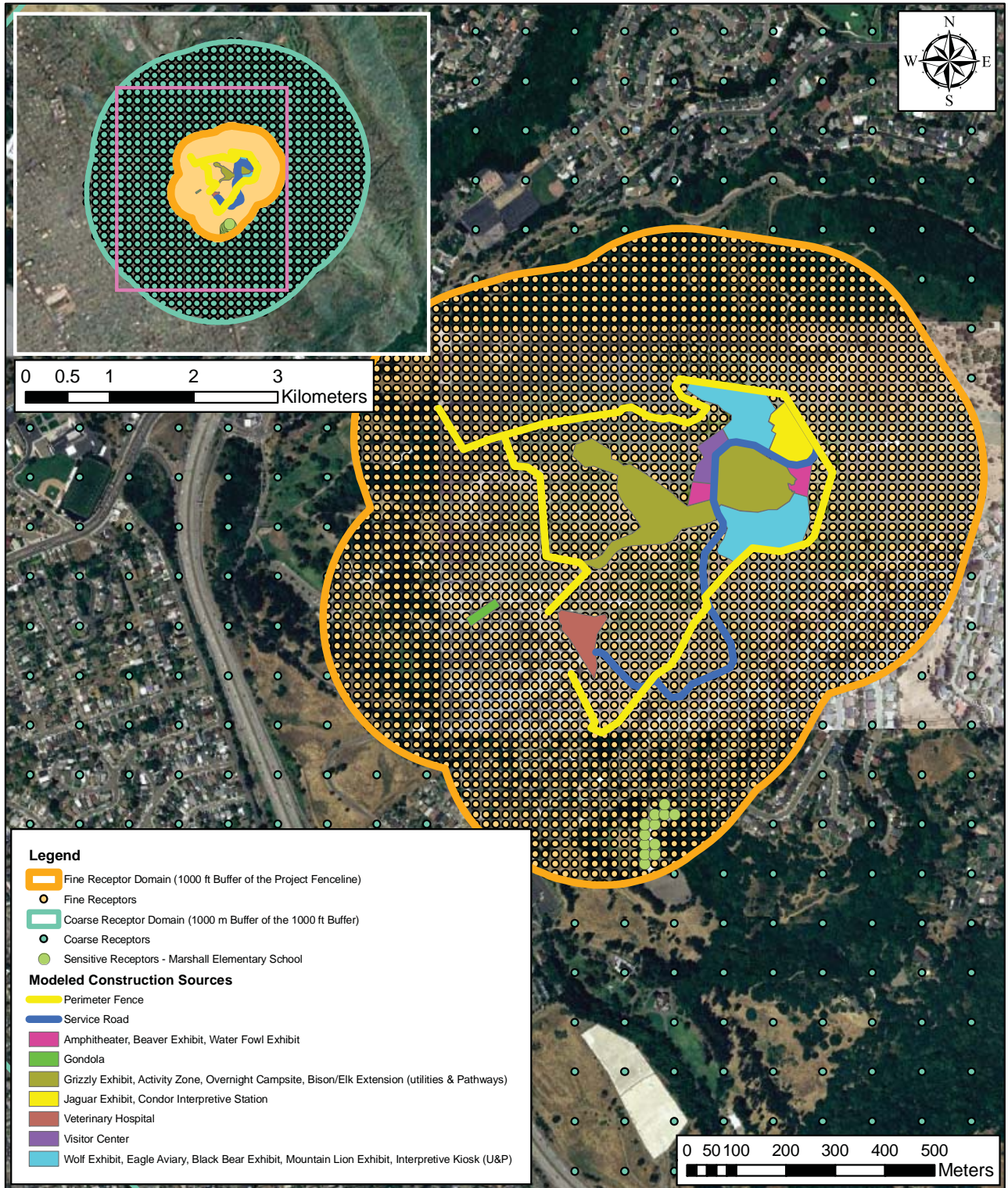
Source: ENVIRON, 2010.

the threshold of significance of one. Therefore, the buildout of the amended Master Plan would not expose people to high TAC levels because it would not generate high levels of TAC or be located near emitters of high levels of TAC. Thus, construction of the buildout of the amended Master Plan would have a less-than-significant impact with respect to TAC exposure.

PM<sub>2.5</sub> emissions associated with construction emissions were calculated based on an air dispersion analysis conducted in accordance with the U.S. EPA, California ARB, and BAAQMD modeling guidelines. A two-tier receptor grid was used to estimate the PM<sub>2.5</sub> impacts in the general vicinity of the Master Plan amendment area. A fine receptor grid covered the area within the 1,000-foot radius of the proposed fence and a coarse grid extended to areas within 1,000 meters of the fine receptor grid (see **Figure 3.2-1**). Receptors include nearby homes and the Marshall School located about one-quarter mile southeast of the Master Plan amendment area. As shown in **Table 3.2-5**, the annual average PM<sub>2.5</sub> concentration at the maximum point of impact would be 0.01µg/m<sup>3</sup>, which is below the threshold of 0.3µg/m<sup>3</sup>. Therefore, PM<sub>2.5</sub> increases associated with construction of the amended Master Plan would be less-than-significant.

**Project Operation.** Operational TACs from the proposed diesel engines would not exceed the BAAQMD Toxic Air Contaminant Trigger Level of 0.34 pounds per year. Annual emissions from the proposed four generators would be 0.10 pounds per year, 0.031 pounds per year, 0.12 pounds per year, and 0.052 pounds per year, for a total of 0.29 pounds per year (ENVIRON 2010, Table 3.1. **See Appendix F**). Thus, the buildout of the amended Master Plan would not result in significant operational impacts associated with TACs.

**Table 3.2-6** shows the PM<sub>2.5</sub> concentrations that would be generated by the standby diesel engines. As shown in this table, use of the diesel engines as part of operations would not generate PM<sub>2.5</sub> concentrations that exceed the 0.3 µg/m<sup>3</sup> threshold.



SOURCE: ENVIRON

◆◆◆

**Figure 3.2-1**  
Location of Modeled Receptors

**TABLE 3.2-5: PM<sub>2.5</sub> CONCENTRATIONS AT POINT OF MAXIMUM IMPACT**

Location of PMI <sup>1</sup>		Year	Modeled Concentration, Annual Average (µg/m <sup>3</sup> )	Threshold of Significance (µg/m <sup>3</sup> )	Exceeds Threshold?
UTMx (m)	UTMy(m)				
575,980	4,178,600	2011	0.004	0.3	No
		2012	0.006		No
		2013	0.008		No
		2014	0.01		No
		2015	0.01		No
		<b>Max</b>	<b>0.01</b>		<b>No</b>

Notes:

<sup>1</sup> The PMI is the offsite receptor location with the maximum annual average PM<sub>2.5</sub> concentration. The modeled receptor grid is presented in Figure 3.2-1.

m = meter

PM = particulate matter

PMI = Point of Maximum Impact

µg/m<sup>3</sup> = microgram per cubic meter

UTM = Universal Transverse Mercator

Source: ENVIRON, 2010.

**TABLE 3.2-6: MODELED PM<sub>2.5</sub> CONCENTRATIONS, STANDBY DIESEL ENGINES**

Sources	PM <sub>2.5</sub> (annual average) <sup>1</sup>		
	Modeled Concentration (µg/m <sup>3</sup> )	Threshold of Significance (µg/m <sup>3</sup> )	Exceeds Threshold?
Standby Diesel Generators <sup>2</sup>	<b>Fire Service Pump</b>	<b>1.4E-03</b>	<b>No</b>
	Veterinary Hospital	4.80E-04	No
	Gondola Auxiliary Engine	1.60E-03	No
	Gondola Excavation Unit	7.80E-04	No
	<b>Total</b>	<b>4.30E-03</b>	<b>No</b>

Notes:

<sup>1</sup> The concentrations of PM<sub>2.5</sub> were modeled using USEPA SCREEN3 model. The SCREEN3 modeling results are presented in Appendix C2 of the ENVIRON Air Quality Technical Report (**Appendix F**).

<sup>2</sup> Since the exact locations of the standby diesel engines were not provided, ENVIRON conservatively assumed all four diesel generators were co-located. In addition, the worst case modeled concentrations were used to represent the maximum impact to the offsite individuals.

µg = microgram

m<sup>3</sup> = cubic meter

PM = particulate matter

Source: ENVIRON, 2010.

Therefore, buildout of the amended Master Plan would not expose persons to substantial levels of TACs. In addition, the Master Plan amendment area is not located in area identified by BAAQMD as a community with an elevated risk from air toxics. No mitigation is required.

**Impact:** Less-than-significant

**Mitigation:** None required

**e) Would the project frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people?**

Primary odor sources associated with the Oakland Zoo are zoo animals, animal feed, and waste composting. The buildout of the amended Master Plan would add manure from the herbivorous animals to the existing composting system, which is located in a maintenance area on a side road near the zoo entrance. The composting system is located more than 500 feet from the closest residences and separated from those residences by a buffer area with trees and other vegetation. The increase in manure throughput from the proposed Master Plan amendment would be less than ten percent. Properly managed composting systems typically do not generate adverse odors (U.S. EPA 2010). There have been no odor complaints to the zoo or BAAQMD regarding the zoo composting system since it began operations in 1993. The distance between the nearest sensitive receptors, which are the nearby residences, and the planned animal exhibits would be greater than 500 feet, which would be more than the distance between existing animal exhibits and the closest residences (350 feet and above). Thus, the current air dilution factor between potential sources of odor and potential receptors would be maintained with the buildout of the amended Master Plan. There have been no odor complaints regarding the existing animal exhibits. Planned animal holding areas in the Veterinary Medical Hospital would be enclosed on three sides and oriented away from the nearest residences to minimize the release of odors and the potential for odor impacts. Furthermore, Veterinary Medical Hospital procedures would require regular cleaning to maintain a sanitary environment. Because of the small increase in manure throughput, the nature of the composting system, the distance between potential odor sources and receptors, the design of the animal holding areas, the sanitation procedures of the Veterinary Medical Hospital, and the absence of a complaint history, the proposed Master Plan amendment would not result in a significant odor impact.

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.2.6 CUMULATIVE IMPACTS

BAAQMD considers past, present, and future development projects to contribute to the region's air quality impacts on a cumulative basis, as no single project is sufficient in size, by itself, to result in nonattainment of ambient air quality standards (2010 CEQA Guidelines). In



developing the thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emission would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable (2010 CEQA Guidelines). Conversely, if a project does not exceed the identified significance thresholds, its emissions would not be cumulatively considerable. Because the emissions from the buildout of the amended Master Plan would not exceed any of the significance thresholds, it would not result in a considerable contribution to cumulative air quality impacts with respect to criteria pollutants.

The buildout of the amended Master Plan would not have any significant odor impacts. The existing zoo operations have not resulted in any significant odor impacts. Given that neither the buildout of the amended Master Plan nor the existing zoo would contribute any significant odors associated with animal operations, and taking into account the distance between these uses and nearby residential areas, the combined activities would not result in significant cumulative odor impacts. Dust generated during construction would be reduced to a less-than-significant level through adherence to **SCA-AIR-1**. No other construction projects are expected in the immediate vicinity of the Master Plan amendment area and thus any dust generated by construction activities would not combine with dust generated by other projects.

For an analysis of cumulative TAC impacts, BAAQMD recommends evaluating all TAC and PM<sub>2.5</sub> sources located within a 1,000-foot radius of a project site. For the proposed Master Plan amendment area, the 1,000-foot radius encompasses the existing zoo, other portions of Knowland Park, and approximately 50 acres of residential uses. This area does not include any freeways, major roads, gasoline dispensing facilities or industrial areas. Thus, the area for assessing cumulative impacts does not include any significant sources of TACs.

As stated above under **Criterion f**, the cumulative TAC impact significance thresholds are a cancer risk level greater than 100 in a million, a non-cancer risk hazard index of greater than 10.0, and an increase of greater than 0.8 micrograms per cubic meter of annual average PM<sub>2.5</sub>. For an analysis of cumulative TAC impacts, BAAQMD recommends evaluating all TAC and PM<sub>2.5</sub> sources located within a 1,000-foot radius of a project site. For the proposed Master Plan amendment area, the 1,000-foot radius encompasses the existing zoo, other portions of Knowland Park, and approximately 50 acres of residential uses. This area does not include any freeways, major roads, gasoline dispensing facilities or industrial areas. Thus, the area for assessing cumulative impacts does not include any significant sources of TACs. The 1,000-foot screening distance is recommended by BAAQMD because multiple sources of TACs separated by more than 1,000 feet are unlikely to combine to create a cumulative impact. Because there are no significant sources of TACs within 1,000 feet of the proposed Master Plan amendment area, the buildout of the amended Master Plan would not contribute to a significant cumulative impact and no further cumulative analysis is required. As shown in **Table 3.2-4**, the construction impacts of the Master Plan amendment buildout are a cancer risk level of two in a million, a chronic non-cancer hazard

index of 0.003, an acute non-cancer hazard index of 0.3, and an annual average PM<sub>2.5</sub> concentration of 0.01 micrograms per cubic meter. The operational emissions from the project did not exceed the BAAQMD Toxic Air Contaminant Trigger Levels, so further analysis is not required. These trigger levels were developed by BAAQMD using the most conservative dispersion parameters, so emission rates below these trigger levels will not result in impacts above any risk significance thresholds. The annual PM<sub>2.5</sub> impact from the diesel engines would be less than the single-source impact threshold of 0.3 micrograms per cubic meter and would not result in a cumulative exceedance of the 0.8 micrograms per cubic meter threshold. The buildout of the amended Master Plan would result in TAC emissions substantially below the project-specific thresholds and, because there are no significant sources of TACs located within 1,000 feet of the proposed Master Plan amendment area, would not combine with other sources of TACs to create a significant cumulative impact. Thus, no significant cumulative impacts would result.

Thus, the buildout of the amended Master Plan would not result in, or substantially contribute to, any air quality cumulative impacts.

### 3.2.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new air quality impacts or a substantial increase in the severity of previously identified air quality impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less than significant. Previously imposed mitigation measures from the 1998 MND have been identified and, where appropriate, have been clarified, refined, revised or deleted. This section also identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.

### 3.2.8 REFERENCES

Bay Area Air Quality Management District (BAAQMD). 2010. California Environmental Quality Act, Air Quality Guidelines, June.

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### 3.3 BIOLOGICAL RESOURCES

This section evaluates potential biological resources impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the amended Master Plan would result in new significant biological resources impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new biological resources significant impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. This section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required.

#### 3.3.1 PRIOR MND ANALYSIS AND CONCLUSIONS

##### 3.3.1.1 1998 Prior MND Impact Findings

The 1998 MND indicated that the Master Plan could result in the following potentially significant biological resource impacts:

1. Removal of 15 to 20 acres of natural habitat and 98 protected trees as defined by the City's Tree Protection Ordinance, which would reduce the quantity of native species, degrade existing habitats, and interfere with wildlife movement opportunities.
2. Loss of some animal species and interference with wildlife movement due to project construction, degradation of habitat, and vehicle and pedestrian traffic.
3. Loss of a colony of robust monardella (*Monardella villosa ssp.globosa*), identified as a rare and endangered plant species, due to construction of the proposed shuttle road.
4. Impacts on special-status animal species and their habitats, if the species were present on the site. The MND found that construction could result in direct mortality of individual Alameda whipsnake, identified as a State-listed threatened species, as well as possible loss of habitat and disruption of movement opportunities for this species if present on the site. Disruption to possible nesting by Cooper's hawk and sharp-shinned hawk, both special-status bird species, was also identified as a potentially significant impact if construction in or near suitable habitat occurred during the nesting season. Two special-status invertebrates, San Francisco Lacewing and Bridge's Coast Range snail, were also considered to have some potential to occur in the riparian and woodland areas and could be adversely affected by construction activities.
5. Introduction of new species or contribution to the spread of undesirable species of plants such as non-native invasive broom into the natural areas of Upper Knowland Park.

### 3.3.1.2 1998 MND Mitigation Measures

For the potential loss of natural habitat and native trees, the 1998 MND identified the following mitigation measures that would reduce the impact to a less-than-significant level:

13a) The proposed Master Plan would include implementation of a Habitat Enhancement Plan that would enhance oak woodlands, native grasslands, coastal scrub and riparian woodland, and remove eucalyptus, French broom and other exotic plants from the California 1820 Exhibit area and Upper Knowland Park. The Habitat Enhancement Plan should include the following:

- An annual assessment of the species and distribution of invasive nonnative weeds (examples of invasive species would include artichoke thistle, French broom, giant reed, German ivy, pampas grass, Algerian ivy, acacia and eucalyptus). The assessment would include a map and estimate of abundance of weeds.
- A management element for the control of each weedy species. Methods used for each species should be based on current accepted best available practices, including hand-pulling, cutting followed by topical application of suitable herbicide, use of livestock, removal or burning of cut plant materials, and so on. The justification for the control methods used should be explained, and a tracking system maintained to document areas treated, methods used, and effectiveness of the results.
- A revegetation element for areas where heavy infestations of weeds comprise a significant portion of the existing vegetation. The riparian zone of lower Arroyo Viejo Creek, for example, is so dominated by nonnative species that planting of indigenous tree and shrub species following the removal of weeds is needed to speed up the restoration process. This element would include a tracking system for areas treated, a record of the source and species of plant materials used, methods of installation and maintenance, and an assessment of the success of each effort.

*(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment to provide mitigation for the loss of natural habitat; see **Subsection 3.3.5.2, Criteria a, b, d, and f, below.**)*

13b) A Tree Protection and Revegetation Plan shall be prepared to protect, replace, and preserve trees on the project site. The Plan shall include the following:

- Native trees lost to development shall be replanted at a minimum ratio of 3:1. Non-native trees lost to development shall be replanted with native trees at a minimum ratio of 1:1.
- Every 10 years, prepare a census of trees qualifying for protection under the Oakland Tree Protection Ordinance within the project area. The census will document the condition of such trees, and recommend actions to extend the life and health of the trees. Recommended actions could include protective devices for reduction of vandalism, excessive treading by pedestrians or rubbing of bark, modification of drainage, erosion or sedimentation to protect trees, and modification of irrigation patterns to reduce pathogens. Recommendations and actions taken would be reported to the City of Oakland and the Department of Fish and Game.

- Protection of oaks in Upper Knowland Park outside of the developed areas of the Zoo will be addressed through the development of a management element for Upper Knowland Park. Since a closed canopy oak woodland is a “fire safe” vegetation type and is visually pleasing, the maximum natural extent of oak woodland may be the management goal. Management practices needed to achieve and maintain oak woodland and forest are: a minimum of grazing livestock, especially during the dry months; few fires; and slope stability. Maintenance of oak woodland would dovetail with weed control measures discussed under Mitigation Measure 13a.

*(NOTE: This mitigation measure has been revised for the proposed Master Plan amendment to clarify the appropriate focus of the Habitat Enhancement Plan and the importance of protecting and enhancing grassland habitat; see **Subsection 3.3.5.2, Criteria d and f, below.**)*

For the potential loss of wildlife habitat and obstruction of wildlife movement opportunities, the 1998 MND identified the following mitigation measures that would reduce the impact to a less-than-significant level:

- 13c) Although mitigations recommended by the Master Plan to minimize impacts to wildlife due to vehicle and pedestrian traffic would reduce potential impacts to less than significant, the following mitigation measure would further reduce the impact. If feasible, the Shuttle Road should be a maximum of 15 feet in width with no curbs or gutters to reduce potential impacts to the Alameda whipsnake. *(NOTE: This mitigation measure has been revised for the proposed Master Plan amendment to remove reference to the “Shuttle Road” which is no longer part of the project and provide flexibility in the methods used to prevent wildlife encounters with vehicles, including possible use of undercrossings; see **Subsection 3.3.5.2, Criteria a and d, below.**)*
- 13d) To mitigate for the potential impacts to small vertebrates from construction of the viewing platforms, the platforms shall be constructed in the dry season (late summer/fall), and native riparian species shall be planted in areas disturbed by construction activities and mitigation measures 2a – 2d included under the Earth section of this Initial Study shall be implemented. *(NOTE: This mitigation measure is not applicable to the proposed Master Plan amendment since the viewing platforms and trail connection between the California Exhibit and Arroyo Viejo are no longer part of the project; see **Subsection 3.3.5.2, Criterion d below.**)*

For the potential loss of special-status plants, specifically robust monardella, the 1998 MND identified the following mitigation measures that would reduce the impact to a less-than-significant level:

- 14a) The shuttle road should be re-routed to avoid the robust monardella colony. A buffer of a minimum of 25 feet shall be established between any project soils disturbance and the existing colony. *(NOTE: This mitigation measure is not applicable to the proposed Master Plan amendment given that the occurrence of robust monardella is no longer present on the site; see **Subsection 3.3.5.2, Criterion a below.**)*
- 14b) The Bison Exhibit boundary shall be revised to exclude the robust monardella colony; alternatively, the robust monardella shall be protected with a perimeter fence providing a 25-foot buffer around the colony. *(NOTE: This mitigation measure is not applicable to the*

*proposed Master Plan amendment given that the occurrence of robust monardella is no longer present on the site; see **Subsection 3.3.5.2, Criterion a** below.)*

For the potential direct mortality to Alameda whipsnakes and the loss of suitable habitat and interference with movement opportunities for this species if present on the site, the 1998 MND identified the following mitigation measures that would reduce the impact to a less-than-significant level:

- 14c) Obtain a Permit for Management of a rare or threatened species pursuant to Fish and Game Code Section 2081. The Management Permit will include all details of a Mitigation and Monitoring Plan which will be prepared by the East Bay Zoological Society. The Mitigation and Monitoring Plan will be subject to approval by the California Department of Fish and Game and the U.S. Fish and Wildlife Service. A summary of the measures to be incorporated into the Mitigation and Monitoring Plan are presented below. *(NOTE: This mitigation measure has been revised for the proposed Master Plan amendment to incorporate specific changes in the project recommended to further reduce potential impacts on core habitat of Alameda whipsnake and potential habitat fragmentation; see **Subsection 3.3.5.2, Criteria a and d**, below.)*
- 14d) All removal of scrub or chaparral habitat shall be done by hand with axes or machetes. Chain saws could be used for larger shrubs. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment to prevent possible inadvertent take of Alameda whipsnake; see **Subsection 3.3.5.2, Criteria a and d** below.)*
- 14e) A biologist qualified to handle Alameda whipsnakes shall monitor all scrub or chaparral removal and all construction activities which may impact the Alameda whipsnake. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment to prevent possible inadvertent take of Alameda whipsnake; see **Subsection 3.3.5, Criteria a and d** below.)*
- 14f) Alameda whipsnake habitat shall be preserved in perpetuity on property owned by the East Bay Zoological Society and contiguous to the east of the California 1820 Exhibit area. Numerous large areas of scrub and/or chaparral habitat are present in the proposed mitigation area and these appear to provide an adequate amount of habitat to offset impacts within the project site. The amount of habitat preserved shall be in accordance with current requirements of the California Department of Fish and Game. *(NOTE: This mitigation measure is no longer applicable to the proposed Master Plan amendment because Mitigation Measure 14c has been revised to include specific provisions regarding habitat replacement mitigation such that Mitigation Measure 14f is no longer necessary; see **Subsection 3.3.5.2, Criterion a** below.)*
- 14g) To reduce the potential for mortality on the shuttle road to a level less than significant, a maximum speed of 10 miles per hour shall be required and shuttle drivers and personnel driving to the offsite breeding exhibit will be instructed to watch for and yield to all wildlife. The road shall also be a maximum of 15 feet in width with no curbs or gutters. Specially designed “snake crossings” under the shuttle road may also be required. *(NOTE: This mitigation measure has been revised for the proposed Master Plan amendment because the offsite breeding exhibit and shuttle road are no longer proposed and Mitigation Measure 13c has a restriction on the maximum width of the service road; see **Subsection 3.3.5.2, Criteria a and d** below.)*



- 14h) Measures will be taken to prevent the spread of French broom on the site and to remove as much French broom from the site as possible in order to keep it from degrading higher quality whipsnake habitat. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment because it serves to protect and enhance existing habitat degraded by invasive species; see **Subsection 3.3.5, Criteria a and d** below.)*

For the potential impact on special-status birds, the 1998 MND identified the following mitigation measure that would reduce the impact to a less-than-significant level:

- 14i) Prior to construction of the creek-viewing platforms, and construction of the Shuttle Road through woodland areas, surveys for nesting Cooper's hawks should be conducted. If no nests are present, construction can proceed. If a nest is present in the vicinity of the site for the viewing platforms, construction should be delayed until the young have fledged. Once the platforms and Shuttle Road are completed, their presence and the presence of hikers on the Trail would be considered a less than significant impact. *(NOTE: This mitigation measure is no longer applicable to the proposed Master Plan amendment because the creek-viewing platforms and the Shuttle Road through woodlands are no longer proposed; see **Subsection 3.3.5.2, Criterion a** below. Implementation of SCA-BIO-1 would ensure that adequate protections are taken to avoid possible nesting birds, including Cooper's hawks, prior to any tree removal.)*

For the potential impact on special-status invertebrates, the 1998 MND identified the following mitigation measure that would reduce the impact to a less-than-significant level:

- 14j) During construction, dust control mitigation measures included in the Air Quality section of this Initial Study (8a) shall be implemented, which will reduce potential impacts to the air passages of San Francisco lacewings. *(NOTE: This mitigation measure is no longer applicable to the proposed Master Plan amendment because it is replaced with SCA-AIR-1; see **Subsection 3.3.5.2, Criterion a**, below.)*

For the potential introduction and spread of weed species, the 1998 MND identified the following mitigation measure that would reduce the impact to a less-than-significant level:

- 15a) The operations and maintenance plan for the new exhibits shall include a weed management and control element. This should include monitoring the natural portions of Upper Knowland Park for infestations of non-native weeds, and implementation of control measures to prevent the weeds from degrading the natural vegetation. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment to control the spread of invasive weed species; see **Subsection 3.3.5.2, Criterion b** below.)*

For the potential impact to Arroyo Viejo Creek, the 1998 MND identified the following mitigation measure that would reduce the impact to a less-than-significant level.

- 16a) The Trail shall be constructed 100 feet from the creek bank and on the outer edges of the riparian vegetation. Streambed crossings shall consist of walkways constructed well above the banks. Creek viewing platforms located within the 100-foot buffer shall be located to minimize impacts to riparian vegetation. Disturbed riparian vegetation will be enhanced by removal of non-native species and planting and maintenance of indigenous species.

Erosion control requirements contained in Ordinance No. 10312 would prevent sedimentation resulting from construction of the Trail and viewing platforms. (NOTE: *This mitigation measure is not applicable to the proposed Master Plan amendment because this trail is not included in the Master Plan amendment, see **Subsection 3.3.5.2, Criterion a and f, below.***)

### 3.3.2 STANDARD CONDITIONS OF APPROVAL

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that relate to biological resources and that would apply to the proposed Master Plan amendment are listed below. If the City approves the proposed Master Plan amendment, the Conditions of Approval will be adopted as requirements of the Master Plan amendment and would ensure no significant impacts on biological resources occur. As a result, the Conditions of Approval are not listed as mitigation measures.

#### **SCA-BIO-1: Tree Removal During Breeding Season**

##### ***Prior to issuance of a tree removal permit***

To the extent feasible, removal of any tree and/or other vegetation suitable for nesting of raptors shall not occur during the breeding season of March 15 and August 15. If tree removal must occur during the breeding season, all sites shall be surveyed by a qualified biologist to verify the presence or absence of nesting raptors or other birds. Pre-removal surveys shall be conducted within 15 days prior to start of work from March 15 through May 31, and within 30 days prior to the start of work from June 1 through August 15. The pre-removal surveys shall be submitted to the Planning and Zoning Division and the Tree Services Division of the Public Works Agency. If the survey indicates the potential presences of nesting raptors or other birds, the biologist shall determine an appropriately sized buffer around the nest in which no work will be allowed until the young have successfully fledged. The size of the nest buffer will be determined by the biologist in consultation with the CDFG, and will be based to a large extent on the nesting species and its sensitivity to disturbance. In general, buffer sizes of 200 feet for raptors and 50 feet for other birds should suffice to prevent disturbance to birds nesting in the urban environment, but these buffers may be increased or decreased, as appropriate, depending on the bird species and the level of disturbance anticipated near the nest.

#### **SCA-BIO-2: Tree Removal Permit**

##### ***Prior to issuance of a demolition, grading, or building permit***

Prior to removal of any protected trees, per the Protected Tree Ordinance, located on the project site or in the public right-of-way adjacent to the project, the project applicant must secure a tree removal permit from the Tree Division of the Public Works Agency, and abide by the conditions of that permit.

### **SCA-BIO-3: Tree Replacement Plantings**

#### ***Prior to issuance of a final inspection of the building permit***

Replacement plantings shall be required for erosion control, groundwater replenishment, visual screening and wildlife habitat, and in order to prevent excessive loss of shade, in accordance with the following criteria:

- a) No tree replacement shall be required for the removal of nonnative species, for the removal of trees which is required for the benefit of remaining trees, or where insufficient planting area exists for a mature tree of the species being considered.
- b) Replacement tree species shall consist of *Sequoia sempervirens* (Coast Redwood), *Quercus agrifolia* (Coast Live Oak), *Arbutus menziesii* (Madrone), *Aesculus californica* (California Buckeye) or *Umbellularia californica* (California Bay Laurel) or other tree species acceptable to the Tree Services Division.
- c) Replacement trees shall be at least of twenty-four (24) inch box size, unless a smaller size is recommended by the arborist, except that three fifteen (15) gallon size trees may be substituted for each twenty-four (24) inch box size tree where appropriate.
- d) Minimum planting areas must be available on site as follows:
  - i. For *Sequoia sempervirens*, three hundred fifteen square feet per tree;
  - ii. For all other species listed in #2 above, seven hundred (700) square feet per tree.
- e) In the event that replacement trees are required but cannot be planted due to site constraints, an in lieu fee as determined by the master fee schedule of the city may be substituted for required replacement plantings, with all such revenues applied toward tree planting in city parks, streets and medians.
- f) Plantings shall be installed prior to the issuance of a final inspection of the building permit, subject to seasonal constraints, and shall be maintained by the project applicant until established. The Tree Reviewer of the Tree Division of the Public Works Agency may require a landscape plan showing the replacement planting and the method of irrigation. Any replacement planting which fails to become established within one year of planting shall be replanted at the project applicant's expense.

### **SCA-BIO-4: Tree Protection During Construction**

#### ***Prior to issuance of a demolition, grading, or building permit***

Adequate protection shall be provided during the construction period for any trees which are to remain standing, including the following, plus any recommendations of an arborist:

- a) Before the start of any clearing, excavation, construction or other work on the site, every protected tree deemed to be potentially endangered by said site work shall be securely fenced off at a distance from the base of the tree to be determined by the Consulting Arborist. Such fences shall remain in place for duration of all such work. All trees to be removed shall be

clearly marked. A scheme shall be established for the removal and disposal of logs, brush, earth and other debris which will avoid injury to any protected tree.

- b) Where proposed development or other site work is to encroach upon the protected perimeter of any protected tree, special measures shall be incorporated to allow the roots to breathe and obtain water and nutrients. Any excavation, cutting, filing, or compaction of the existing ground surface within the protected perimeter shall be minimized. No change in existing ground level shall occur within a distance to be determined by the Consulting Arborist from the base of any protected tree at any time. No burning or use of equipment with an open flame shall occur near or within the protected perimeter of any protected tree.
- c) No storage or dumping of oil, gas, chemicals, or other substances that may be harmful to trees shall occur within the distance to be determined by the Consulting Arborist from the base of any protected trees, or any other location on the site from which such substances might enter the protected perimeter. No heavy construction equipment or construction materials shall be operated or stored within a distance from the base of any protected trees to be determined by the tree reviewer. Wires, ropes, or other devices shall not be attached to any protected tree, except as needed for support of the tree. No sign, other than a tag showing the botanical classification, shall be attached to any protected tree.
- d) Periodically during construction, the leaves of protected trees shall be thoroughly sprayed with water to prevent buildup of dust and other pollution that would inhibit leaf transpiration.
- e) If any damage to a protected tree should occur during or as a result of work on the site, the project applicant shall immediately notify the Public Works Agency of such damage. If, in the professional opinion of the Consulting Arborist, such tree cannot be preserved in a healthy state, the Consulting Arborist shall require replacement of any tree removed with another tree or trees on the same site deemed adequate by the Tree Reviewer to compensate for the loss of the tree that is removed.
- f) All debris created as a result of any tree removal work shall be removed by the project applicant from the property within two weeks of debris creation, and such debris shall be properly disposed of by the project applicant in accordance with all applicable laws, ordinances, and regulations.

#### **SCA-BIO-5: Whipsnake Habitat, Biological Monitor**

##### ***Prior to issuance of a demolition, grading, or building permit and ongoing throughout demolition, grading, and/or construction***

If the project is located within confirmed Alameda Whipsnake Habitat area, the project applicant shall hire an on-site biological monitor who is qualified to identify Alameda Whipsnakes. The on-site biological monitor shall instruct the project superintendent and the construction crews (primarily the clearing, demolition and foundation crews) of the potential presence, status and identification of Alameda Whipsnakes. The biological monitor shall also provide information to the Planning and Zoning Division on the steps to take if a whipsnake is seen on the project site,

including who to contact, to ensure that whipsnakes are not harmed or killed, as regulation by the federal Endangered Species Act.

#### **SCA-BIO-6: Whipsnake Habitat, Placement of Debris**

##### ***Prior to issuance of a demolition, grading, or building permit and throughout construction***

If the project is located within confirmed Alameda Whipsnake Habitat area, the project applicant shall ensure that the placement of construction debris is limited to the area immediate adjacent to the foundation of the proposed buildings or and to the area between the foundation and the street. Install flexible construction fencing at the limit of work line (approximately ten feet beyond the foundation of the proposed building other than in the direction of the street). Such construction fencing shall limit the placement of construction materials and construction debris to inside the fencing.

#### **SCA-BIO-7: Whipsnake Habitat, Barrier Fence**

##### ***Prior to issuance of a demolition, grading, or building permit and throughout construction***

If the project is located within confirmed Alameda Whipsnake Habitat area, the project applicant shall install a solid fence to prevent whipsnakes from entering the work site. The snake barrier shall be constructed as follows and shall remain in place throughout the entire construction period:

- a) Plywood sheets at least three feet in height above ground. Heavy duty geotextile fabric approved by U.S. Fish and Wildlife Service and California Department of Fish and Game may also be used for snake exclusion fences;
- b) Buried four to six inches into the ground;
- c) Soil back-filled against the plywood fence to create a solid barrier at the ground;
- d) Plywood sheets maintained in an upright position with wooden or masonry stakes;
- e) Ends of each plywood sheet overlapped to ensure a continuous barrier; and
- f) An exclusion fence shall completely enclose the work site or construction area or approved traps shall be installed at the ends of exclusion fence segments to allow capture and relocation of Alameda whipsnake away from the construction area by a qualified biologist.

### **SCA-BIO-8: Whipsnake Habitat, Downsloping Lots**

#### ***Prior to issuance of a demolition, grading, or building permit and throughout construction***

If the project is located within confirmed Alameda Whipsnake Habitat area, the project applicant shall install erosion control devices, such as hay bales, at the downhill limit of construction line to prevent rocks and soil from moving downhill. No erosion control materials with plastic or nylon monofilament netting shall be used.

### **SCA-BIO-9: Creek Protection Plan**

#### ***Prior to and ongoing throughout demolition, grading and/or construction activities***

- a) The approved creek protection plan shall be included in the project drawings submitted for a building permit (or other construction-related permit). The project applicant shall implement the creek protection plan to minimize potential impacts to the creek during and after construction of the project. The plan shall fully describe in plan and written form all erosion, sediment, stormwater, and construction management measures to be implemented on-site.
- b) If the plan includes a stormwater system, all stormwater outfalls shall include energy dissipation that slows the velocity of the water at the point of outflow to maximize infiltration and minimize erosion. The project shall not result in a substantial increase in stormwater runoff volume or velocity to the creek or storm drains.

### **SCA-BIO-10: Regulatory Permits and Authorization**

#### ***Prior to issuance of a demolition, grading, or building permit within vicinity of the creek***

The project applicant shall obtain all necessary regulatory permits and authorizations from the U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), California Department of Fish and Game, and the City of Oakland, and shall comply with all conditions issued by applicable agencies. Required permit approvals and certifications may include, but not be limited to the following:

- a) U.S. Army Corps of Engineers (Corps): Section 404. Permit approval from the Corps shall be obtained for the placement of dredge or fill material in Waters of the U.S., if any, within the interior of the project site, pursuant to Section 404 of the federal Clean Water Act.
- b) Regional Water Quality Control Board (RWQCB): Section 401 Water Quality Certification. Certification that the project will not violate state water quality standards is required before the Corps can issue a 404 permit, above.
- c) California Department of Fish and Game (CDFG): Section 1602 Lake and Streambed Alteration Agreement. Work that will alter the bed or bank of a stream requires authorization from CDFG.

**SCA-BIO-11: Creek Monitoring*****Prior to issuance of a demolition, grading, or building permit within vicinity of the creek***

A qualified geotechnical engineer and/or environmental consultant shall be retained and paid for by the project applicant to make site visits during all grading activities; and as a follow-up, submit to the Building Services Division a letter certifying that the erosion and sedimentation control measures set forth in the Creek Protection Permit submittal material have been instituted during the grading activities.

**SCA-BIO-12: Creek Landscaping Plan*****Prior to issuance of a demolition, grading, or building permit within vicinity of the creek***

The project applicant shall develop a final detailed landscaping and irrigation plan for review and approval by the Planning and Zoning Division prepared by a licensed landscape architect or other qualified person. Such a plan shall include a planting schedule, detailing plant types and locations, and a system for temporary irrigation of plantings.

- a) Plant and maintain only drought-tolerant plants on the site where appropriate as well as native and riparian plants in and adjacent to riparian corridors. Along the riparian corridor, native plants shall not be disturbed to the maximum extent feasible. Any areas disturbed along the riparian corridor shall be replanted with mature native riparian vegetation and be maintained to ensure survival.
- b) All landscaping indicated on the approved landscape plan shall be installed prior to the issuance of a Final inspection of the building permit, unless bonded pursuant to the provisions of Section 17.124.50 of the Oakland Planning Code.
- c) All landscaping areas shown on the approved plans shall be maintained in neat and safe conditions, and all plants shall be maintained in good growing condition and, whenever necessary replaced with new plant materials to ensure continued compliance with all applicable landscaping requirements. All paving or impervious surfaces shall occur only on approved areas.

**SCA-BIO-13: Creek Dewatering and Aquatic Life*****Prior to the start of and ongoing throughout any in-water construction activity***

- a) If any dam or other artificial obstruction is constructed, maintained, or placed in operation within the stream channel, ensure that sufficient water is allowed to pass down channel at all times to maintain aquatic life (native fish, native amphibians, and western pond turtles) below the dam or other artificial obstruction.
- b) The project applicant shall hire a biologist, and obtain all necessary State and federal permits (e.g. CDFG Scientific Collecting Permit), to relocate all native fish/native amphibians/pond turtles within the work site, prior to dewatering. The applicant shall first obtain a project-specific authorization from the CDFG and/or the USFWS, as applicable to relocate these

animals. Captured native fish/native amphibians/pond turtles shall be moved to the nearest appropriate site on the stream channel downstream. The biologist/contractor shall check daily for stranded aquatic life as the water level in the dewatering area drops. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets, and by hand. Captured aquatic life shall be released immediately in the nearest appropriate downstream site. This condition does not allow the take or disturbance of any state or federally listed species, nor state-listed species of special concern, unless the applicant obtains a project specific authorization from the CDFG and/or the USFWS, as applicable.

#### **SCA-BIO-14: Creek Dewatering and Diversion**

##### ***Prior to the start of any in-water construction activities***

If installing any dewatering or diversion device(s), the project applicant shall develop and implement a detailed dewatering and diversion plan for review and approval by the Building Services Division. All proposed dewatering and diversion practices shall be consistent with the requirements of the Streambed Alteration Agreement issued by the California Department of Fish and Game.

- a) Ensure that construction and operation of the devices meet the standards in the latest edition of the Erosion and Sediment Control Field Manual published by the Regional Water Quality Control Board (RWQCB).
- b) Construct coffer dams and/or water diversion system of a non-erodible material which will cause little or no siltation. Maintain coffer dams and the water diversion system in place and functional throughout the construction period. If the coffer dams or water diversion system fail, repair immediately based on the recommendations of a qualified environmental consultant. Remove devices only after construction is complete and the site stabilized.
- c) Pass pumped water through a sediment settling device before returning the water to the stream channel. Provide velocity dissipation measures at the outfall to prevent erosion.

#### **SCA-BIO-15: Vegetation Management Plan on Creekside Properties**

##### ***Prior to issuance of a demolition, grading, and/or construction and ongoing***

The project applicant shall submit a vegetation management plan for review and approval by the Planning and Zoning Division, Fire Services Division, and Environmental Services Division of the Public Works Agency that includes, if deemed appropriate, the following measures:

- a) Identify and do not disturb a 20-foot creek buffer from the top of the creek bank. If the top of bank cannot be identified, leave a 50-foot buffer from the centerline of the creek or as wide a buffer as possible between the creek centerline and the proposed site development.
- b) Identify and leave “islands” of vegetation in order to prevent erosion and landslides and protect nesting habitat.



- c) Leave at least 6 inches of vegetation on the site.
- d) Trim tree branches from the ground up (limbing up) and leave tree canopy intact.
- e) Leave stumps and roots from cut down trees to prevent erosion.
- f) Plant fire-appropriate, drought-tolerant, preferably native vegetation.
- g) Err on the side of caution. If you don't know if a plant, tree or area is sensitive, ask for a second opinion before you cut.
- h) Provide erosion and sediment control protection if cutting vegetation on a steep slope.
- i) Leave tall shrubbery at least 3-feet high.
- j) Fence off sensitive plant habitats and creek areas to protect from goat grazing.
- k) Obtain a tree protection permit for a protected tree (includes all mature trees except eucalyptus and Monterey pine).
- l) Contact the City Tree Department (615-5850) for dead trees.
- m) Do not clear-cut vegetation. This can lead to erosion and severe water quality problems and destroy important habitat.
- n) Do not remove vegetation within 20-feet of the top of bank. If the top of bank cannot be identified, do not cut within 50-feet of the centerline of the creek or as wide a buffer as possible between the creek centerline and the proposed site development.
- o) Do not trim/prune branches that are larger than 4 inches in diameter.
- p) Do not remove tree canopy.
- q) Do not dump cut vegetation in a creek.
- r) Do not cut tall shrubbery to less than 3-feet high.
- s) Do not cut of short vegetation (grasses, ground-cover) to less than 6-inches high.

**SCA-HYDRO-1: Stormwater Pollution Prevention Plan (SWPPP)**

(Please refer to **Section 3.7, Hydrology and Water Quality**.)

**SCA-HYDRO-3: Post-Construction Stormwater Management Plan**

(Please refer to **Section 3.7, Hydrology and Water Quality**.)

**SCA-HYDRO-4: Maintenance Agreement for Stormwater Treatment Measures**

(Please refer to **Section 3.7, Hydrology and Water Quality**.)

### 3.3.3 UPDATED REGULATORY SETTING

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, certain regulatory requirements have changed. The buildout of the amended Master Plan must comply with current regulations. Presented below is a summary of applicable regulations, with an emphasis on those that have changed since the 1998 MND was adopted.

#### 3.3.3.1 CEQA Provisions Related to Sensitive Natural Communities

The California Natural Diversity Data Base (CNDDDB) is a branch of the California Department of Fish and Game (CDFG) and provides information on special-status species and sensitive natural communities. This includes an inventory of sensitive natural communities considered to have a high inventory priority in the state by the CDFG. Since 1998, the vegetation classification system used by the CNDDDB has changed from a habitat-based system to a floristically-based system. While the classification system is still being refined by the CNDDDB,<sup>1</sup> it provides greater definition for which natural communities are considered sensitive and have a high inventory priority that should be recognized during CEQA review. This includes use of a ranking system to provide an indication of rarity, based on NatureServe's standard heritage program methodology.

Ranking of the various vegetation types according to their rarity and threat is an important part of the current classification system used by the CNDDDB. In the latest version of the *List of California Vegetation Alliances* (CDFG 2009a), the alliances are ranked using a system derived from NatureServe's standard heritage program methodology.<sup>2</sup> Each community type is ranked with a Global (G) and a State (S) code of 1, 2, 3, 4, or 5, with a 1 representing the most sensitive and 5 representing relatively common types. If an alliance is marked with a 1 through 3 code on the State or Global level, this means that all of the associations within it will also be considered of high inventory priority and should be considered as part of the CEQA review process. If marked as G4 or G5, these alliances are generally considered common enough to not be of concern. The ranking status of each of the vegetation alliances in the proposed Master Plan amendment area is presented in **Subsection 3.3.4.3** below. Implications for resource sensitivity

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<sup>1</sup> The purpose of the CNDDDB natural community inventory was originally to identify and determine the significance and rarity of the various vegetation types in the state. The classification system for "natural communities" currently used by the CNDDDB is being refined and has undergone substantial changes in the past five to ten years. It is based on the system described in the *Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), a floristically-based system that uses two units of classification, called the alliance and the association as described in *National Vegetation Classification* (Grossman, et al. 1998). Because the classification for natural communities in California is incomplete, the detail in the finest resolution of the hierarchy, the association, is not uniform. Associations are defined quantitatively by a classification procedure that compares the component species in related vegetation sampling plots. Although it is just now being used in a broad scale, this quantitative vegetation classification and systematic mapping method will allow conservationists and resource managers to have a greater understanding of natural ecosystems, their abundance, and their relative security.

<sup>2</sup> NatureServe is an international, non-profit conservation organization providing scientific data used to assist in resource planning and conservation. The *List of California Vegetation Alliances* is structured differently from previous lists in that it emphasizes the relationship of California alliances with the current National Vegetation Classification System. The conservation status of a species or ecosystem is designated by a number from 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment (G = Global, S = State).

and subsequent conclusions regarding the adequacy of mitigation measures from the 1998 MND are discussed in **Subsection 3.3.5.2** below.

### 3.3.3.2 City of Oakland General Plan

The Open Space, Conservation and Recreation (OSCAR) Element of the Oakland General Plan, which was adopted in 1996 prior to the adoption of the 1998 MND, contains the following key applicable biological resource-related policies:

*Policy CO-7.1: Protection of Native Plant Communities.* Protect native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way which prevents or mitigates adverse impacts to these communities.

*Policy CO-7.2: Native Plant Restoration.* Encourage efforts should [sic] to restore native plant communities in areas where they have been compromised by development or invasive species, provided that such efforts do not increase an area's susceptibility to wildfire.

*Policy CO-7.3: Forested Character.* Make every effort to maintain the wooded or forested character of tree-covered lots when development occurs on such lots.

*Policy CO-7.4: Tree Removal.* Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons.

*Policy CO-8.1: Mitigation of Development Impacts.* Work with federal, state, and regional agencies on an on-going basis to determine mitigation measures for development which could potentially impact wetlands. Strongly discourage development with unmitigatable adverse impacts.

*Policy CO-11.1: Protection from Urbanization.* Protect wildlife from the hazards of urbanization, including loss of habitat and predation by domestic animals.

*Policy CO-11.2: Migratory Corridors.* Protect and enhance migratory corridors for wildlife. Where such corridors are privately owned, require new development to retain native habitat or take other measures which help sustain local wildlife population and migratory patterns. Wildlife corridors are shown in Figure 14 (Potential Wildlife Corridors).

These policies are discussed in **Subsection 3.3.5** below and in **Section 3.8, Land Use, Recreation and Planning**.

### 3.3.3.3 City of Oakland Creek Protection Ordinance

Title 13, Chapter 13.16 of the City of Oakland Municipal Code establishes a number of guidelines to protect Oakland's creeks by reducing and controlling stormwater pollution, preserving and enhancing creekside vegetation and wildlife, and controlling erosion and sedimentation.

In 1997, the City stormwater ordinance was revised to provide stronger provisions to safeguard creeks. The ordinance, now called the "Creek Protection, Stormwater Management, and

Discharge Control Ordinance,” includes permitting guidelines for development and construction projects taking place on creekside property.

The ordinance prohibits activities that would result in the discharge of pollutants to Oakland’s waterways or damaging of the creeks, creek functions, or habitat. The ordinance aims to reduce pollutants in stormwater by regulating grading, excavation, and filling activities. The ordinance requires that all construction projects develop a site map, grading plan, and drainage plan prior to approval. The City of Oakland has developed Standard Conditions of Approval for projects affecting creeks (see **Subsection 3.4.2** above).

#### **3.3.3.4 City of Oakland Tree Protection Ordinance**

Title 12, Chapter 12.36 of the City of Oakland Municipal Code identifies protected trees that require a permit for removal. According to the ordinance, a tree removal permit must be obtained to remove a “protected tree.” A protected tree consists of any coast live oak measuring four inches in diameter at breast height (dbh) or any other tree species measuring nine inches dbh or larger, except non-native eucalyptus and Monterey pine (*Pinus radiata*). Monterey pine trees must be protected only on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed. Except as noted in the ordinance, eucalyptus and Monterey pine are not protected by the ordinance. Replacement tree plantings are typically required where native tree species are removed. Native protected trees proposed for removal must be replaced in accordance with the ordinance. Protected trees located within ten feet of construction must be identified. Adequate protection must also be provided during the construction period for any trees that are to remain in the vicinity of proposed development. The City of Oakland has developed Standard Conditions of Approval for projects affecting tree resources (see **Subsection 3.3.2**).

### **3.3.4 EXISTING CONDITIONS**

#### **3.3.4.1 Resource Identification Approach**

Biological resources associated with the proposed Master Plan amendment were identified through a review of available background information, field reconnaissance surveys, and conduct of updated detailed site surveys and mapping.

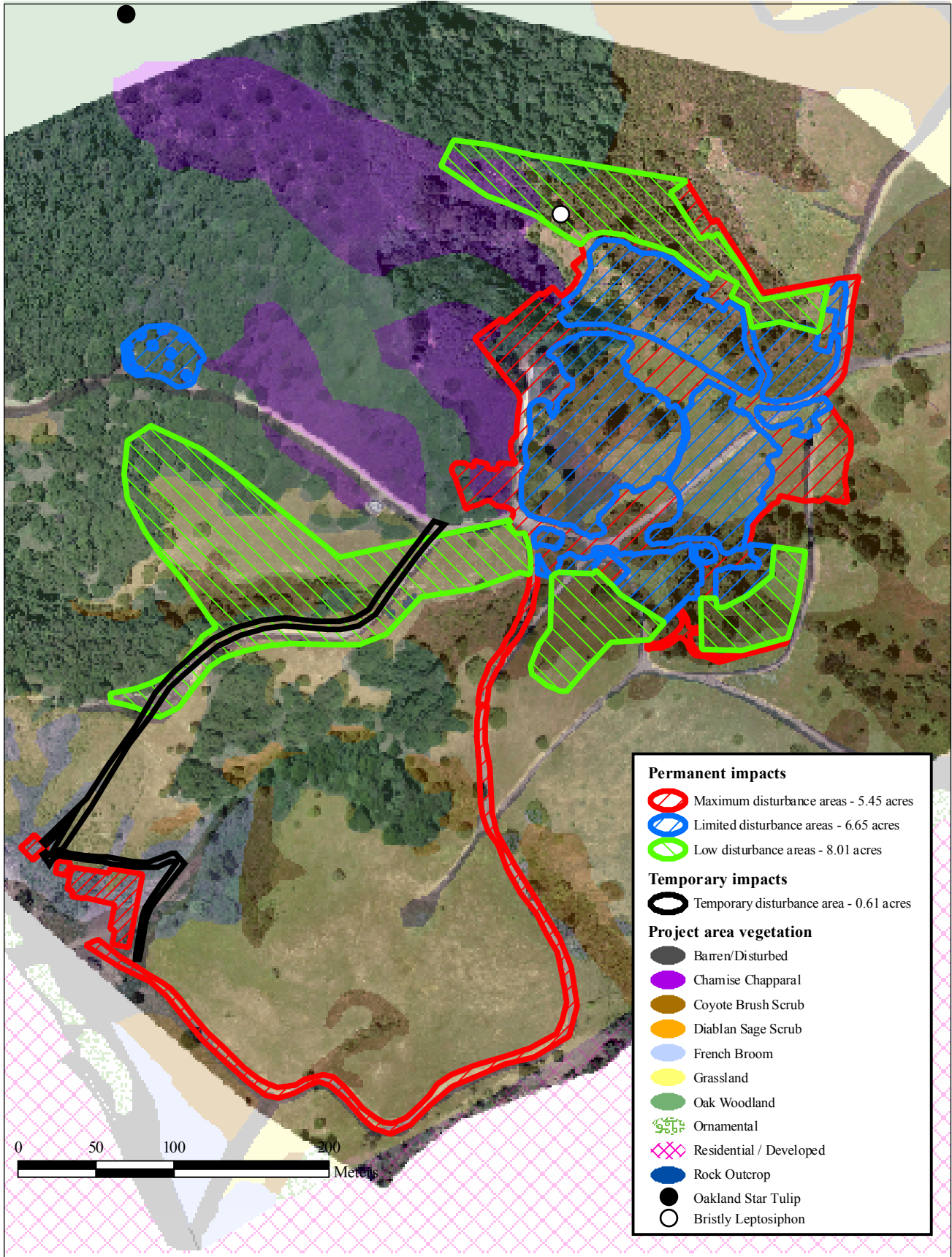
Extensive field surveys and resource mapping were performed in advance of and subsequent to preparation of the 1998 MND. This work included preparation of a biotic resources survey (Cheung Environmental Consulting 1996), conduct of protocol surveys for the State- and federally-listed threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*) in 1998 and 1999 (Swaim Biological, Inc. 2011), and preparation of a tree survey (Cheung Environmental Consulting 1997). The 1996 biotic resources survey (BRS) described and mapped existing natural communities on the site, summarized the results of systematic surveys for special-status

plants, provided information on the potential for occurrence of special-status animals, and made conclusions about the significance of potential impacts on sensitive resources and wildlife habitat that would result from improvements proposed as part of the approved Master Plan. A copy of the Status Report for Alameda whipsnake presenting the findings of surveys conducted in 1998 and 1999 is contained in **Appendix G-1**.

In addition to the 1996 BRS, the 1997 tree survey, and 1998 and 1999 protocol surveys for Alameda whipsnake conducted in the proposed Master Plan amendment area, a review of the occurrence records of the CNDDDB of the CDFG was completed in 2009, followed by additional detailed surveys and mapping. Field reconnaissance surveys were conducted by James Martin, Principal of Environmental Collaborative, on May 7 and 19 and June 18 and 29, 2009 to confirm the vegetation and wildlife resources, presence of any sensitive natural communities, potential for jurisdictional waters, and suitability of the site to support populations of special-status species. Additional field surveys were conducted on November 5 and 30, and December 16, 2010. Supplemental detailed surveys for special-status plant species were conducted by Dianne Lake, Consulting Botanist, with field surveys conducted on May 19, 21, 26, and 29, and June 29, 2009, and on February 25, April 9, and May 6, 2010. Updated protocol surveys for Alameda whipsnake were conducted in the fall of 2009 and spring and summer of 2010, as summarized in the Status Report (Swaim Biological, Inc. 2011) contained in **Appendix G-1**. Finally, a Habitat Enhancement Plan (Environmental Collaborative 2011), detailing habitat protection and enhancement measures proposed as part of the project, was prepared in fulfillment of the requirements of a biological-related mitigation measure from the 1998 MND, specifically Mitigation Measure 13a (see **Subsection 3.3.1.2** above). A copy of the Habitat Enhancement Plan is contained in **Appendix G-2**.

### 3.3.4.2 General Vegetation and Wildlife Habitat

The proposed Master Plan amendment area is part of the larger Knowland Park and consists of a mosaic of grassland, woodland, scrub, and chaparral vegetation. The developed exhibit area of the existing zoo forms the southwestern edge of the Master Plan amendment area and contains large areas of paved parking, ornamental landscaping, structures, and animal enclosures. Arroyo Viejo Creek is a perennial creek that flows approximately 600 feet north of the proposed California Exhibit area, at its closest location, and supports a dense cover of riparian trees and shrubs. The vicinity of the proposed outfall replacement along Arroyo Viejo Creek was part of a major creek restoration project implemented in 2007. However, vegetation at the existing outfall location is limited to sapling willows that were installed as cuttings along the bottom of the bank during the creek restoration, sapling invasive trees, and a few scattered native tree and groundcover plantings. Mature ornamental plantings from the original arboretum are located in the open turf area south of the creek corridor and outfall location. **Figure 3.3-1** shows the extent of the various vegetation types within and surrounding the proposed Master Plan area.



SOURCE: Swaim Biological Inc. and Environmental Collaborative

**Figure 3.3-1**  
Vegetation Cover and Disturbance Areas Map

As described in the BRS, non-native French broom (*Genista monspessulana*) forms dense thickets in some locations and is spreading throughout the remaining natural areas of Knowland Park, replacing grassland habitat and invading the understory of the woodlands, scrub, and chaparral. The Oakland Zoo and City of Oakland have taken several steps to control this problematic species given how it compromises native habitat, interferes with use of some of the existing animal enclosures, and contributes to fire fuel loading.

Knowland Park supports a wide range of animal species, including a variety of birds, mammals, amphibians, reptiles, and invertebrates. The mosaic of vegetation types, protective cover, and available surface water provides important habitat resources to resident and migratory species that use the largely undeveloped parklands. The restored reach of Arroyo Viejo Creek now provides relatively high-quality riparian habitat as the native trees, shrubs and groundcover plantings become fully established, provide complexity to the vegetative cover, and complement the aquatic habitat of the creek. Golf Links Road bisects the parklands, and Skyline Boulevard separates Knowland Park from the nearby Anthony Chabot Regional Park to the east. These roadways disrupt movement opportunities between natural areas for some terrestrial wildlife species but do not form complete barriers to wildlife movement. Existing residential development to the north, south and east, and the urbanized area to the west, including Interstate 580, limit opportunities for movement and dispersal of terrestrial wildlife beyond these boundaries of Knowland Park.

### 3.3.4.3 Sensitive Natural Communities

Sensitive natural communities are natural community types considered to be rare or of a high inventory priority by the CDFG, as described in **Subsection 3.3.3.1** above. Sensitive natural community types occurring in the proposed California Exhibit area include native grasslands and some vegetation associations in the chaparral cover. The associations of oak woodland in the area are not recognized as a sensitive natural community type with a high inventory priority by the CNDDDB, but trees meeting the definition of “protected tree” are regulated under the City’s Tree Protection Ordinance. The native grassland and chaparral natural communities in the proposed California Exhibit area are described below.

**Native Grassland.** As discussed in the BRS, much of the remaining grasslands on portions of the proposed California Exhibit area support a high percentage of native species. An estimated 7.6 acres of grassland cover occur within the limits of the proposed California Exhibit area, and a large portion of these were mapped as native grasslands in the BRS in 1996. The condition of the remaining native grasslands throughout Upper Knowland Park has been degraded by historic grazing activities, more recently by the ongoing intensive grazing by goats for fire fuel load reduction, and the spread of French broom and other invasive species. However, stands dominated by native grassland species continue to represent a sensitive resource. These stands of native grassland can be best characterized as Valley Needle grass Grasslands under the

*Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), or as alliances dominated by *Nacelle pilchard* and *Antonia californica* based on classification of the Manual of California Vegetation (Sawyer et. al. 1995). Under both of these classification systems, the native grasslands are considered sensitive natural community types with a high inventory priority by the CNDDDB. Both *Nacelle pilchard* and *Antonia californica* alliances are rated G4S3 in the *List of California Vegetation Alliances* (CDFG 2009, revised 2010), meaning they have a high inventory ranking in the state.

**Chaparral.** Chamise (*Aden stoma fasciculata*) forms the dominant species in most of the chaparral habitat in the vicinity of the California Exhibit area. While chaparral is generally not considered a sensitive natural community, several associations of the chamise-dominated alliances are considered to have a high inventory priority as indicated in the *List of California Vegetation Alliances* (CDFG 2009, revised 2010). This includes the chamise association with bush monkey flower (*Limulus aurantiacus*), which is found in the proposed Master Plan amendment area in the dense stands of chaparral. No attempt was made to map out the specific associations with bush monkeyflower, as this species is broadly distributed in the chaparral and nearby coastal scrub.

#### 3.3.4.4 Special-Status Species

Special-status species<sup>3</sup> are plants and animals that are legally protected under State and/or federal Endangered Species Acts or other regulations, as well as other species that are considered rare enough by the scientific community and trust agencies to warrant special consideration, particularly with regard to the protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitat.

The BRS and 1998 MND provide a summary of special-status species that could potentially occur in the proposed Master Plan amendment area. This discussion included information on 27 special-status animal species: four mammals, 12 birds, two reptiles, two amphibians, and seven invertebrates. Essential habitat for most of these species was determined to be absent in the Master Plan area, with the exception of possible nesting habitat for Cooper's hawk (*Accipiter cooperii*) and sharp-shinned hawk (*Accipiter striatus*), possible use of woodland by the San Francisco lacewing (*Nothochrysa californica*), and the potential for occurrence of Alameda whipsnake in areas of chaparral and other suitable habitat.

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<sup>3</sup> Special-status species include designated rare, threatened, or endangered species and candidate species for listing by the CDFG; designated threatened or endangered species and candidate species for listing by the U.S. Fish and Wildlife Service (USFWS); species considered rare or endangered under the conditions of Section 15380 of the CEQA Guidelines, such as those plant species identified on Lists 1A, 1B and 2 in the *Inventory of Rare and Endangered Plants of California* by the California Native Plant Society (CNPS); and possibly other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for State or federal status, such as those included on List 3 in the CNPS *Inventory* or identified as animal "California Species of Special Concern" (SSC) by the CDFG.



San Francisco lacewing is no longer a federal Candidate Species of Concern, although this species may be considered endangered, rare, or threatened under the CEQA Guidelines. Cooper's hawk and sharp-shinned hawk were previously considered Species of Special Concern (SSC) by the CDFG, but no longer receive this designation (CDFG 2011). No nests of any raptors were detected during field surveys conducted as part of the BRS or in subsequent field reconnaissance surveys. The woodlands provide suitable nesting habitat for hawks and other raptors, and the grassland and areas of open scrub and woodland provide suitable foraging habitat for raptors and other bird species. Raptor nests in active use are protected under the State Fish and Game Code and nests in active use by most bird species are protected under the federal Migratory Bird Treaty Act.

As described in **Subsection 3.3.4.1** above, additional detailed studies have been performed to confirm presence or absence of Alameda whipsnake and to identify any new occurrences of special-status plant and animal species on the site that were undetected in past systematic surveys. The results of these additional studies are summarized below.

**Alameda Whipsnake.** A habitat evaluation (Swaim Biological, Inc. 2009) was prepared to further evaluate potential effects of the proposed Master Plan amendment on Alameda whipsnake, quantifying potential impacts on vegetative cover, and providing a comparison to the potential impacts associated with the approved Master Plan (see **Appendix G-3**). Given that almost ten years had passed since the first protocol surveys conducted in 1989 and 1999 during which no Alameda whipsnakes were encountered, a second round of protocol surveys were conducted through fall of 2009 and the spring and summer of 2010. The Status Report (Swaim Biological, Inc. 2011) describes the methods used in conducting the surveys, summarizes the results of the original and second protocol surveys, discusses the effects of the proposed Master Plan amendment, and makes recommendations to address potentially significant impacts (see **Appendix G-1**).

A small adult male Alameda whipsnake was captured on June 3, 4, and 27, 2010 in three different traplines. This snake was found in stands of chamise chaparral, first along the spur ridge in the vicinity of the proposed wolf enclosure and later near the existing fire road between the proposed Overnight Experience and amphitheater. No other Alameda whipsnakes were encountered during the trapping effort, but given an individual was found, the site must be considered occupied habitat.

Based on current findings, it is unclear whether the Master Plan amendment area and larger Knowland Park area do or could support a viable long-term population of Alameda whipsnake. The Master Plan amendment area vicinity includes large areas of physically suitable core type habitat, but two years of trapping only resulted in a single capture, and no Alameda whipsnakes were captured during the survey conducted in 1989 and 1999. When high-quality core habitat is present and Alameda whipsnakes are detected, they are usually relatively abundant and the

dominant snake species (Swaim Biological, Inc. 2011). The population viability in the Master Plan amendment area may also be limited by the poor level of connectivity to other occupied or potentially occupied habitat. In 2003 and 2004, live trapping surveys were conducted at Anthony Chabot Regional Park near the interface with Upper Knowland Park on the east side of Skyline Boulevard. These surveys produced negative results, but were located in the most likely point of connectivity between Upper Knowland Park and Anthony Chabot Regional Park (Swaim Biological, Inc. 2011).

**California Red-legged Frog.** This species is listed as threatened by the United States Fish and Wildlife Service (USFWS) and is recognized as a SSC by the CDFG. It typically occurs in aquatic habitat of streams and ponds, but can disperse considerable distances in search of breeding and aestivation sites. Continued loss of upland dispersal habitat, fragmentation of remaining breeding locations, competition and predation by bullfrog, and degradation of aquatic habitat are primary concerns regarding protection and recovery of this species. The California red-legged frog was historically known to occur throughout the East Bay, but according to the CNDDDB there are no historical records for the Arroyo Viejo Creek watershed and surrounding lands. No protocol surveys have been conducted for the Master Plan area in the past, but the absence of suitable breeding pond habitat and lack of any records for occurrence in the surrounding area limit the likelihood that this species is present in Knowland Park. The restored reach of Arroyo Viejo Creek provides marginally suitable habitat for this species, but it is unlikely that individuals could have immigrated to the site from known occurrences given the extent of intervening urban development and unsuitable upland habitat.

**Western Pond Turtle.** This species typically inhabits ponds and streams with permanent pools, used as retreat habitat, and is recognized as a SSC by the CDFG. Individuals are known to establish nests in protected uplands near aquatic habitat, sometimes several hundred feet from pools and ponds used for retreat. Western pond turtles have not been reported from the Arroyo Viejo watershed according to the CNDDDB records. Ponds and larger pools in streams necessary for retreat from predators are absent in Knowland Park, precluding successful occupation by this species. The restored reach of Arroyo Viejo Creek now provides suitable dispersal and limited foraging opportunities for this species, but immigration from known occurrences is considered unlikely given the extent of intervening urban development and unsuitable upland habitat.

#### 3.3.4.5 Special-Status Plants

As described in the BRS and 1998 MND, one special-status plant species, robust monardella (*Monardella villosa* ssp. *globosa*), was encountered on the site during systematic surveys conducted at the time. This species was found in two locations, one within dense chaparral and the second within what was then described as the “Bison Exhibit.” Robust monardella has no legal protective status under the Endangered Species Acts but is maintained on List 1B (rare or endangered in California and elsewhere) of the *Inventory of Rare and Endangered Plant Species*

(California Native Plant Society electronic inventory) and as such is a special-status species. However, no occurrences of robust monardella were located during the 2009 and 2010 survey efforts, and in the professional judgment of the consulting botanist and biologist, this species is no longer believed to be present in the Master Plan amendment area. It is uncertain why these occurrences of robust monardella are no longer present; possibilities include natural causes associated with shading by invasive French broom or intensive grazing by goats used to reduce fuel loads for fire prevention.

Two previously undetected plant species of note were located during systematic surveys of the site conducted in 2009 and 2010. These two species, Oakland star tulip (*Calochortus umbellatus*) and bristly leptosiphon (*Leptosiphon acicularis*) were found in the northern portion of the site and the adjacent open space areas of Knowland Park (see **Figure 3.3-1**), in grassy openings in chaparral and scrub habitat. Neither of these species is listed under the State and/or federal Endangered Species Acts, and both are maintained on List 4.2 (limited distribution) of the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Plant Species (Inventory)*. Very few plants from List 4 of the CNPS *Inventory* are eligible for state listing, but some may be of local significance, and CNPS recommends that they be evaluated for consideration during preparation of environmental documents under CEQA. Information on both of these species is listed below.

**Bristly leptosiphon** is an annual herb on the Polemoniaceae family, found from Humboldt to San Benito counties, typically found in grassy areas in woodland and chaparral habitat. The Calflora website records maintained by the U.S. Department of Agriculture identify 15 occurrences of this species in Alameda County, the closest from nearby Leona Heights (from a record in 1893) and Diamond Canyon (from a record in 1900), and the most recent record from Hayward in 1921. This species has been observed from Pleasanton Ridge as recently as 2003, but has not been reported from the Oakland vicinity since the 1921 record in Hayward. As discussed under **Criterion a** in **Subsection 3.3.5.2** below, Bristly leptosiphon does not qualify as a “species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations.”

**Oakland star tulip** is a perennial herb that has been reported from Modoc to Santa Clara counties, found in chaparral, valley grassland, yellow pine forest, and mixed evergreen forest. The Calflora website records identify 68 records of this species in Alameda County. The closest of these is from another location in Knowland Park, reported in 2004 from a “steep meadow on a hillside near a fire road” (Calflora 2010). Other reported occurrences include Leona Heights (from records in 1897 and 1998) and Redwood Regional Park along Skyline Boulevard (from records in 1981, 1989, 1991, and 1998). As discussed under **Criterion a** in **Subsection 3.3.5.2** below, Oakland star tulip does qualify as a “species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations.”

No other special-status plant species were encountered in the Master Plan amendment area during past or recent systematic surveys conducted in 2009 and 2010, and no additional occurrences are believed to be present.

#### 3.3.4.6 Potential Jurisdictional Wetlands and Waters

Although definitions vary to some degree, wetlands are generally considered to be areas that are periodically or permanently inundated by surface or ground water and that support vegetation adapted to life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their high inherent value to fish and wildlife, use as storage areas for storm and flood waters, and water recharge, filtration, and purification functions. The CDFG, U.S. Army Corps of Engineers (Corps), and Regional Water Quality Control Board (RWQCB) have jurisdiction over modifications to wetlands and other “waters of the United States.”<sup>4</sup>

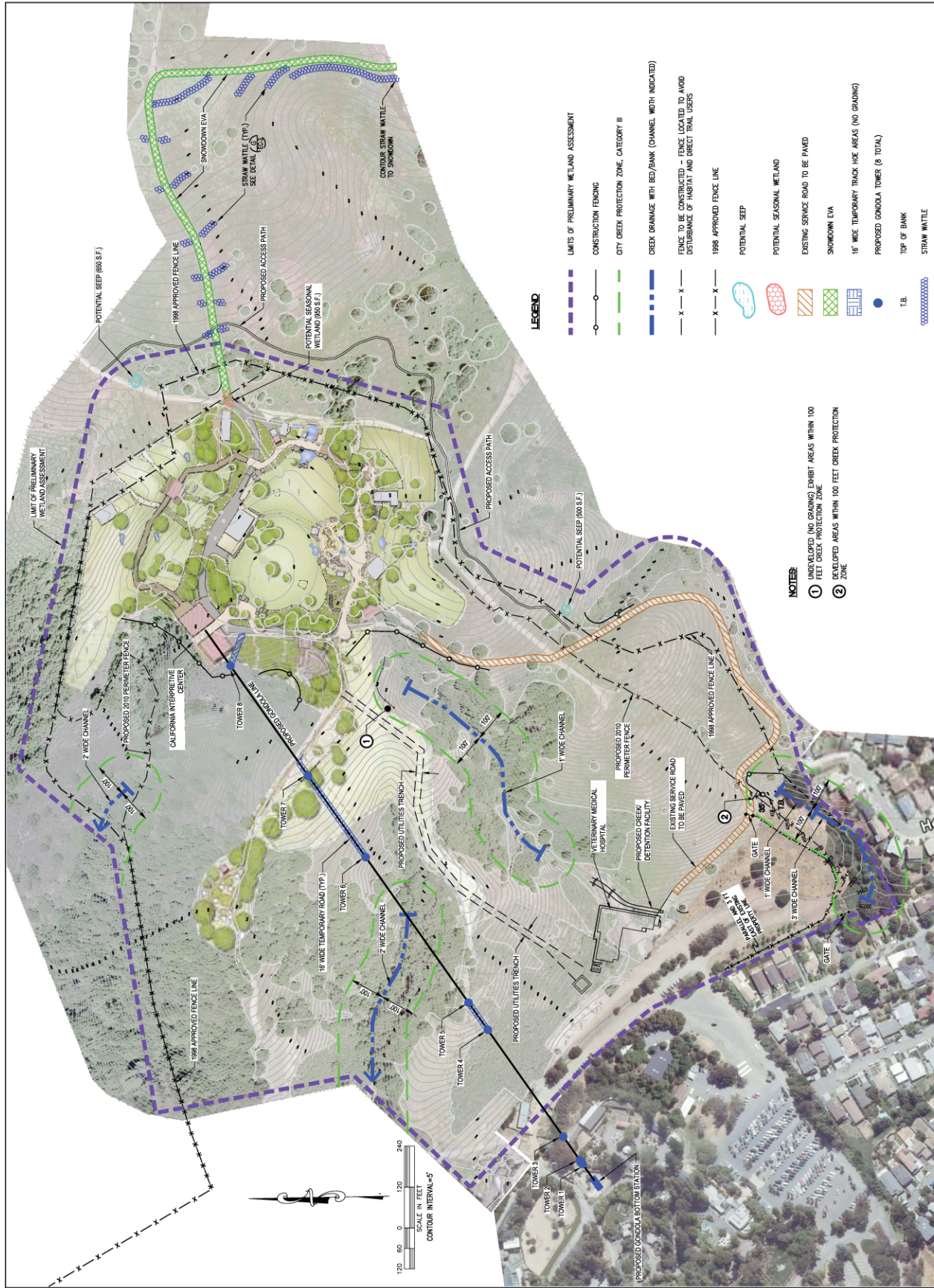
A preliminary wetland assessment was conducted as part of the field reconnaissance surveys in 2009 to confirm the extent of potential jurisdictional wetlands and unvegetated other waters in the Master Plan amendment area determined as part of the BRS in 1996. Additional field investigation was conducted in 2010 to more accurately map and document the extent of potential jurisdictional wetlands and other waters regulated by the Corps under Section 404 of the Clean Water Act.

**Figure 3.3-2** presents a comprehensive mapping of potential waters in the Master Plan area, although the Corps must formally verify the extent of jurisdictional waters on the site.

Based on the results of the assessment and field investigation, no wetlands potentially regulated by the Corps are believed to occur within the limits of the proposed Master Plan amendment. As indicated in **Figure 3.3-2**, two potential seeps occur just outside the proposed eastern alignment of the perimeter fence. The southern seep occurs in a small excavated area and occupies approximately 500 square feet. A natural drainage continues downslope from the seep, and this feature is most likely considered a regulated water by both the Corps and RWQCB. The eastern-most seep appears to have formed as a result of runoff from the fire road bladed through the surrounding grasslands, and occupies an estimated 650 square feet. Because this feature has no hydrologic connection with any Traditional Navigable Waters (TNW) it is most likely exempt from Corps jurisdiction. However, it may be considered a regulated “waters of the State” by the RWQCB under the Porter-Cologne Act. A jurisdictional determination would be made by the Corps and RWQCB at the time a formal wetland delineation is verified in advance of any application where potential waters could be affected by project-related activities.

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<sup>4</sup> Jurisdiction of the Corps is established through provisions of Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material without a permit. The RWQCB jurisdiction is established through Section 401 of the Clean Water Act, which requires certification or waiver to control discharges in water quality. Under the State Porter-Cologne Act, the RWQCB also has jurisdiction over hydrologically isolated waters, including features no longer regulated under the Corps. Jurisdictional authority of the CDFG over wetland areas is established under Section 1600 of the State Fish and Game Code, which pertains to activities that would disrupt the natural flow or alter the channel, bed, or bank of any lake, river, or stream.



SOURCE: Aliquot and Environmental Collaborative

**Figure 3.3-2**  
Creek Protection Plan

As indicated in **Figure 3.3-2**, a potential seasonal wetland occurs where the fire roads converge near the proposed gated eastern emergency access into the California Exhibit area from Upper Knowland Park. This feature appears to have formed as a result of past and on-going road maintenance. It occupies an estimated 950 square feet where routine blading of the road surface has exposed a natural hardpan along the crest of the ridgeline. Water now ponds on the road during the rainy season because of the hardpan, level road surface, and a small berm formed from sidecast bladed soil that has accumulated along the south edge of the roadway, preventing surface water from flowing off the road and creating conditions that now support wetland vegetation. The potential seasonal wetland is not hydrologically connected to a TNW and appears to be a human-made feature in an otherwise upland location, and is therefore most likely exempt from Corps jurisdiction. However, it may be considered a regulated waters by the RWQCB under the Porter-Cologne Act.

Although wetland vegetation is generally absent, Arroyo Viejo Creek is a regulated waters under jurisdiction of the Corps, RWQCB and CDFG. With the exception of willow cuttings installed as part of the creek restoration in 2007, wetland vegetation is absent along the reach of Arroyo Viejo Creek where the proposed outfall replacement would be installed. Arroyo Viejo Creek is a perennial stream approximately 10 feet in width between the Ordinary High Water Mark (OHWM) used to determine the extent of Corps and RWQCB jurisdiction under Section 404 and 401 of the Clean Water Act, respectively. The CDFG typically takes jurisdiction over the bed and bank of a creek, together with any associated riparian vegetation that may extend beyond the top of bank.

A number of small ephemeral drainages occur in the vicinity of the proposed California Exhibit area (see **Figure 3.3-2**) but contain no wetland vegetation and are generally indistinguishable from the surrounding vegetative cover. They consist of narrow, incised channels from one to two feet wide that convey surface water during and immediately after rainfall events generating surface runoff. Most of these drainages are hydrologically connected to downstream jurisdictional waters, such as Arroyo Viejo Creek, and as such would most likely be considered regulated waters by the Corps and RWQCB. However, the drainage upslope of the proposed Veterinary Medical Hospital site ends where the ravine opens up, and surface flows apparently disperse as sheet flow across the vicinity of the proposed Veterinary Medical Hospital site before being intercepted by the existing fire road and then flowing into a drainage ditch and culvert system along the northern edge of the existing visitor parking lot. Because it is hydrologically isolated from TNW, this ephemeral drainage upslope of the proposed Veterinary Medical Hospital appears to be exempt from Corps and RWQCB jurisdiction.

### 3.3.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

#### 3.3.5.1 Methodology

This analysis evaluates the potential biological impacts associated with buildout of the amended Master Plan. It employs a two-tiered approach that determines:

- Applicability of the biological mitigation measures recommended in the 1998 MND for the approved Master Plan and the City's Standard Conditions of Approval to the buildout of the amended Master Plan; and
- The significance of potential impacts with buildout of the amended Master Plan on biological resources, based on review of available data and mapping such as the California Tree Diagram and Tree Survey (PJA 2009 and 2010), evaluation of proposed improvement plans, and comparison of these plans to the impact assessment in the 1998 MND and on-site conditions.

To confirm the extent of sensitive resources, further detailed surveys for special-status plant species were conducted, mapping of tree resources was updated, and additional protocol surveys for Alameda whipsnake were conducted.

The amended Master Plan has been designed to further minimize potential impacts on important wildlife habitat, protected trees, special-status species, and sensitive natural communities. As part of the initial refinements to the proposed Master Plan amendment, James Martin, Principal of Environmental Collaborative, provided input into the proposed adjusted alignment of the perimeter fence, modifications to animal enclosures in the California Exhibit, and the alignment of the proposed public access path along the eastern edge of the Master Plan area, with the goal of minimizing impacts on sensitive biological resources.

### 3.3.5.2 CEQA Thresholds/Criteria of Significance

The project would have a significant impact on the environment if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service;
- Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service;
- Have a substantial adverse effect on federally protected wetlands (as defined by Section 404 of the Clean Water Act) or state protected wetlands, through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan;
- Fundamentally conflict with the City of Oakland Tree Protection Ordinance (Oakland Municipal Code (OMC) Chapter 12.36) by removal of protected trees under certain circumstances (considering the number, type, size, location and condition of (a) the

protected trees to be removed and/or impacted by construction and (b) the protected trees to remain, with special consideration given to native trees); or

- g) Fundamentally conflict with the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16) intended to protect biological resources (considering whether there is substantial degradation of riparian or aquatic habitat through: (a) discharging a substantial amount of pollutant into a creek; (b) significantly modifying the natural flow of the water; (c) depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability; or (d) adversely impacting the riparian corridor by significantly altering vegetation or wildlife habitat).

These criteria are discussed below.

**a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?**

In general, buildout of the amended Master Plan would continue to have the potential to affect biological resources, including special-status species, with impacts similar to those identified in the 1998 MND. Through refinements to the Master Plan, however, the buildout of the amended Master Plan would generally reduce the previously identified impacts on special-status species. These refinements include (1) eliminating the approved shuttle bus system, which would create a new loop road across the hillsides and require substantial grading and tree removal; (2) providing visitor access to the California Exhibit by a gondola people-moving system that would pass over rather than through dense woodland and chaparral vegetation; (3) eliminating the approved River Exhibit and replacing it with the proposed Veterinary Medical Hospital at a substantial reduction in the amount of grading in the vicinity; (4) eliminating the approved Canyon Exhibit, which would avoid grading at this location; and (5) adjusting the alignment of the perimeter fence so that less acreage is contained within the proposed California Exhibit and removal of chaparral habitat in the northwestern portion is minimized. Some aspects of the proposed Master Plan amendment, such as the modified exhibit areas, the Overnight Experience in the proposed California Exhibit, and the proposed public access path, would expand proposed exhibits and visitor uses into locations where no improvements were previously proposed. Collectively, however, the amount of affected habitat and associated vegetation removal and habitat disturbance would be substantially reduced with the amended Master Plan. **Table 3.3-1** provides a summary comparison of the amount of vegetative cover affected by the approved Master Plan and the amended Master Plan.

As summarized in the 1998 MND and shown in **Table 3.3-1**, the approved Master Plan would directly affect 36.3 acres of habitat in exhibit areas, plus an additional 9.0 acres of habitat associated with construction of the loop road. In addition, the loop road would affect an additional 58 acres of habitat by enclosing this area in the loop roadway system, with shuttle



**TABLE 3.3-1: COMPARISON OF ESTIMATED VEGETATIVE COVER AFFECTED (ACRES) – APPROVED MASTER PLAN AND PROPOSED MASTER PLAN AMENDMENT**

	CC	DSS	CBS	FBS	GSL	OW	Rock	BOD	ORN	Total
<b>Acreage Affected Under Approved Master Plan</b>										
Bison Exhibit	3.6	0.0	0.7	0.0	3.5	0.0	0.0	0.0	0.0	<b>7.8</b>
Breeding Area	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	<b>0.8</b>
Wolf Exhibit	0.0	0.4	1.4	0.2	1.5	0.2	0.0	0.0	0.0	<b>3.7</b>
River Exhibit (included currently proposed Veterinary Medical Hospital site)	0.0	0.2	0.3	5.6	5.0	0.5	0.0	0.0	0.0	<b>11.6</b>
Canyon Exhibit	0.0	0.0	0.0	4.2	0.9	7.3	0.0	0.0	0.0	<b>12.4</b>
<b>Total Exhibit Acreage</b>	<b>3.6</b>	<b>0.6</b>	<b>2.4</b>	<b>10.0</b>	<b>10.9</b>	<b>8.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>36.3</b>
Area enclosed by loop road but outside exhibits	0.0	1.3	5.8	4.0	18.9	28.0	0.0	0.0	0.0	<b>58.0</b>
<b>Total Acreage</b>	<b>3.6</b>	<b>1.9</b>	<b>8.2</b>	<b>14.0</b>	<b>29.8</b>	<b>36.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>94.3</b>
<b>Acreage Affected Under Proposed Master Plan Amendment</b>										
Maximum + Limited Disturbance *	0.24	0.0	4.25	0.17	3.79	0.89	0.0	1.53	0.02	<b>10.89</b>
Low Disturbance *	0.32	0.0	2.82	0.0	3.17	1.15	0.0	0.54	0.0	<b>8.00</b>
Veterinary Medical Hospital	0.0	0.0	0.0	0.5	0.03	0.0	0.0	0.33	0.0	<b>0.86</b>
Service Road	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.59	0.02	<b>0.81</b>
<b>Total Acreage</b>	<b>0.56</b>	<b>0.0</b>	<b>7.07</b>	<b>0.67</b>	<b>7.19</b>	<b>2.04</b>	<b>0.0</b>	<b>2.99</b>	<b>0.04</b>	<b>20.56</b>
<i>Temporary Impacts</i>										
Veterinary Medical Hospital	0.0	0.0	0.03	0.48	0.24	0.0	0.0	0.58	0.0	<b>1.33</b>
Service Road	0.0	0.01	0.04	0.0	0.71	0.0	0.0	0.95	0.07	<b>1.78</b>
Emergency Vehicle Access (EVA) Road	0.0	0.0	0.0	0.0	0.13	0.0	0.0	0.63	0.00	<b>0.76</b>
Joint Utility Trench	0.0	0.0	0.01	0.06	0.31	0.0	0.0	0.15	0.00	<b>0.53</b>
<b>Total Acreage</b>	<b>0.0</b>	<b>0.01</b>	<b>0.08</b>	<b>0.54</b>	<b>1.39</b>	<b>0.0</b>	<b>0.0</b>	<b>2.31</b>	<b>0.07</b>	<b>4.40</b>

CC = Chamise Chaparral  
DSS = Diablan Sage Scrub  
CBS = Coyote Brush Scrub  
FBS = French Broom  
GSL = Grassland

OW = Oak Woodland  
Rock = Rock Outcrop  
BOD = Barren or Disturbed  
ORN = Ornamental

\* Maximum Disturbance = Area of high level of disturbance (i.e., structures, roadways, pathways, etc.); Limited Disturbance = Area partially developed (i.e., visitor uses and day-time exhibit areas); Low Disturbance = Area with low disturbance (i.e., non-display exhibit areas and larger animal enclosure areas)

Source: Swaim Biological, Inc., 2009.

vehicles running frequently along the route during the daytime. The shuttle bus system would create an impediment to movement of smaller terrestrial species into the habitat surrounded by the loop road. Under the proposed Master Plan amendment, the existing service road on the east side of the California Exhibit would be widened and paved but would be used only for controlled service access with a low volume of vehicle trips per day. Buildout of the amended Master Plan would directly affect approximately 20.56 acres of habitat and temporarily affect approximately 4.4 acres of habitat during construction.

The following discussion analyzes and provides the results of the updated review regarding potential for occurrence of special-status species and potential impacts with buildout of the amended Master Plan.

**Special-Status Plant Species.** As discussed in **Subsection 3.3.4.1** above, systematic rare plant surveys were conducted in the Master Plan area in 1995 as part of the BRS for the approved Master Plan. Given the length of time since the initial field surveys and the proposed changes to the approved Master Plan, supplemental surveys of the Master Plan amendment area were conducted in 2009 and 2010. The only species detected during systematic surveys of the site conducted in 1995 consisted of two occurrences of robust monardella. However, no occurrences of robust monardella were located during the 2009 and 2010 survey efforts, and in the professional judgment of the consulting botanist and biologist, this species is no longer believed to be present on the site. It is uncertain why these occurrences of robust monardella are no longer present; possibilities include natural causes associated with shading by invasive French broom or intensive grazing by goats used to reduce fuel loads for fire prevention. Consequently, the protective measures specified in Mitigation Measures 14a and 14b from the 1998 MND, which called for rerouting the loop road and revising the boundary of the Bison Exhibit, are no longer applicable.

Two previously undetected plant species of note were encountered during the systematic surveys conducted in 2009 and 2010 – Oakland star tulip and bristly leptosiphon (see **Figure 3.3-1**). The occurrence of Oakland star tulip is located more than 500 feet from the proposed perimeter fence at its closest location, and no disturbance to this population is anticipated with the buildout of the amended Master Plan. Oakland star tulip has no legal protective status under the State and/or federal Endangered Species Acts and is maintained on List 4.2 of the CNPS *Inventory*. The Technical Appendices (Volume 1, Chapter 3) of the Oakland General Plan OSCAR Element provides information on the definition of special-status species used by the City of Oakland and identifies 31 plant species considered to be “Rare, Threatened, and Endangered Vascular Plants Potentially Present in Oakland”, including Oakland star tulip. As such, Oakland star tulip does qualify as a “species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations,” required under **Criterion a** for an impact to be considered potentially significant. No impacts to this population of Oakland star

tulip are anticipated, but the project applicant has nevertheless proposed measures to monitor and protect this occurrence as part of the Habitat Enhancement Plan (HEP) required by Mitigation Measure 13a from the 1998 MND. The Special-Status Species Protection Element of the HEP states that any future vegetation management activities will be designed to avoid direct disturbance and retain suitable habitat conditions for this species (see HEP in **Appendix G-2**). No significant adverse impacts to this occurrence of Oakland star tulip are anticipated, and no additional measures are considered necessary with regard to protection of this species.

The occurrence of bristly leptosiphon would be located within the wolf exhibit area of the amended Master Plan. Based on the GPS mapping of the occurrence, the occurrence of bristly leptosiphon would be located approximately 50 feet from the wolf enclosure fencing at its closest point to the west, and about 120 feet northwest of the proposed boardwalk separating the secondary wolf area from the primary wolf exhibit area. Although it appears that direct disturbance to this occurrence would be avoided, the occurrence could be affected by trampling, den digging, and other activities of wolves within the enclosure area. Bristly leptosiphon has no legal protective status under the State and/or federal Endangered Species Acts, is maintained on List 4.2 of the CNPS *Inventory*, and is not included on the list of 31 “Rare, Threatened, and Endangered Vascular Plants Potentially Present in Oakland” according to the Technical Appendices (Volume 1, Chapter 3) of the Oakland General Plan OSCAR Element. It is also not included on the list of “Unusual or Significant Plants in Oakland” contained in Appendix 3-A of the OSCAR Element. The City has no specific policies or practices in place about protecting CNPS List 4 species. As such, bristly leptosiphon does not meet the criteria as a special-status species requiring avoidance or compensatory mitigation. Although the discovery of the occurrence of bristly leptosiphon on the site may be considered important botanically to some, any potential impacts on this species would not be considered significant under CEQA.

Bristly leptosiphon does not qualify as a “species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations,” as would be required under **Criterion a** for an impact to be considered significant. However, the presence of this species does contribute to the biological diversity of Knowland Park, and as such the project applicant has proposed measures to monitor and protect this occurrence. The proposed schematic planting plan for the California Exhibit (see **Figure 2-10**) shows the location of the occurrence of bristly leptosiphon and its relationship to landscape and hardscape improvements, and recognizes that protection and monitoring measures will be implemented pursuant to the HEP. The Special-Status Species Protection Element of the HEP defines the avoidance and protection measures to be implemented as part of the project (see HEP in **Appendix G-2**). No additional measures are considered necessary with regard to protection of this species. The following is language related to protection of bristly leptosiphon taken directly from the HEP and would be implemented as part of the Master Plan amendment:

***Bristly leptosiphon.*** *The population of bristly leptosiphon is located within the “Wolf Expansion” area of the California Exhibit site, and shall be avoided and protected during construction and future management activities. No direct impacts to this occurrence are anticipated, but appropriate controls over construction operation shall be implemented and the population monitored to determine whether indirect impacts from wolf activities are adversely affecting the occurrence. The location of the population shall be indicated on project plans, and temporary construction restriction fencing installed around the entire occurrence and a minimum 25-foot buffer. The temporary construction restriction fencing shall be installed under the supervision of a qualified botanist or biologist, shall remain in place for the duration of construction, and all workers informed of the need to avoid entering the area. Any future vegetation management activities shall be designed to minimize disturbance and retain suitable habitat conditions for this species.*

*Annual monitoring shall be provided for a minimum of five years once wolves begin using the “Wolf Expansion” area to determine whether trampling, digging, and other possible disturbances could result in the extirpation of this population. The monitoring shall be conducted by a qualified botanist or biologist, with annual reports on the condition of the occurrence, reproductive success, and need for any changes in access or management. Annual monitoring reports shall be submitted to the City of Oakland by October 15 of each year of monitoring. If it is clear that the occurrence becomes threatened by wolf activities, permanent protective fencing shall be installed providing a 25-foot buffer around the population. Annual monitoring shall be provided a minimum of three years beyond installation of any permanent protective fencing to ensure that the population is adequately protected and monitor changes in population size and distribution within and outside of the protective fence boundary.*

No other occurrences of special-status plant species are believed to occur on the site based on the results of detailed surveys conducted in 1995, 2009, and 2010. Some aspects of the proposed Master Plan amendment involve expansion into areas not surveyed in 1995, including an expansion associated with the proposed wolf enclosure area where the occurrence of bristly leptosiphon was encountered, adjustments to the alignment of the perimeter fence, and provisions for a new public access path along the eastern edge of the California Exhibit area outside the perimeter fence. However, the systematic surveys in 2009 and 2010 have confirmed the extent and distribution of special-status plant species in these areas or other parts of the Master Plan amendment area. No other adverse impacts on special-status plant species are anticipated, and no additional mitigation measures are considered necessary. Nonetheless, the applicant has included protective measures in the HEP to address the Oakland star tulip and bristly leptosiphon on the site.

Implementation of the HEP (see **Appendix G-2**) calls for conducting supplemental systematic surveys for special-status plant species and adherence to appropriate avoidances and protection measures where invasive species treatment and native revegetation would occur in portions of Upper Knowland Park outside the limits of past surveys. This would provide baseline data on the presence or absence of any additional occurrences of special-status species in possible vegetation treatment areas, and would ensure avoidance of any potential adverse impacts if additional populations are encountered.

**Special-Status Animal Species.** The 1996 BRS and 1998 MND provide a discussion of the potential effects of the approved Master Plan on special-status animal species that could occur in the proposed Master Plan amendment area. The following discussion addresses the potential effects of the proposed Master Plan amendment on special-status animal species.

*Special-Status Birds and Invertebrates.* As discussed above and shown in **Table 3.3-1**, the proposed Master Plan amendment would have a less-than-significant impact on the existing natural habitat found in the area, including potential foraging habitat for special-status birds as well as special-status invertebrates. Additionally, as discussed under **Criterion f** below, the proposed Master Plan amendment would reduce the number of trees to be removed and therefore would reduce the potential for disrupting suitable habitat for special-status bird species if they were to nest in the area in the future.

Mitigation Measure 14i in the 1998 MND addressed potential impacts on nesting Cooper's hawks and Mitigation Measure 14j addressed potential impacts on San Francisco lacewings. There remains a potential for occurrence of other nesting birds on the site that would also be protected under the federal Migratory Bird Treaty Act and possibly the State Fish and Game Code. The City's Standard Conditions of Approval (**SCA-BIO-1**) regarding protection of possible nesting habitat and the requirement that a preconstruction survey be conducted if vegetation removal and construction is to be initiated during the breeding/nesting season (from March 15 through August 15) would serve to mitigate potential impacts on bird species of concern to less-than-significant levels, including Cooper's hawk making Mitigation Measure 14i unnecessary. This measure was focused on tree removal associated with construction of viewing platforms and the shuttle road, which are no longer proposed as part of the amended Master Plan, making Mitigation Measure 14i no longer applicable to the proposed Master Plan amendment.

San Francisco lacewing is no longer a federal Candidate Species of Concern, although this species may be considered endangered, rare or threatened under the CEQA Guidelines. The dust control measures called for in Mitigation Measure 14j in the 1998 MND would be provided as part of Best Management Practices during grading and construction on the site, as called for in **SCA-AIR-1** which would continue to provide protection for this species and other insects and other wildlife, ensuring a less-than-significant impact. Given that dust control measures would be implemented, Mitigation Measure 14j is no longer applicable to the proposed Master Plan amendment.

Mitigation Measures 13c and 14g have been revised as indicated below to remove references to the "Shuttle Road," which is no longer part of the proposed Master Plan amendment. Mitigation Measure 13c has also been revised to delete a specific reference to "curb and gutter" given options to prevent possible obstruction of movement by Alameda whipsnake and other smaller wildlife, such as undercrossings, direction fencing, and other treatments. These details

would be coordinated with representatives of the U.S. Fish and Wildlife Service and California Department of Fish and Game as part of securing incidental take authorizations for the project. Implementation of **SCA-BIO-10**, which requires the applicant to obtain all regulatory permits and authorizations and comply with all their conditions would ensure that appropriate treatment of the roadway edge would be designed and constructed. Mitigation Measure 14g has also been revised to delete the reference to an offsite breeding exhibit, which is no longer part of the project and to eliminate the duplication restricting the service road to a maximum of 15 feet which is already called for in Mitigation Measure 13c.

*Alameda Whipsnake.* A major focus of the BRS and the 1998 MND was the potential for occurrence of Alameda whipsnake (AWS) in the Master Plan area. The 1998 MND assumed that AWS was present in the area, although none had been observed in the past, and that impacts would be potentially significant. The 1998 MND recommended broad mitigation measures to address these impacts. As discussed in **Subsection 3.3.4.4**, protocol surveys were conducted in 1998 and 1999 with no AWS encountered. A second round of protocol surveys were conducted in the fall of 2009 and the spring and summer of 2010, and a single adult male AWS was captured in June 2010 near the end of the survey effort. This snake was found in three different locations in stands of chamise chaparral, but was the only AWS encountered during a total of 135 trapping days with 35 traplines distributed in areas of optimal habitat. The results of the protocol surveys are discussed in detail in the 2011 Status Report (see **Appendix G-1**).

In advance of conducting the supplemental protocol surveys in 2009 and 2010, a habitat evaluation (Swaim Biological, Inc. 2009) was prepared to further evaluate potential effects of the proposed Master Plan amendment on AWS and to provide a comparison of the potential impacts associated with the approved Master Plan (see **Appendix G-3**). **Table 3.3-1**, taken from the habitat assessment, provides a comparison of the amount of existing vegetative cover affected by the approved Master Plan and the proposed Master Plan amendment. As shown in **Table 3.3-1**, the proposed Master Plan amendment would affect an estimated 21 acres of vegetative cover. An estimated 4.4 acres would be temporarily disturbed. Collectively, this amount of affected acreage represents an approximately 15.7-acre reduction in anticipated loss and disturbance of existing AWS habitat, not including an additional 58 acres of habitat that would be enclosed by the loop road under the approved Master Plan.

**Figure 3.3-1** shows the existing vegetation cover and the extent of habitat disturbance associated with the proposed Master Plan amendment. Consistent with the categories listed in **Table 3.3-1**, this figure identifies three possible levels of disturbance in the Master Plan amendment area, based on construction and long-term use activities as determined by the Oakland Zoo's consulting architect. These consist of areas with maximum disturbance (i.e., occupied by structures, roadways, pathways, etc.), areas with limited disturbance (i.e., visitor use and day-time exhibit areas), and areas with low disturbance (i.e., non-display exhibit areas and larger animal enclosures). Tree removal and native vegetation clearing would be avoided or

minimized within most of these zones to the degree possible, with greater flexibility possible in the limited and low disturbance zones. Long-term animal activity, such as foraging and trampling in the bison exhibit, could eventually reduce ground covers and possibly eliminate most of the grassland from some locations within the enclosure areas unless properly managed. Areas of open grassland within the bison exhibit would be irrigated and maintained with grassland to retain important cover for dispersing AWS, as recommended in the 2011 Status Report. However, for the purposes of this assessment, disturbances resulting from the proposed Master Plan amendment were considered similar in their degree of long-term impact on vegetative cover and wildlife habitat.

Buildout of the amended Master Plan would result in a substantial (approximately 15.7-acre) reduction in the area of affected AWS habitat. Therefore, potential impacts on AWS associated with buildout of the amended Master Plan would be less than those associated with the approved Master Plan. However, as identified in the 1998 MND, this would remain a potentially significant impact requiring compensatory mitigation and incidental take authorizations from the USFWS and CDFG. The consulting herpetologist who conducted the protocol surveys, Karen Swaim of Swaim Biological, Inc., has initiated informal consultation with the USFWS and CDFG and included conclusions and recommendations addressing potential impacts on Alameda whipsnake in the 2011 Status Report (see **Appendix G-1**).

As indicated in the 2011 Status Report and confirmed during initial informal consultation with the USFWS, several factors indicate that the Veterinary Medical Hospital could be constructed without significant effect on AWS habitat or taking of an individual snake with implementation of avoidance and minimization measures (Swaim Biological, Inc. 2011). The factors supporting this finding include the barren and/or highly disturbed nature of much of the location and its proximity to the existing zoo parking lot, which would discourage use or dispersal by AWS; the small area to be disturbed with construction of this facility; the larger distance from core type chaparral and scrub habitat preferred by this species; and the results of the trapping surveys, which indicate an extremely low number of AWS in the site vicinity.

Several modifications to the California Exhibit were recommended by the consulting herpetologist in the 2011 Status Report to reduce direct impacts on core habitat and potential habitat fragmentation. These include removing the amphitheater from the stand of chamise-chaparral, moving the Interpretive Center ten feet to the east and limiting grading to within ten feet of the edge of the building, modifying and establishing controls to the bison/tule elk extension exhibit, and ensuring that the perimeter fence is permeable to allow for unrestricted movement of AWS through the area. Controls associated with the bison/tule elk exhibit include limiting the number of animals housed to 20 bison and 20 tule elk, maintaining protective cover by creating irrigated pasture outside woodland habitat, and placing rock outcrops and/or logs to serve as refugia for dispersing snakes. A final mitigation program would be negotiated with the USFWS and CDFG establishing permanently conserved habitat that would be enhanced through invasive species

control and native vegetation re-establishment where native cover types have been displaced by non-native species. Implementation of the recommended 1998 MND Mitigation Measures 14c, 14d, 14e, 14g, and 14h and the applicable Standard Conditions of Approval (**SCA-BIO-5 through SCA-BIO-8**) would reduce potential impacts on AWS to less-than-significant levels. As indicated below, Mitigation Measure 14c has been revised to incorporate specific provisions regarding compensatory mitigation for AWS habitat and modifications to the California Exhibit as recommended in the 2011 Status Report. Mitigation Measure 14f has been deleted because specific provisions have been added to Mitigation Measure 14c to ensure that adequate compensatory mitigation will be provided at a minimum of 1:1 (at least one acre of replacement habitat for every acre of impact), or at a greater ratio as required by USFWS and CDFG. Therefore, Mitigation Measure 14f is no longer necessary. Mitigation Measure 14g has been revised to delete the references to “offsite breeding exhibit” and the shuttle road, which are no longer part of the project.

*California Red-Legged Frog.* The potential for occurrence of California red-legged frog was not specifically addressed in the 1998 MND, presumably because this species has not been reported from the Arroyo Viejo Creek watershed or surrounding lands. Although the potential for occurrence of this species is considered highly unlikely, the restored reach of Arroyo Viejo Creek now provides marginally suitable habitat for this species. Potential impacts in the vicinity of the creek corridor are now limited to the replacement of the existing drainage outfall and enhancement of approximately 40 linear feet of the south bank (see **Figure 2-19**). Compliance with **SCA-BIO-13** requires that a qualified biologist shall be present “to relocate all native fish/native amphibians/pond turtles within the work site, prior to dewatering.” Resource agency authorizations required under **SCA-BIO-10** and **SCA-BIO-13** would ensure adequate protection for California red-legged frog in the remote instance they were encountered during the creek-related construction activities. Implementation of applicable Standard Conditions of Approval (**SCA-BIO-10, SCA-BIO-13** and **SCA-BIO-14**) would reduce potential impacts on California red-legged frog to less-than-significant levels, in the remote instance they become established or disperse into the construction reach of Arroyo Viejo Creek. This species has no potential for occurrence at other locations in the Master Plan area, and preconstruction surveys are not necessary outside the Arroyo Viejo Creek vicinity.

*Western Pond Turtle.* This species was also not addressed in the 1998 MND, and it is highly unlikely that individuals could survive in the Arroyo Viejo Creek watershed because of a lack of critical pond and deep pool habitat necessary to escape predators. Compliance with **SCA-BIO-13** would serve to avoid any inadvertent loss or harm to this species during construction associated with the drainage outfall replacement, in the remote instance that individual turtles were somehow able to establish a population in the restored reach of Arroyo Viejo Creek. No additional mitigation is considered necessary and implementation of **SCA-BIO-13** would reduce potential impacts on western pond turtle to less-than-significant-levels.



**Summary.** Buildout of the amended Master Plan would no longer have any adverse impacts on robust monardella, since those occurrences are no longer present on the site, and no mitigation measures are required for this species. Mitigation Measures 14a and 14b from the 1998 MND are no longer applicable for robust monardella since, in the professional judgment of the consulting botanist and biologist, this species is no longer present in the Master Plan area. Potential impacts on Oakland star tulip and bristly leptosiphon would not be considered significant given the distance of the population from proposed improvements and the status of this species, respectively. Implementation of the HEP would ensure the protection of the occurrences of these two species given that they contribute to the biological diversity of Knowland Park and their protection would be consistent with the goals of the project applicant.

Buildout of the amended Master Plan has the potential to affect special-status birds and possibly San Francisco lacewing, an invertebrate species. Compliance with the City's applicable Standard Conditions of Approval (**SCA-BIO-1**) would require that potential nesting habitat for birds is avoided during construction and tree removal, these impacts would remain less than significant, and Mitigation Measure 14i is no longer necessary. San Francisco lacewing is no longer a federal Candidate species, but compliance with applicable Standard Conditions of Approval (**SCA-AIR-1**, **SCA-HYDRO-1** and **SCA-HYDRO-3**) would provide the dust controls as part of Best Management Practices, making Mitigation Measure 14j unnecessary. The proposed Master Plan amendment has the potential to affect the State- and federally-listed threatened Alameda whipsnake. However, the City's applicable Standard Conditions of Approval (**SCA-BIO-5 through SCA-BIO-8**), Mitigation Measures 14c, 14d, 14e, 14g, and 14h from the 1998 MND, and revisions to Mitigation Measure 14c would ensure that the impact would remain less-than-significant. Revisions to Mitigation Measure 13c is recommended below to remove the reference to "Shuttle Road" since it is no longer part of the proposed Master Plan amendment. Mitigation Measure 14f has been replaced by the revisions to Mitigation Measure 14c and is no longer necessary. Mitigation Measures 13c and 14g have been revised to clarify the intent of restrictions associate with the service road with regard to disruption of movement by AWS and other wildlife.

Buildout of the amended Master Plan has a remote potential to affect California red-legged frog and western pond turtle, if either or both of these species are present along Arroyo Viejo Creek in the vicinity of the drainage outfall replacement and habitat enhancement area. Compliance with **SCA-BIO-13** requires that a qualified biologist shall be present to relocate any native amphibians and pond turtles from the construction zone prior to dewatering, ensuring that inadvertent take is avoided and that any potential impacts remain less-than-significant.

Compared to the approved Master Plan evaluated in the 1998 MND, the proposed Master Plan amendment would not create a new significant impact or increase the severity of the impact in relation to this criterion. Compared to the approved Master Plan, the amended Master Plan would have less impact on existing natural habitat and would reduce the number of trees to be

removed (see discussion below under **Criterion f**), thereby reducing the potential for impacts on special-status animal species.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 13a, 13c, 14c, 14d, 14e, 14g, and 14h as revised below.

The proposed Master Plan amendment has the potential to affect special-status bird and invertebrate species.

**Revisions to Mitigation Measure 14c.** Mitigation Measure 14c has been revised to reinforce the recommendations from the 2011 Status Report on Alameda whipsnake intended to reduce potential impacts of the California Exhibit on core habitat and potential habitat fragmentation. New text is shown with underline and deleted text is shown with strikethrough.

14c) Obtain appropriate authorizations from resource agencies to address possible incidental take and a Permit for Management of a rare or threatened species pursuant to Fish and Game Code Section 2081 and Section 7 of the Endangered Species Act, as called for under SCA-BIO-10. ~~The project applicant shall provide compensatory mitigation for impacts to Alameda whipsnake habitat. Such mitigation shall be provided at a ratio of no less than 1:1 (at least one acre for every acre of impact), subject to any increase in this ratio that may be required by the resource agencies. There is adequate area within Knowland Park to achieve this mitigation ratio. Subject to the approval of the resource agencies, mitigation shall be achieved through habitat restoration and enhancement within the California Exhibit boundaries, the Ecological Recovery Zone, and other locations within Knowland Park, at another restoration location with an Alameda whipsnake habitat restoration plan area approved by the U.S. Fish and Wildlife Service and the California Department of Fish and Game, through the purchase of mitigation credits at a mitigation bank within the East Bay region, or some combination of these options. The project applicant shall retain a qualified biologist to prepare an Alameda whipsnake Mitigation and Monitoring Plan in connection with the application for an incidental take authorization and Management Permit. The Management Permit will include all details of a Mitigation and Monitoring Plan which will be prepared by the East Bay Zoological Society.~~ The Mitigation and Monitoring Plan will be subject to approval by the California Department of Fish and Game and the U.S. Fish and Wildlife Service. The Mitigation and Monitoring Plan shall include (a) a habitat restoration/creation performance standard of no net loss of habitat functions and values; (b) location of the mitigation site(s); (c) a detailed habitat restoration/creation plan for the mitigation site(s); (d) provisions for timing and methods for invasive species removal, controls on herbicide application, and worker training programs that, at a minimum and subject to the requirements of the resource agencies, meet the applicable requirements of the Invasive Species Control Element of the HEP; (f) provisions for interpretive programs and access restrictions; (g) revegetation provisions that include cover requirements, methods of installation and maintenance, a tracking system, a record of source and species of plant materials used in revegetation; and (h) success criteria to be used to evaluate whether the restoration/creation efforts have achieved the identified goals of the Mitigation and Monitoring Plan.

The proposed California Exhibit shall be modified to incorporate recommendations from the 2011 Status Report (Swaim Biological, Inc. 2011), which include removing the amphitheater from the stand of chamise-chaparral; restricting the California Interpretive Center ten feet to the east and limiting grading to within ten feet of the edge of the building; modifying and establishing controls to the bison/tule elk extension exhibit, and ensuring that the perimeter fence is permeable to allow for unrestricted movement of Alameda whipsnake through the area. Controls associated with the bison/tule elk exhibit shall include limiting the number of animals housed to 20 bison and 20 tule elk, maintaining protective cover by creating irrigated pasture outside woodland habitat, and placing rock outcrops and logs to serve as refugia for dispersing snakes. A summary of the measures to be incorporated into the Mitigation and Monitoring Plan are presented below.

**Revisions to Mitigation Measures 13c, and 14g.** Mitigation Measures 13c and 14g have been revised to delete the reference to the “Shuttle Road”, which is no longer part of the proposed Master Plan amendment. Mitigation Measure 13c has also been revised to provide flexibility in the treatment of the service road as required by resource agencies as part of the incidental take permit. Mitigation Measure 14g has also been revised to delete the reference to the “offsite breeding exhibit” which is no longer part of the proposed Master Plan amendment, and to remove the reference to the maximum width of the service road which is already addressed in revised Mitigation Measure 13c. New text is shown with underline and deleted text is shown with strikethrough.

- 13c) The service road shall be a maximum of 15 feet in width and designed to accommodate crossing by Alameda whipsnake and other wildlife, where necessary, ~~Although mitigations recommended by the Master Plan to minimize impacts to wildlife due to vehicle and pedestrian traffic would reduce potential impacts to less than significant, the following mitigation measure would further reduce the impact.~~ If feasible, the service road Shuttle Road should be a maximum of 15 feet in width with no curbs or gutters to reduce potential impacts to the Alameda whipsnake.
- 14g) To reduce the potential for mortality on the service shuttle road to a level less than significant, a maximum speed of ten 40 miles per hour shall be required and all shuttle drivers and personnel driving to the offsite breeding exhibit will be instructed to watch for and yield to all wildlife. ~~The road shall also be a maximum of 15 feet in width with no curbs or gutters.~~ Specially designed “snake crossings” under the service shuttle road may also be required.

**Significance after Implementation of Mitigation:** Less-than-significant

- b) Would the project have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?**

**Riparian, Woodland, and Chaparral Habitats.** The amended Master Plan would largely avoid impacts on riparian, woodland, and chaparral habitats, as discussed under **Criterion a** above and

**Criteria c, f, and g** below. Implementation of Mitigation Measure 13a in the 1998 MND to provide for further native habitat avoidance and replacement, together with compliance with the City's Standard Conditions of Approval (**SCA-BIO-9 through SCA-BIO-15**), would ensure that potential impacts on these habitat types would remain less than significant. Implementation of revised Mitigation Measure 14c would provide for further avoidance of chaparral habitat and the core habitat for Alameda whipsnake, as recommended in the 2011 Status Report and discussed above under **Criterion a**.

With buildout of the amended Master Plan, approximately 7.19 acres of grassland cover would be contained within improvements and exhibit areas and would be adversely affected, and an additional 1.39 acres would be temporarily affected by grading and other improvements (see **Table 3.3-1**). In total, an estimated 8.6 acres of grassland habitat would be affected under the proposed Master Plan amendment, but this is less than the estimated 10.9 acres of grassland habitat that would be lost or modified under the approved Master Plan. Loss of or further degradation to grasslands would occur as a result of construction of roadways, pathways, new structures, and fencing, as well as from grazing and trampling by confined animals in the exhibit enclosures. Native grasslands in the Master Plan area have been degraded by historic grazing activities, ongoing intensive grazing by goats for fire fuel load reduction, and the spread of French broom and other invasive species. Based on estimates made during field reconnaissance and systematic surveys for special-status plants, less than a quarter of the grasslands in the proposed Master Plan amendment area continue to qualify as native grasslands. Nonetheless, to be conservative, the loss of this sensitive natural community type continues to represent a potentially significant impact.

Mitigation Measure 13a in the 1998 MND calls for implementation of a Habitat Enhancement Plan (HEP) that would “enhance” native grasslands among other habitat types in the Master Plan amendment area and Upper Knowland Park and remove invasive species such as French broom. The focus of this mitigation is on removal of invasive species. A HEP (Environmental Collaborative 2011) was prepared to guide the implementation of Mitigation Measure 13a and provide details on habitat management activities, performance standards, and monitoring requirements (see HEP in **Appendix G-2**). The following is language related to mitigation for impacts on grassland habitat taken directly from the HEP and would be implemented as part of the Master Plan amendment:

*A grassland enhancement and replacement program will be implemented as part of the HEP to ensure that adequate mitigation is provided for the estimated 8.6 acres of native and non-native grassland habitat possibly lost or modified within the footprint of proposed improvements or within animal enclosures of the California Exhibit. The grassland program will identify historic grasslands in Knowland Park currently dominated or under threat by invasion of French broom and other non-native species. Some limited removal of dead or senescent planted Monterey pines may be appropriate as a management technique in meeting the grassland mitigation and enhancement goals of the HEP. Through invasive species removal, and native revegetation where required, the grassland protection and enhancement goal of the HEP will be met.*

Implementation Actions in the HEP specifies that a minimum of 17.2 acres of grassland habitat will be treated, protected and managed as part of this program to provide a minimum 2:1 mitigation ratio for grasslands lost or compromised as a result of buildout of the amended Master Plan, in addition to management of the remaining grassland habitat within the California Exhibit area. With implementation of the HEP and Mitigation Measure 13a, the loss of grassland habitat would be reduced to a less-than-significant level.

**Summary.** In summary, the proposed Master Plan amendment would result in slightly reduced impacts on sensitive natural habitats, compared to those of the approved Master Plan as described in the 1998 MND. The proposed Master Plan amendment would not create new significant impacts or increase the severity of previously identified impacts.

The proposed Master Plan amendment would be required to comply with the City's Standard Conditions of Approval (**SCA-BIO-9 through SCA-BIO-14**) and mitigation measures identified in the 1998 MND. Implementation of the HEP and Mitigation Measure 13a would ensure adequate protection and management of grassland habitat. Refinement of Mitigation Measure 14c calling for removing the proposed amphitheater, as recommended under **Criterion a**, would provide for additional avoidance of chaparral habitat as called for in the 2011 Status Report on Alameda whipsnake (see **Appendix G-1**). Mitigation Measure 15a would control the introduction and spread of weed species. These measures would ensure compliance with Policies CO-7.1 and CO-7.2 of the OSCAR Element of the Oakland General Plan, related to the protection of native plant communities and native plant restoration.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 13a and 15a and revised Mitigation Measure 14c, as listed above under **Criterion a**.

**Significance after Implementation of Mitigation:** Less-than-significant

**c) Would the project have a substantial adverse effect on federally protected wetlands (as defined by Section 404 of the Clean Water Act) or state protected wetlands, through direct removal, filling, hydrological interruption, or other means?**

No substantial adverse impacts on federal or state protected wetlands are anticipated under the proposed Master Plan amendment. Direct modifications to federal jurisdictional waters (not wetlands) would consist of the proposed outfall modifications and habitat enhancement along Arroyo Viejo Creek. A 950-square foot water feature that has developed in the existing fire road at the eastern edge of the California Exhibit area may be modified or eliminated by the planned road improvements. Adequate controls would be implemented to minimize potential direct and indirect impacts on nearby creeks and aquatic habitat, as discussed further in **Section 3.7, Hydrology and Water Quality**, and specified in **SCA-HYDRO-1, SCA-HYDRO-3, and SCA-HYDRO-4**.

Replacement of the drainage outfall, recountouring of the channel bank, and installation of native enhancement plantings would result in disturbance to approximately 40 linear feet of the south bank of Arroyo Viejo Creek, which is a regulated waters under jurisdiction of the Corps, RWQCB, and CDFG. Most of this activity would occur just above the OHWM defining the limits of Corps jurisdiction, and sapling willow cuttings installed as part of the 2007 creek restoration project would be retained to the maximum extent possible. Less than 100 square feet of Corps jurisdictional waters below the OHWM would be temporarily disturbed, but no wetlands would be removed and native riparian cover would be established as part of revegetation. Authorizations would be required from the Corps under Section 404 of the Clean Water Act, the RWQCB under Section 401 of the Clean Water Act, and CDFG as part of the Streambed Alteration Agreement program. A Creek Protection Permit would also be required from the City of Oakland. The proposed native enhancement plantings (see **Figure 2-19**) would serve to fully mitigate the impacts associated with the outfall replacement, and no additional mitigation is considered necessary.

The buildout of the amended Master Plan would avoid the potential wetland seep that is likely under Corps jurisdiction to the south of the California Exhibit, as well as the 650-square-foot seep along the fire road northeast of the California Exhibit area that is most likely not under Corps jurisdiction but may be considered a regulated water by the RWQCB (see **Figure 3.3-2**). The proposed public access path would be located more than 100 feet from the 650-square-foot seep.

The perimeter fence and eastern entrance gate would bisect the 950-square-foot water feature that has developed in the existing fire road (see **Figure 3.3-2**), and would result in modifications or possibly elimination of this feature through installation of base rock, pavement, and other road improvements to make it serviceable all year. This feature has most likely formed as a result of grading associated with construction and maintenance of the fire road, is vegetated by non-native species, and has limited habitat value. These factors make it unlikely that this feature would be considered a wetland or regulated water. There is some possibility, however, that the RWQCB could consider this feature a regulated water requiring compensatory mitigation if it is eliminated. If the RWQCB determines that this feature is a regulated waters of the State, its loss could be considered significant.

Implementation of the City's Standard Conditions of Approval related to creek and wetland protection (**SCA-BIO-9 through SCA-BIO-14**) would ensure that direct and indirect impacts on Arroyo Viejo Creek would be adequately addressed, that appropriate agency authorizations are secured, and that potential impacts on creeks and wetlands would be less than significant. Additionally, the native enhancement plantings included as part of the outfall replacement activities would fully mitigate any impacts associated with the outfall replacement (See also **Criterion g** below.) Implementation of **SCA-BIO-10** would ensure that adequate replacement mitigation is provided for the potential loss of the 950-square-foot water feature, if it is

determined to be a regulated waters of the State by the RWQCB, and compensatory mitigation is considered necessary.

With implementation of **SCA-BIO-9 through SCA-BIO-15**, potential impacts to creeks and wetlands associated with the buildout of the amended Master Plan would be less-than-significant.

**Impact:** Less-than-significant

Although no additional mitigation is required, **Mitigation Measure-BIO-1** has been included to further reduce this less-than-significant impact. **Mitigation Measure-BIO-1** provides specific requirements for the implementation of **SCA-BIO-10** should the RWQCB determine that the 950-square-foot water feature located in the fire road is a regulated water of the State.

**Mitigation Measure-BIO-1:** As required under **SCA-BIO-10**, the project applicant shall obtain all necessary regulatory permits and authorizations and shall comply with all conditions issued by applicable agencies. As part of this process, and in connection with the outfall replacement and the loss of the 950-square-foot potential seasonal wetland, the project applicant shall prepare a wetland delineation as required, and to be verified, by the U.S Army Corps of Engineers to confirm the wetland delineation. In the remote instance that the 950-square-foot potential seasonal wetland is considered a jurisdictional waters of the State by the Regional Water Quality Control Board and compensatory mitigation is required for its loss, the following specific provisions amplify the City's requirements, criteria, and performance standards for compensatory mitigation for this particular circumstance. The project applicant shall retain a qualified wetland specialist to prepare a mitigation program that shall be implemented by the project applicant. If one is required, the mitigation program shall be approved by the Regional Water Quality Control Board and the City of Oakland and shall include the following components:

- **Replacement Ratio:** Provide for a minimum 1:1 replacement for the potential seasonal wetland, or greater replacement ratio as may be required by the Regional Water Quality Control Board.
- **Replacement Location:** The replacement wetlands shall be located within Knowland Park. Replacement wetlands shall be created in a location where wetland vegetation is self-sustaining and does not require long-term irrigation beyond initial establishment.
- **Habitat Function and Value:** The replacement wetlands shall have higher habitat functions and values than the existing feature.
- **Planting Plan:** The mitigation program shall contain a planting plan restricted to native wetland and upland species. The planting plan shall specify construction methods, timing

and sequence of the planting, methods for establishing the plants, and invasive species control methods.

- **Success Criteria/Performance Standards:** The mitigation program shall identify success criteria/performance standards based on the characteristics of the replacement wetland type. At a minimum, wetland indicator species shall comprise an absolute cover of 80 percent in the replacement wetlands. These criteria/standards shall be verifiable. The program shall include a description of the parameters to be monitored in order to track whether the replacement wetlands are meeting the criteria/standards and whether adaptive management is required.
- **Maintenance, Monitoring and Reporting:** The mitigation program shall include maintenance, monitoring and reporting requirements. Any created wetland habitat shall be monitored by the qualified wetland specialist for a minimum of three years or until all success criteria have been met. Annual monitoring reports shall be provided to the Regional Water Quality Control Board and City of Oakland by December 31<sup>st</sup> of each monitoring year, shall describe the degree to which performance standards have been met, need for any maintenance, and identify any remedial actions.

**d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?**

Like the approved Master Plan, by extending zoo-related development into the currently undeveloped portion of Knowland Park, the buildout of the amended Master Plan has some potential to interfere with wildlife movement. However, compared to the approved Master Plan, the proposed Master Plan amendment would substantially reduce potential significant impacts on wildlife habitat and movement opportunities. The 1998 MND identified this impact as potentially significant and mitigated to a less-than-significant level. The total acreage of directly affected habitat would be reduced from 36.3 acres to 20.56 acres, with 4.4 acres of temporarily disturbed habitat (see **Table 3.3-1**). In addition, buildout of the amended Master Plan would eliminate the loop road that is allowed by the approved Master Plan and that would enclose an additional 58 acres (see **Table 3.3-1**). In lieu of the loop road, the proposed Master Plan amendment includes a gondola system that would pass over existing woodland, chaparral, and grassland habitat, allowing these areas to remain accessible to small, ground-mobile terrestrial species. The proposed perimeter fence alignment would still interfere with the movement of large animals such as deer and mountain lion, but it would be designed to allow for the passage of small animals along the base of the fence approximately every 300 feet. And the pedestrian trail connecting the California Exhibit with Arroyo Viejo Creek and passing through sensitive chaparral and riparian habitat is no longer proposed as part of the project thereby eliminating the potential impact previously associated with the trail.

Buildout of the amended Master Plan would minimize the adverse effect of the proposed perimeter fence on existing habitat and wildlife movement. As discussed in **Chapter 2, Project**



**Description,** the design of the perimeter fence would include wildlife-friendly undercrossings spaced at approximately 300-foot intervals that would allow for passage of most terrestrial wildlife species with the exception of deer. Compared to the alignment allowed by the approved Master Plan, the alignment has been pulled back in the northwestern portion of the proposed California Exhibit to minimize disturbance of existing chamise-chaparral cover. As a result, over five acres of chaparral and woodland habitat that would be contained within the perimeter fence under the approved Master Plan would remain as part of the larger natural open space area outside the fence alignment. Native wildlife would continue to have unimpeded access along the northern slopes of Knowland Park.

With implementation of the relevant 1998 mitigation measures, including habitat protections provided in Mitigation Measures 13a and 13b, implementation of the HEP, and restrictions called for in Mitigation Measures 13c, together with implementation of the City's Standard Conditions of Approval related to tree removal (**SCA-BIO-1 through SCA-BIO-4**), creek protection (**SCA-BIO-9 through SCA-BIO-14**), and other habitat protections, the buildout of the amended Master Plan would have a less-than-significant impact on wildlife movement in the vicinity. As a result, no conflicts with Policies CO-11.1 and CO-11.2 of the OSCAR Element of the Oakland General Plan, relating to sustaining wildlife populations and protection of wildlife movement opportunities, are anticipated. Arroyo Viejo Creek is identified as a "Potential Wildlife Corridor to be Protected" in Figure 14 of the OSCAR Element of the General Plan, but modifications to this creek corridor are limited to the outfall replacement, bank recountouring and native enhancement plantings proposed as part of the proposed Master Plan amendment, as discussed above under **Criterion c**. These improvements would be installed using sensitive construction practices to minimize short-term disturbance to aquatic habitat, and ultimately would serve to enhance the existing habitat value of the affected reach of Arroyo Viejo Creek.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 13a, 13b, 14d, 14e, and 14h, and revised Mitigation Measures 13c, 14c, and 14g, as listed above under **Criterion a**.

**Significance after Implementation of Mitigation:** Less-than-significant

**e) Would the project fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan?**

There are no applicable habitat conservation plans or natural community conservation plans covering the Master Plan amendment area. Accordingly, the proposed Master Plan amendment would have no impact in relation to this criterion.

**Impact:** No impact

**Mitigation:** None required

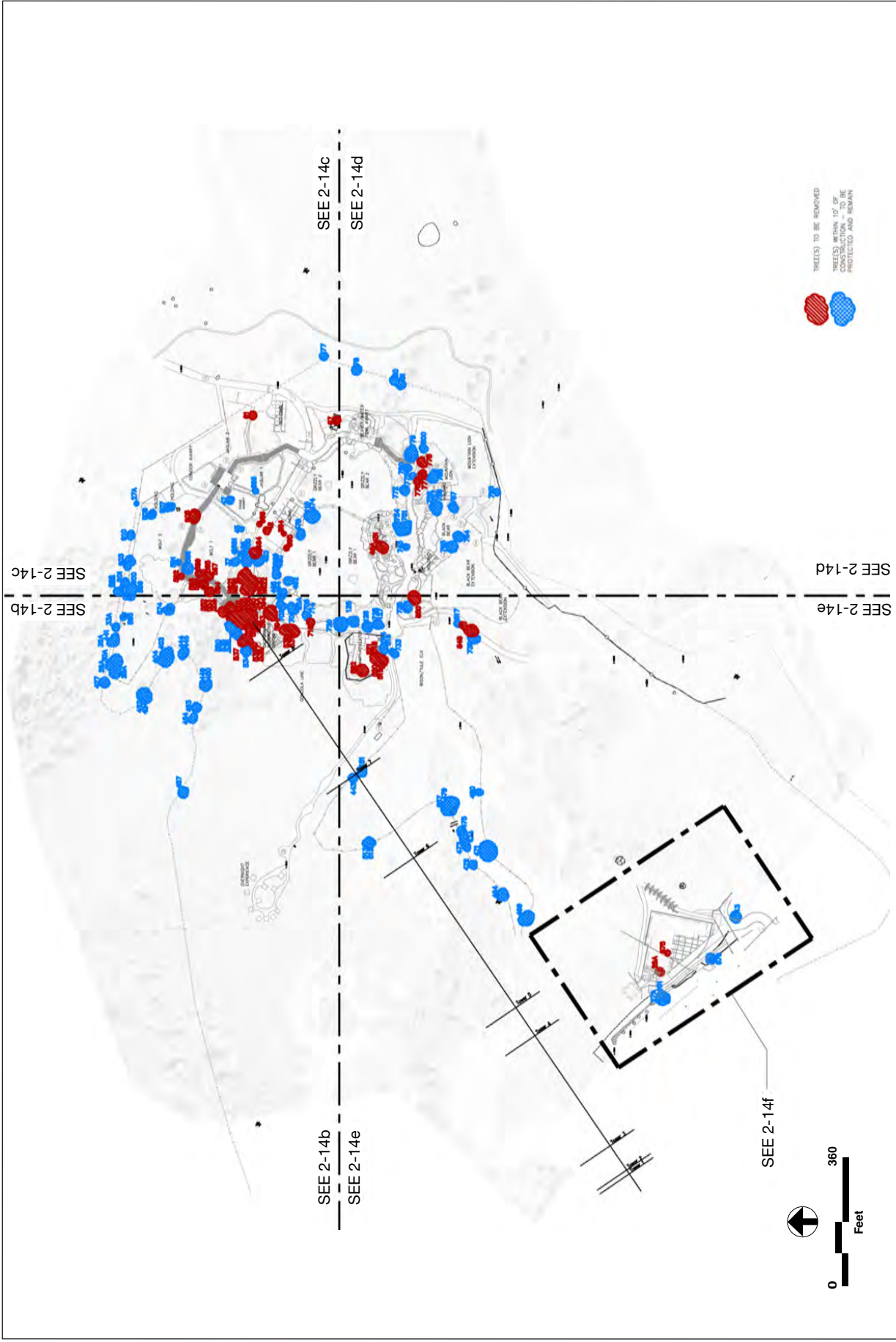
- f) **Would the project fundamentally conflict with the City of Oakland Tree Protection Ordinance (Oakland Municipal Code (OMC) Chapter 12.36) by removal of protected trees under certain circumstances? Factors to be considered in determining significance include: The number, type, size, location and condition of (a) the protected trees to be removed and/or impacted by construction and (b) the protected trees to remain, with special consideration given to native trees?**

The tree diagrams in **Figures 3.4-3** through **3.4-8** identify protected trees to be removed and protected trees within ten feet of anticipated construction as part of the proposed Master Plan amendment. An inventory of protected trees proposed for removal or located within ten feet of construction as part of the proposed Master Plan amendment is contained in **Appendix G-4**. The inventory includes the tree identification number, species, and estimated trunk diameter, and location on the respective tree diagrams in **Figures 3.3-3** through **3.3-8**.

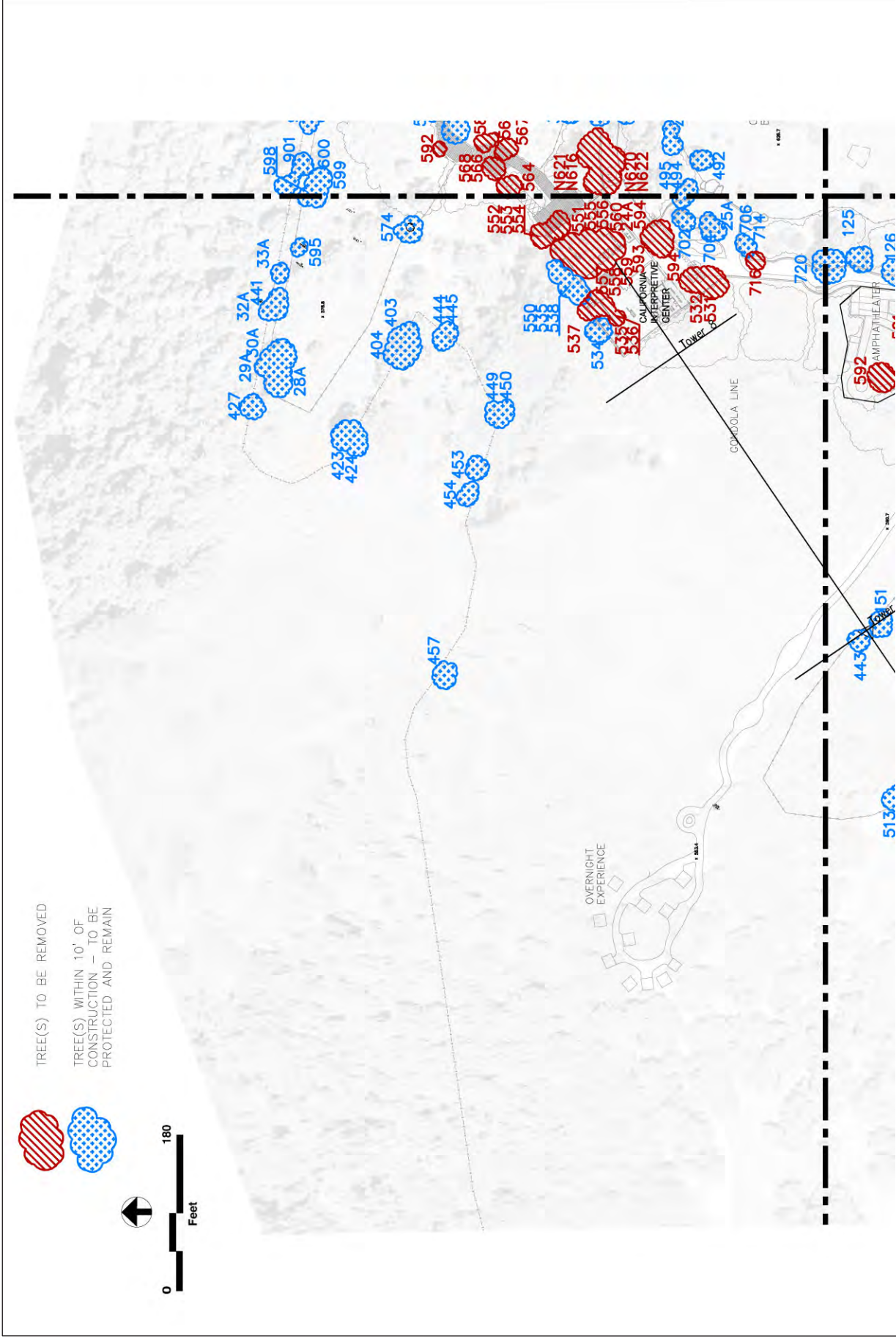
The proposed Master Plan amendment would result in the removal or transplantation of a total of 51 “protected trees” as defined by the City of Oakland Tree Protection Ordinance. Another 110 trees would be preserved but located within ten feet of construction, and could be adversely affected if careful controls are not implemented to avoid damage or loss. Non-protected trees to be removed are limited to two multi-trunk eucalyptus trees to be removed in the California Exhibit area to improve natural habitat.

**Table 3.3-2** compares impacts on protected trees from the proposed Master Plan amendment and the approved Master Plan. The proposed Master Plan amendment would result in removal of fewer protected trees than the approved Master Plan, which would remove 98 protected trees. Most of the trees proposed for removal under the approved Master Plan were associated with the dense woodlands along the northwestern edge of the proposed Master Plan amendment area, where extensive grading would be required to accommodate the approved loop road. Although not quantified in the 1998 MND, a great number of protected trees would be located within ten feet of construction given that the roadway would have pass through dense oak woodland. The proposed Master Plan amendment would replace this road with the proposed gondola people-moving system. This system has been designed to avoid any tree removal, with the gondola passing over the large stand of woodland and chaparral cover along the alignment. Some future trimming of oaks under the gondola alignment may be required to maintain adequate clearance, but the system has been designed to provide a minimum clearance of ten feet over the tops of these mature trees where they would be closest to the gondola cars. Because the trees are mature, it is anticipated that any future trimming would be minimal and would not adversely affect the long-term health of the trees.

Impacts on trees as a result of the proposed Master Plan amendment would be mitigated through implementation of the Tree Protection and Revegetation Plan required in Mitigation Measure 13b of the 1998 MND and compliance with the City's Tree Protection Ordinance and Standard Conditions of Approval (**SCA-BIO-1** through **SCA-BIO-4**). The HEP includes



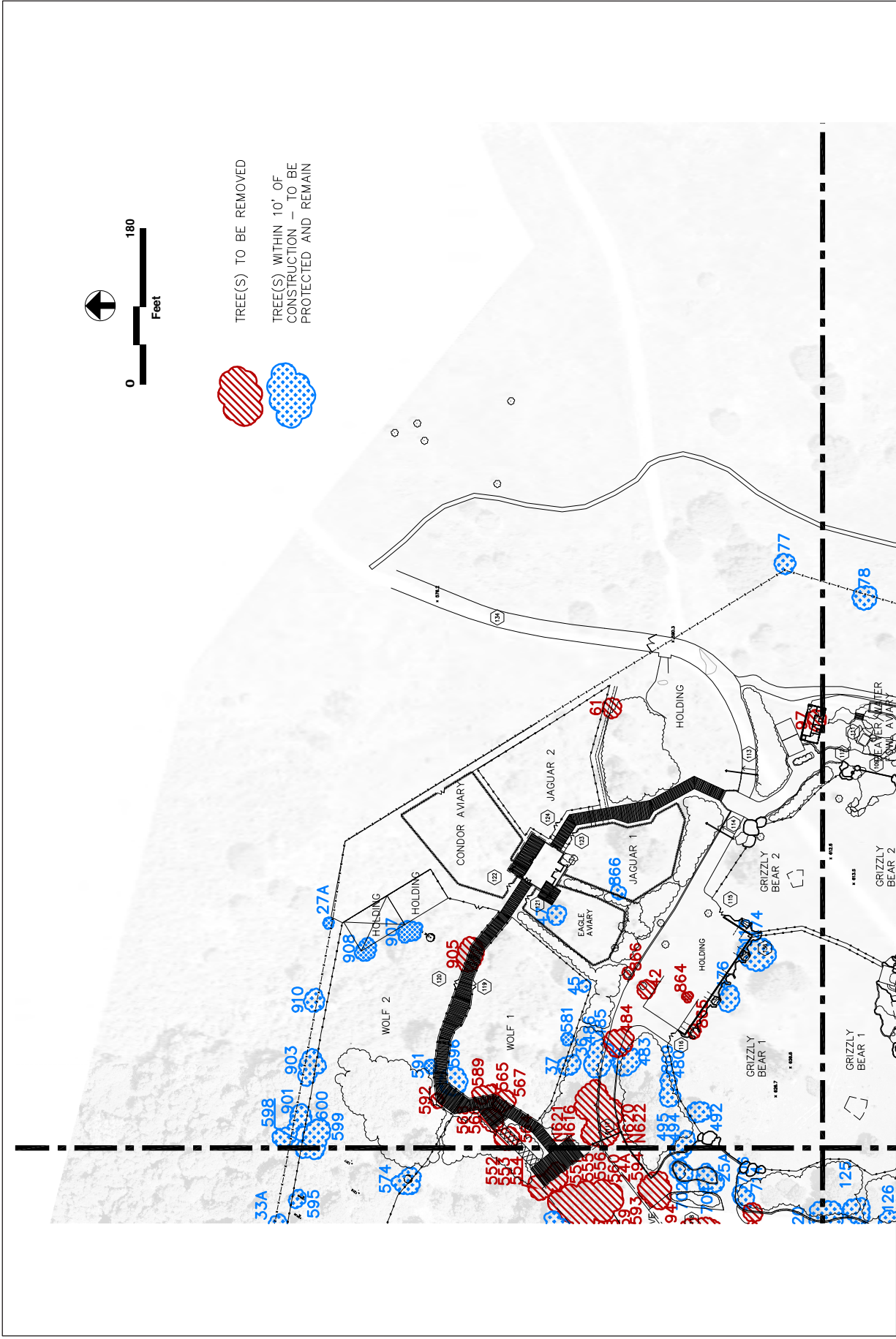
**Figure 3.3-3**  
Proposed Master Plan Amendment: Trees Proposed for Removal  
and Trees Within 10 Feet of Proposed Construction - Key



SOURCE: PJA



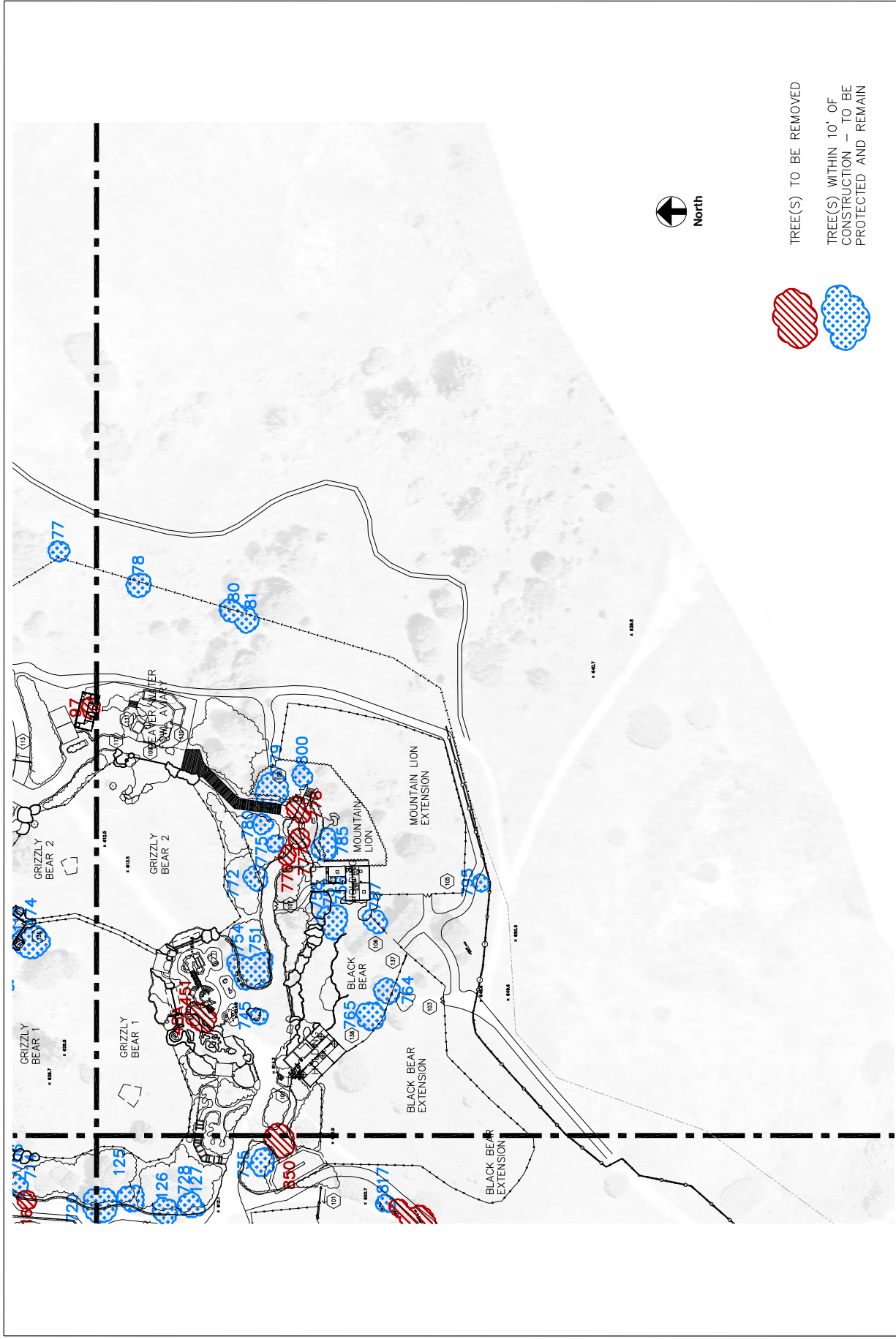
**Figure 3.3-4**  
 Proposed Master Plan Amendment: Trees Proposed for Removal  
 and Trees Within 10 Feet of Proposed Construction – Area 1



SOURCE: PJA



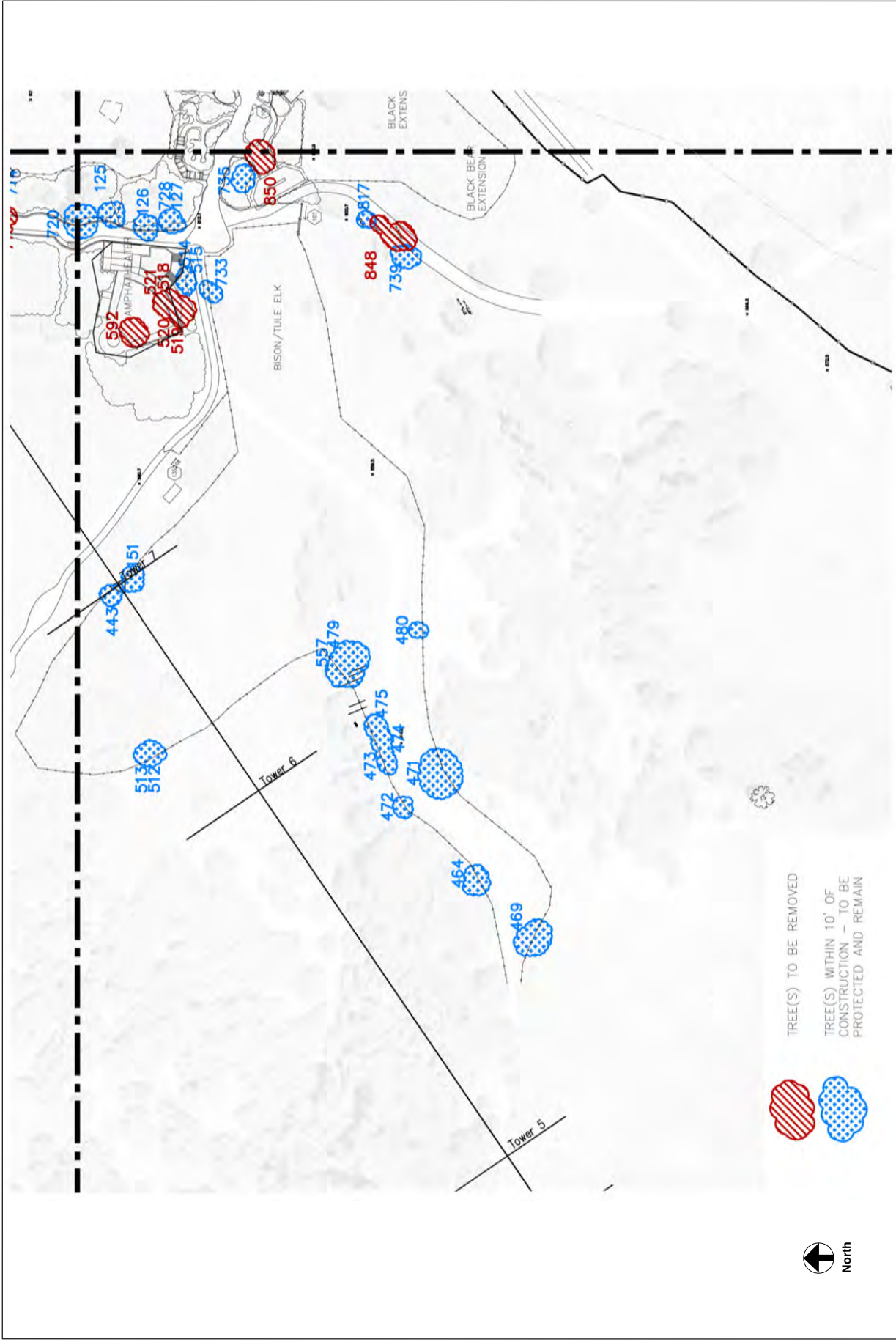
**Figure 3.3-5**  
Proposed Master Plan Amendment: Trees Proposed for Removal  
and Trees Within 10 Feet of Proposed Construction – Area 2



SOURCE: PJA

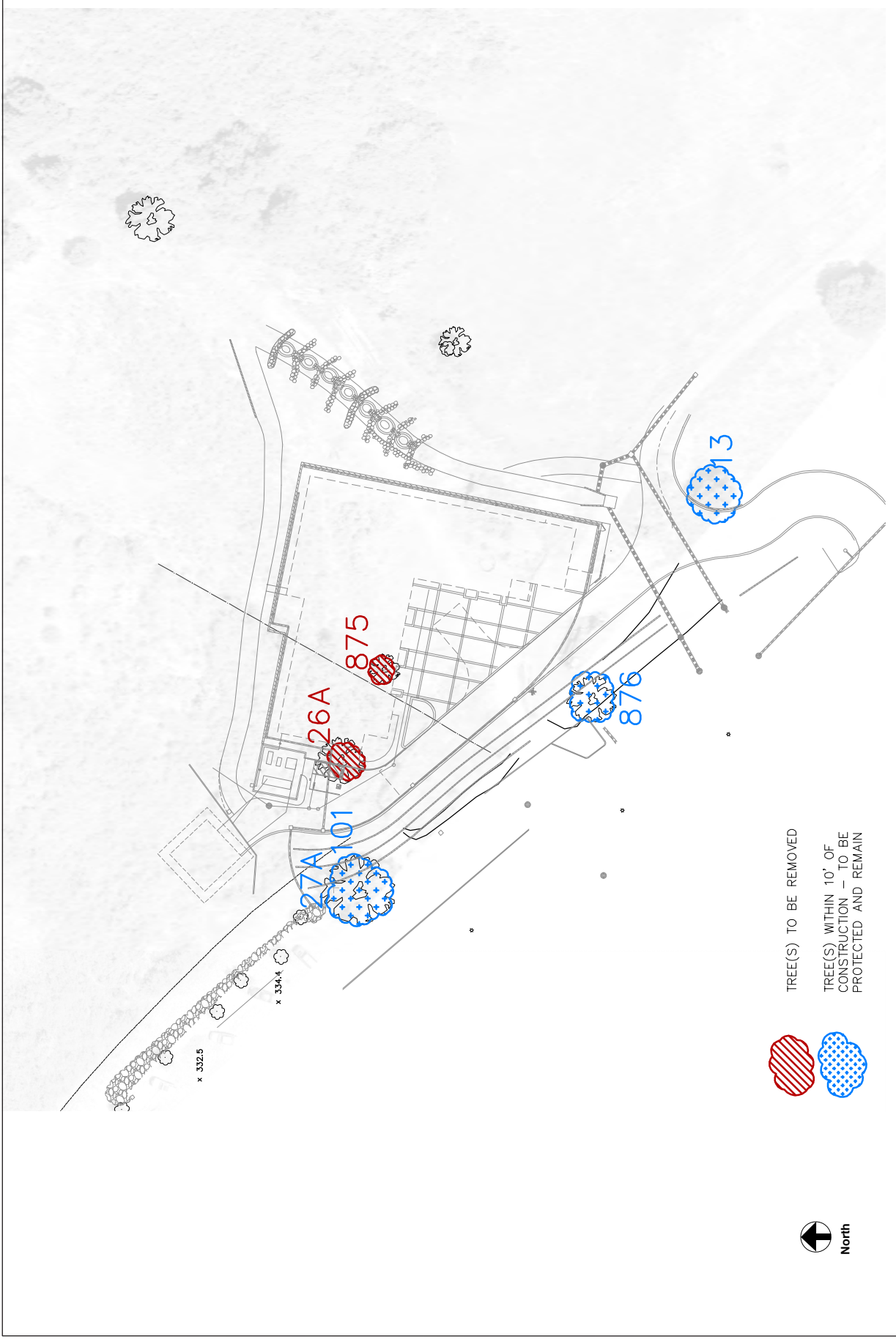


**Figure 3.3-6**  
 Proposed Master Plan Amendment: Trees Proposed for Removal  
 and Trees Within 10 Feet of Proposed Construction – Area 3



SOURCE: PJA

**Figure 3.3-7**  
 Proposed Master Plan Amendment: Trees Proposed for Removal  
 and Trees Within 10 Feet of Proposed Construction - Area 4



SOURCE: PJA

**Figure 3.3-8**  
 Proposed Master Plan Amendment: Trees Proposed for Removal  
 and Trees Within 10 Feet of Proposed Construction – Area 5



**TABLE 3.3-2: PROTECTED TREE IMPACTS – APPROVED MASTER PLAN AND PROPOSED MASTER PLAN AMENDMENT**

	Approved Master Plan	Proposed Master Plan Amendment
<b>Number of Protected Trees to be Removed</b>		
Native Species	73	51
Non-Native Species	25	0
<b>Total</b>	<b>98</b>	<b>51</b>
<b>Number of Protected Trees Within 10 Feet of Construction</b>		
Native Species	Not recorded	92
Non-Native Species	Not recorded	16
<b>Total</b>	<b>Not recorded</b>	<b>110</b>

Source: PJA

provisions related to native tree protection and replacement (see HEP in **Appendix G-2**). To account for tree loss, Mitigation Measure 13b from the 1998 MND is revised to ensure that tree loss is further minimized through field adjustments during installation of the perimeter fence and other improvements, where feasible, and to ensure that there is a balance in adequately protecting and enhancing grassland resources as part of implementing the HEP. With implementation of the revised Mitigation Measure 13b and relevant provisions of the HEP, and adherence to the City's Standard Conditions of Approval (**SCA-BIO-1 through SCA-BIO-4**), the proposed Master Plan amendment would ensure compliance with Policies CO-7.3 and CO-7.4 from the OSCAR Element of the Oakland General Plan, related to maintaining woodland cover and minimizing tree removal.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measure 13a and as revised below.

#### **Revisions to Mitigation Measure 13b.**

13b) A Tree Protection and Revegetation Plan shall be prepared to protect, replace, and preserve trees on the project site. The Plan shall include the following:

- Native trees lost to development shall be replanted at a minimum ratio of 3:1. Non-native trees lost to development shall be replanted with native trees at a minimum ratio of 1:1.
- Every 10 years, prepare a census of trees qualifying for protection under the Oakland Tree Protection Ordinance within the project area. The census will document the condition of such trees, and recommend actions to extend the life and health of the trees. Recommended actions could include protective devices for reduction of vandalism, excessive treading by pedestrians or rubbing of bark, modification of

drainage, erosion or sedimentation to protect trees, and modification of irrigation patterns to reduce pathogens. Recommendations and actions taken would be reported to the City of Oakland and the Department of Fish and Game.

- Protection of oaks in Upper Knowland Park outside of the developed areas of the Zoo will be addressed through the development of a management element for Upper Knowland Park. ~~Since a closed canopy oak woodland is a “fire safe” vegetation type and is visually pleasing, the maximum natural extent of oak woodland may be the management goal.~~ Management practices needed to achieve and maintain oak woodland and forest are: a minimum of grazing livestock, especially during the dry months; few fires; and slope stability. Maintenance of oak woodland would dovetail with weed control measures discussed under Mitigation Measure 13a and the need to provide adequate mitigation for the loss of grassland habitat as provided in the Habitat Enhancement Plan.
- The perimeter fence alignment and exhibit enclosure fencing shall be field-adjusted during installation to further reduce the need to remove protected trees and minimize disturbance in close proximity to the tree root systems. The final alignment of both the perimeter fencing and enclosure fencing shall be overseen by a certified arborist and adjustments made, where feasible, to minimize removal and damage to protected trees. Where tree removal is unavoidable, replacement plantings shall be provided consistent with the City’s Standard Conditions of Approval.

**Significance after Implementation of Mitigation:** Less-than-significant

- g) Would the project fundamentally conflict with the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16) intended to protect biological resources? Although there are no specific, numeric/quantitative criteria to assess impacts, factors to be considered in determining significance include whether there is substantial degradation of riparian or aquatic habitat through: (a) discharging a substantial amount of pollutant into a creek; (b) significantly modifying the natural flow of the water; (c) depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability; or (d) adversely impacting the riparian corridor by significantly altering vegetation or wildlife habitat.**

The buildout of the amended Master Plan would not conflict with the City’s Creek Protection Ordinance and would not discharge substantial amounts of pollutants, significantly modify natural flows, deposit substantial amounts of material, cause bank erosion or instability, or significantly alter vegetation or wildlife habitat in creeks within or near the Master Plan area.

The outfall replacement, bank recountouring, and native plant enhancement proposed as part of the Master Plan amendment would all occur within the Creek Protection Zone of Arroyo Viejo Creek. As discussed above under **Criterion c**, however, these modifications would be relatively minor, could be accomplished consistent with the City’s relevant Standard Conditions of Approval (**SCA-BIO-9 through SCA-BIO-14**), and would ultimately serve to improve the natural riparian habitat along this segment of Arroyo Viejo Creek. No substantial conflicts with

the City's Creek Protection Ordinance would occur with implementation of these creek-related improvements.

Arroyo Viejo Creek qualifies as a "creek" under the City's Creek Protection Ordinance, and it appears that the ephemeral drainages features in the Master Plan area qualify as well.

**Figure 3.3-2** shows the assumed Creek Protection Zone delineated by the Oakland Zoo's civil engineer around each of the creeks in the Master Plan area, mapped in accordance with the Creek Protection Ordinance. The Creek Protection Zone encompasses the entire work area where the proposed drainage outfall modification work is proposed along Arroyo Viejo Creek (see **Figure 2-19**).

As discussed under **Criterion c**, no significant direct impacts on wetlands and waters are anticipated under the proposed Master Plan amendment. No creeks would be directly affected in the vicinity of the California Exhibit area, as indicated in **Figure 3.3-2**.

Improvements associated with the proposed Veterinary Medical Hospital would be located over 100 feet downstream from the current terminus of the small ephemeral drainage channel to the north. Additionally, with the proposed Master Plan amendment, the alignment of the proposed perimeter fence has been intentionally adjusted to avoid the ephemeral drainages located to the southwest, southeast, and northwest.

The City's Creek Protection Ordinance includes permitting guidelines for development and construction projects taking place in or near creeks, and requires that a Creek Protection Plan be prepared in advance of issuance of a Creek Protection Permit. The City's Standard Conditions of Approval are typically applied as development standards for projects affecting creek resources. Implementation of the City's Standard Conditions of Approval (**SCA-BIO-9 through SCA-BIO-14** and **SCA HYDRO-1, SCA-HYDRO-3** and **SCA-HYDRO-4**) would ensure that direct and indirect impacts on these features are adequately avoided and potential impacts on creeks and wetlands would be less than significant.

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.3.6 CUMULATIVE IMPACTS

The geographic area for assessing the potential for cumulative biological resource impacts is the immediately surrounding area, including Knowland Park, the existing zoo facilities, and the immediately surrounding residential neighborhoods. The Existing Conditions subsection (**Subsection 3.3.4**) describes the past and present development in this area. The buildout of the amended Master Plan is the only reasonably foreseeable future project in this geographic area. The Knowland Park area outside of the Master Plan boundary is zoned Open Space (Resource

Conservation Area) and no future development is expected at this time. The immediately surrounding residential areas are largely built out, and future improvements to existing houses or the potential construction of houses on any vacant parcels would be unlikely to have an impact on biological resources, given the urban nature of this area. Any such improvements would likely be located too far from the Master Plan area to combine with the amended Master Plan to create a cumulative impact. The two development projects anticipated elsewhere in southeast Oakland – the Leona Quarry and Oak Knoll projects – are located too far from the Master Plan area for the biological resource impacts of these projects to combine with the amended Master Plan.

All of the potentially significant biological resource impacts of the buildout of the amended Master Plan would be reduced to less-than-significant levels. As described above, the Master Plan amendment generally would reduce the impacts on special-status species that would be expected under the approved Master Plan. Native grassland impacts would be mitigated through the HEP, which requires mitigation for grasslands affected by the amended Master Plan through invasive species removal and grassland restoration at a 2:1 ratio in other areas Knowland Park. Nesting birds would be protected during construction under mitigation measures from the 1998 MND and **SCA-BIO-1**. Mitigation for the Alameda whipsnake under the revised mitigation measures from the 1998 MND and **SCA-BIO-5 through SCA-BIO-8** would ensure that potential impacts on Alameda whipsnake and its habitat are reduced to less-than-significant levels. Additionally, the HEP would protect and enhance Alameda whipsnake habitat in the California Exhibit area and Upper Knowland Park through invasive species removal and long-term management. Although no impacts on California red legged frog or western pond turtle are expected from the replacement of the deteriorated outfall, the City's **SCA-BIO-13** would ensure that any such potential impact would be avoided or mitigated. Additionally, the proposed outfall would not remove any wetlands and would comply with the terms of the required state and federal authorizations. Similarly, the possible loss of the 950-square foot potential seasonal wetland would be subject to **SCA-BIO-10** requiring review and compensatory mitigation as further detailed in **Mitigation Measure BIO-1**. The proposed Master Plan amendment also must comply with the City's Tree Protection Ordinance and the Creek Protection Ordinance, which are designed to prevent and mitigate potential impacts on significant trees and local creeks. Through implementation of the invasive species control and native revegetation elements of the HEP, the biological resources and diversity in Upper Knowland Park, which are currently threatened by the invasion of French broom and other non-native species, would be protected and enhanced.

Other past, present, and reasonably foreseeable future projects in the surrounding area also have been, and would be, subject to the City's relevant Standard Conditions of Approval and State and federal regulatory permitting requirements. Environmental review of other development projects in the vicinity of the Master Plan area has ensured, and will continue to ensure, that important biological resources are identified and that appropriate avoidance, impact reduction,

protection, management, and other mitigation measures are imposed in order to avoid or reduce any significant adverse impacts.

Consequently, the proposed Master Plan amendment would not result in, or make a considerable contribution to, any significant adverse cumulative biological resource impacts in the area.

### 3.3.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new biological resources impacts or a substantial increase in the severity of previously identified biological resources impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less-than-significant. Previously imposed mitigation measures from the 1998 MND have been identified and, where appropriate, have been clarified, refined, revised, or deleted. This section also identified the applicable provisions of the City's Standard Conditions of Approval. A new mitigation measure has been identified which would further reduce an already-less-than-significant impact.

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## 3.4 GEOLOGY AND SOILS

This section evaluates potential geological and soil impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant geological and soils impacts not identified in the 1998 MND or a substantial increase in the severity of the previously identified impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant geological and soil impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. This section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required.

### 3.4.1 PRIOR MND ANALYSIS AND CONCLUSIONS

#### 3.4.1.1 1998 Prior MND Impact Findings

The 1998 MND concluded that the Master Plan would have potentially significant impacts due to (1) hazards related to unstable slopes, (2) short-term erosion during construction, (3) water quality degradation and potential changes to capacity and flow patterns in Arroyo Viejo Creek and the site's several intermittent and ephemeral waterways due to construction-period erosion and uncontrolled surface water runoff (addressed in the Hydrology and Water Quality section), (4) expansive soils, and (5) earthquake hazards.

#### 3.4.1.2 1998 MND Mitigation Measures

For the potential impact related to unstable slopes, the 1998 MND identified the following mitigation measures that would reduce the impact to a less-than-significant level:

- 1a) The geotechnical report prepared for the Center for Science and Environmental Education and the African Savanna Exhibit recommended the use of retaining walls, the creation of keyed and benched slopes, proper slope gradients, proper fill compaction, removal of expansive soils and the development of proper drainage facilities to reduce slope failure. These recommendations as well as any additional suggestions from the City of Oakland Building and Engineering Departments shall be adhered to. *(NOTE: This mitigation measure is not applicable to the proposed Master Plan amendment because the Center for Science and Environmental Education and the African Savanna Exhibit have been completed.)*
- 1b) City of Oakland standards for engineering controls and slope stabilization outlined in the Oakland Grading Ordinance shall be adhered to prior to and during facility and roadway construction. *(NOTE: This mitigation measure is replaced with **SCA-GEO-1** and **SCA-GEO-2**, which address engineering requirements; see **Subsection 3.4.5.3, Criterion a** below.)*
- 1c) Additional geotechnical studies shall be required prior to design and construction of the remaining proposed Master Plan buildings, roads and facilities. *(NOTE: This mitigation*

*measure is replaced with **SCA-GEO-1**, which requires geotechnical reports for each construction site; see **Subsection 3.4.5.3, Criterion a** below.)*

- 1d) All proposed facilities shall be constructed in conformance with the Uniform Building Code and California Amendments, and incorporate specific engineering design recommendations from the geotechnical and soils reports. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment using the updated 2007 version of the California Building Code as adopted by the City on January 1, 2008, and is supplemented with **SCA-GEO-1** and **SCA-GEO-2**; see **Subsection 3.4.3.3** and **Subsection 3.4.5.3, Criterion a** below.)*
- 1e) Close construction inspection, testing and quality control shall be performed by the proposed geotechnical engineer or engineering geologist to ensure that site grading plans and geotechnical recommendations criteria are adequate and appropriate. *(NOTE: This mitigation measure is replaced with **SCA-GEO-1** and **SCA-GEO-2**, which address adequate testing and quality control measures; see **Subsection 3.4.5.3, Criterion a** and **Criterion c** below.)*

For the potential short-term erosion impact, the 1998 MND concluded that compliance with the City's grading regulations (Ordinance No. 10312) codified in the Oakland Municipal Code as Section 15.04.780 along with the following mitigation measures would reduce the impact to a less-than-significant level:

- 2a) Facilities and infrastructure improvements should be designed to control runoff so that it is not directed over unprotected slopes. Drainage improvements shall be designed to adequately collect surface water runoff and convey it to the proper storm drain system. A permanent storm drain shall be designed, installed, and maintained to catch water from the existing natural drainage pattern in Knowland Park above Stella Street. The water will be redirected to City storm drain system. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment and is supplemented with **SCA-HYDRO-1 through SCA-HYDRO-5** see **Section 3.7, Hydrology and Water Quality, Subsection 3.7.5.3, Criteria a, e, f, and g; SCA-BIO-9 through SCA-BIO-14** see **Subsection 3.3, Biological Resources, Subsection 3.3.5.2, Criteria c and g; and SCA-SERVICES-4**, see **Section 3.10 Public Services and Utilities, Subsection 3.10.5, Criteria a, b, and c**. These Standard Conditions of Approval regulate drainage, erosion control, water quality, and creek protection.)*
- 2b) The construction contractor shall use water bars, temporary swales and culverts, mulch and jute netting, silt fences, straw bales and sediment traps to prevent surface water from eroding soil and transporting it to nearby creeks and natural drainages. These and other methods outlined in the California Stormwater Best Management Practice Handbook, Construction Activity, shall be implemented to reduce erosion. *(NOTE: This mitigation measure is replaced with **SCA-HYDRO-1 through SCA-HYDRO-5** see **Section 3.7, Hydrology and Water Quality, Subsection 3.7.5.3, Criteria a, e, f, and g; and SCA-BIO-9 through SCA-BIO-12** see **Section 3.3 Biological Resources, Subsection 3.3.5.2, Criteria c and g**. These Standard Conditions of Approval regulate drainage, erosion control, water quality and creek protection.)*
- 2c) Grading and construction activities shall be restricted to the dry season. Exposed surface areas shall be watered down, especially during construction, to reduce wind erosion. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment; see **Subsection 3.4.5.3**,*



**Criterion b below; and Section 3.7 Hydrology and Water Quality, Subsection 3.7.5.3, Criteria a and c.)**

- 2d) Erosion control methods and implementation procedures shall be monitored during construction and modified as conditions warrant. *(NOTE: This mitigation measure is replaced with **SCA-HYDRO-1**; see Section 3.7 Hydrology and Water Quality, Subsection 3.7.5.3, Criterion a.)*

For the potential impact on water quality, channel capacity, and flow patterns in Arroyo Viejo Creek and the site's intermittent and ephemeral waterways due to construction-period erosion and uncontrolled surface water runoff, the 1998 MND concluded that compliance with the City's grading regulations (Ordinance No. 10312) codified in the Oakland Municipal Code as Section 15.04.780 and the following mitigation measure would reduce the impact to a less-than-significant level:

- 3a) Mitigation Measures 2a through 2d shall be implemented. *(NOTE: Refer to discussion above.)*

For the potential impact related to expansive soils, the following mitigation measures, as identified in the 1998 MND and modified by the City Council, were found to reduce the impact to a less-than-significant level:

- 4a) Implement the recommendations from the Harza report such as removal of expansive soils, clearing of rich compressible organic soils and use of appropriately engineered fill materials shall be adhered to for the development of the Center for Science and Education and the African Savanna Exhibit. *(NOTE: This mitigation measure is not applicable to the proposed Master Plan amendment because the Center for Science and Education and the African Savanna Exhibit have been completed.)*
- 4b) Additional geotechnical and soils studies for the presence of expansive soils shall be required prior to design and construction of the remaining buildings, roads and facilities proposed by the Master Plan. *(NOTE: This mitigation measure is replaced with **SCA-GEO-1**, which addresses soils conditions; see Subsection 3.4.5.3, Criterion c below.)*
- 4c) New structures and facilities proposed by the Master Plan shall incorporate the recommendations of the additional geotechnical reports and any additional requirements from the City of Oakland. *(NOTE: This mitigation measure is replaced with **SCA-GEO-1** and **SCA-GEO-2**, which require geotechnical and soils reports for each construction site; see Subsection 3.4.5.3, Criterion a through c below.)*

For the potential impact related to earthquake hazards, the following mitigation measures, as identified in the 1998 MND and modified by the City Council, were found to reduce the impact to a less-than-significant level:

- 5a) The geotechnical recommendations in the Harza report for the Center for Science and Environmental Education and the African Savanna Exhibit located within the Alquist-Priolo Zone shall be incorporated into the final design and siting of these facilities. Geotechnical

recommendations in the supplemental Kleinfelder report shall also be incorporated into the final design of the Center. (NOTE: *This mitigation measure is not applicable to the proposed Master Plan amendment because the Center for Science and Environmental Education and the African Savanna Exhibit have been completed.*)

- 5b) Geotechnical evaluations shall be performed for each additional facility proposed by the Master Plan and recommendations to reduce seismic-related hazards shall be incorporated into the design and siting of these new facilities. (NOTE: *This mitigation measure is replaced with **SCA-GEO-2**, which requires a geotechnical report for each construction site; see **Subsection 3.4.5.3, Criterion a** below.*)
- 5c) All proposed structures shall be designed and constructed in accordance with the Uniform Building Code and California Amendments. The interpretation of the applicability of the appropriate UBC standard for each proposed structure shall be determined by the Oakland Building and Engineering staff at the time of preliminary plan submittal. (NOTE: *This mitigation measure is applicable to the proposed Master Plan amendment using the updated 2007 version of the California Building Code as adopted by the City on January 1, 2008, and is supplemented with **SCA-GEO-1**; see **Subsection 3.4.5.3, Criterion a** below.*)
- 5d) Proper earthquake-resistant techniques for securing indoor fixtures, machinery and furnishings within proposed structures shall be used during construction to minimize the risk of damage or injury from toppled objects. (NOTE: *This mitigation measure is applicable to the proposed Master Plan amendment; see **Subsection 3.4.5.3, Criterion a** below.*)
- 5e) The Zoo's Emergency Preparedness and Response Plan and Animal Capture Plan shall be updated as proposed facilities are developed. The Zoo and Neighborhood (KPHA and SHRA) Associations will work together to educate the neighborhood about the Zoo's Emergency Preparedness and Response Plan and how it is implemented. This will be accomplished through written communication and a phone tree. The Zoo will provide a demonstration to the representatives of KPHA and SHRA of the safety of the animal enclosures in case of a natural disaster. (NOTE: *This mitigation measure is applicable to the proposed Master Plan amendment; see **Subsection 3.4.5.3, Criterion a** below. This mitigation measure is also addressed in **Section 3.6, Hazards and Hazardous Materials, Subsection 3.6.5 Criterion g**.)*
- 5f) A balanced cut and fill grading plan shall be used for all project development so import and export of fill is minimized. (NOTE: *This mitigation measure is not applicable to the proposed Master Plan amendment because the Master Plan amendment proposes a balanced grading plan; see **Chapter 2, Project Description, Subsection 2.4.6**.*)

### 3.4.2 STANDARD CONDITIONS OF APPROVAL

Since City approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that relate to geology and soils and that would apply to the proposed Master Plan amendment are listed below. If the City approves the Master Plan amendment, these Conditions of Approval would be adopted as requirements of the Master Plan amendment and would ensure no significant impacts on geology and soils occur. As a result, the Conditions of Approval are not listed as mitigation measures.

### SCA-GEO-1: Soils Report

A preliminary soils report for each construction site within the project area shall be required as part of this project and submitted for review and approval by the Building Services Division. The soils reports shall be based, at least in part, on information obtained from on-site testing. Specifically the minimum contents of the report should include:

- A. Logs of borings and/or profiles of test pits and trenches:
  - a) The minimum number of borings acceptable, when not used in combination with test pits or trenches, shall be two (2), when in the opinion of the Soils Engineer such borings shall be sufficient to establish a soils profile suitable for the design of all the footings, foundations, and retaining structures.
  - b) The depth of each boring shall be sufficient to provide adequate design criteria for all proposed structures.
  - c) All boring logs shall be included in the soils report.
- B. Test pits and trenches
  - a) Test pits and trenches shall be of sufficient length and depth to establish a suitable soils profile for the design of all proposed structures.
  - b) Soils profiles of all test pits and trenches shall be included in the soils report.
- C. A plat shall be included which shows the relationship of all the borings, test pits, and trenches to the exterior boundary of the site. The plat shall also show the location of all proposed site improvements. All proposed improvements shall be labeled.
- D. Copies of all data generated by the field and/or laboratory testing to determine allowable soil bearing pressures, shear strength, active and passive pressures, maximum allowable slopes where applicable and any other information which may be required for the proper design of foundations, retaining walls, and other structures to be erected subsequent to or concurrent with work done under the grading permit.
- E. Soils Report. A written report shall be submitted which shall include, but is not limited to, the following:
  - a) Site description;
  - b) Local and site geology;
  - c) Review of previous field and laboratory investigations for the site;
  - d) Review of information on or in the vicinity of the site on file at the Information Counter, City of Oakland, Office of Planning and Building;
  - e) Site stability shall be addressed with particular attention to existing conditions and proposed corrective attention to existing conditions and proposed corrective actions at locations where land stability problems exist;

- f) Conclusions and recommendations for foundations and retaining structures, resistance to lateral loading, slopes, and specifications, for fills, and pavement design as required;
  - g) Conclusions and recommendations for temporary and permanent erosion control and drainage. If not provided in a separate report they shall be appended to the required soils report;
  - h) All other items which a Soils Engineer deems necessary;
  - i) The signature and registration number of the Civil Engineer preparing the report.
- F. The Director of Planning and Building may reject a report that she/he believes is not sufficient. The Director of Planning and Building may refuse to accept a soils report if the certification date of the responsible soils engineer on said document is more than three years old. In this instance, the Director may be require that the old soils report be recertified, that an addendum to the soils report be submitted, or that a new soils report be provided.

### **SCA-GEO-2: Geotechnical Report**

- a) A site-specific, design level, landslide or liquefaction geotechnical investigation for each construction site within the project area shall be required as part of this project and submitted for review and approval by the Building Services Division. Specifically:
  - i. Each investigation shall include an analysis of expected ground motions at the site from identified faults. The analyses shall be accordance with applicable City ordinances and polices, and consistent with the most recent version of the California Building Code, which requires structural design that can accommodate ground accelerations expected from identified faults.
  - ii. The investigations shall determine final design parameters for the walls, foundations, foundation slabs, surrounding related improvements, and infrastructure (utilities, roadways, parking lots, and sidewalks).
  - iii. The investigations shall be reviewed and approved by a registered geotechnical engineer. All recommendations by the project engineer, geotechnical engineer, shall be included in the final design, as approved by the City of Oakland.
  - iv. The geotechnical report shall include a map prepared by a land surveyor or civil engineer that shows all field work and location of the “No Build” zone. The map shall include a statement that the locations and limitations of the geologic features are accurate representations of said features as they exist on the ground, were placed on this map by the surveyor, the civil engineer or under their supervision, and are accurate to the best of their knowledge.
  - v. Recommendations that are applicable to foundation design, earthwork, and site preparation that were prepared prior to or during the projects design phase, shall be incorporated in the project.
  - vi. Final seismic considerations for the site shall be submitted to and approved by the City of Oakland Building Services Division prior to commencement of the project.

- vii. A peer review is required for the geotechnical report. Personnel reviewing the geotechnical report shall approve the report, reject it, or withhold approval pending the submission by the applicant or subdivider of further geologic and engineering studies to more adequately define active fault traces.

**SCA-HYDRO-1: Stormwater Pollution Prevention Plan (SWPP)**

(Please refer to **Section 3.7, Hydrology and Water Quality.**)

**SCA-HYDRO-2: Drainage Plan for Projects on Slopes Greater Than 20 Percent**

(Please refer to **Section 3.7, Hydrology and Water Quality.**)

**SCA-HYDRO-5: Erosion, Sedimentation and Debris Control Measures**

(Please refer to **Section 3.7, Hydrology and Water Quality.**)

**SCA-BIO-9: Creek Protection Plan**

(Please refer to **Section 3.3 Biological Resources**)

**SCA-BIO-10: Regulatory Permits and Authorization**

(Please refer to **Section 3.3 Biological Resources**)

**SCA-BIO-11: Creek Monitoring**

(Please refer to **Section 3.3 Biological Resources**)

**SCA-BIO-12: Creek Landscaping Plan**

(Please refer to **Section 3.3 Biological Resources**)

### 3.4.3 UPDATED REGULATORY SETTING

State and local governments administer programs for reducing geologic hazards and requirements for identifying and avoiding active faults, ground failure, and the effects of seismic ground shaking. Since adoption of the 1998 MND, the California Building Code and City of Oakland Municipal Code and General Plan have been updated. The buildout of the amended Master Plan amendment must comply with current regulations. Presented below is a summary of applicable regulations.

### **3.4.3.1 Alquist-Priolo Earthquake Fault Zoning Act**

The California Legislature passed the Alquist-Priolo Earthquake Fault Zoning Act in 1972 to mitigate the hazard of surface faulting to structures for human occupancy (California Division of Mines and Geology 1997). The California Public Resources Code, Division 2 Chapter 7.5, commencing with Section 2621, provides the regulations applicable to projects located within Alquist-Priolo Earthquake Fault Zones. The primary purpose of the Act is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, the city or county with jurisdiction must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active or potentially active faults.

The proposed Master Plan amendment area is not located within an Alquist-Priolo Earthquake Fault Zone and procedures and regulations recommended by the California Geological Survey for investigations conducted in such zones do not apply. It is noted that the Hayward Fault, an active Earthquake Fault Zone, passes through the westernmost part of Knowland Park, about 200 feet to the west of the proposed Master Plan amendment area. This active fault is located within an Alquist-Priolo Earthquake Fault Zone as shown on the Earthquake Fault Zone Maps of the Oakland East and San Leandro quadrangles (California Division of Mines and Geology 1982a and 1982b).

### **3.4.3.2 Seismic Hazards Mapping Act**

The California Seismic Hazards Mapping Act of 1990 (California Public Resources Code Sections 2690-2699.6) is designed to protect the public from the effects of seismic hazards other than surface rupture, including strong ground shaking, liquefaction and seismically induced landslides. The Seismic Hazards Mapping Act establishes a statewide public safety standard for mitigation of earthquake hazards based on providing a level of mitigation that would reduce the risk of ground failure during an earthquake to a level that would not result in collapse of a building for human occupancy, but, in most cases, not to a level at which no ground failure would occur. The Act directs the California Geological Survey to identify and map areas prone to the earthquake hazards of liquefaction, seismically induced landslides, and amplified ground shaking. The Act also requires site-specific geotechnical investigations to identify potential seismic hazards and formulate corrective measures to reduce the hazards associated with seismicity and unstable soils prior to issuance of development permits for a project located in a Seismic Hazard Zone. The California Geological Survey has published Special Publication 117A, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (California Geological Survey 2008), to guide the evaluation of seismic hazards and determine mitigation as required by the Act.

Portions of the proposed Master Plan amendment area are located within a Seismic Hazard Zone as shown on maps published by the State of California (California Geological Survey 2003a and 2003b) and are subject to the provisions of the Seismic Hazards Mapping Act. The City of Oakland requires both a soils report that must address site stability issues and corrective measures as outlined in **SCA-GEO-1** and a site-specific design-level landslide or liquefaction geotechnical investigation that must include corrective requirements as outlined in **SCA-GEO-2** (see **Subsection 3.4.2** above).

### 3.4.3.3 California Building Code

Title 24 of the California Code of Regulations, also known as the California Building Code, sets minimum requirements for building design and construction. The 2007 version of the California Building Code was adopted by the State of California and the City of Oakland on January 1, 2008. The California Building Code is a compilation of three types of building standards from three different origins:

- Building standards that have been adopted by state agencies without change from building standards contained in national model codes;
- Building standards that have been adopted and adapted from the national model code standards to meet California conditions; and
- Building standards, authorized by the California legislature, that constitute extensive additions not covered by the model codes that have been adopted to address particular California concerns.

In the context of earthquake hazards, the California Building Code's design standards have a primary objective of assuring public safety and a secondary goal of minimizing property damage and maintaining function during and following seismic events. Specific sections that apply to the proposed Master Plan amendment include Chapter 16, Structural Design, which includes information on soil loads and earthquake loads including seismic safety; Chapter 18, Soils and Foundations, which covers excavations, foundation design, retaining walls, and soils; and Appendix J, Grading, which covers requirements for grading and grading permits. These provisions require preparation of foundation and soils reports and other geotechnical reports that address site-specific conditions, potential hazards and required methods and design parameters for remediating and protecting against potential seismic hazards.

### 3.4.3.4 City of Oakland General Plan

Key geology and soils policies of the Oakland General Plan that are applicable to the proposed Master Plan amendment are listed below. These policies, along with other geology- and soils-related General Plan policies, are discussed in **Section 3.8, Land Use, Recreation and Planning**.

**Open Space, Conservation and Recreation (OSCAR) Element Policies.** The Open Space, Conservation and Recreation (OSCAR) Element of the Oakland General Plan was adopted in June 1996, before the 1998 MND was adopted. The OSCAR Element contains the following geology and soils-related policies relevant to the proposed Master Plan amendment (City of Oakland 1996):

*Policy CO-1.1: Soil Loss in New Development.* Regulate development in a manner which protects soil from degradation and misuse or other activities which significantly reduce its ability to support plant and animal life. Design all construction to ensure that soil is well secured so that unnecessary erosion, siltation of streams, and sedimentation of water bodies does not occur.

*Policy CO-2.1: Slide Hazards.* Encourage development practices which minimize the risk of landsliding.

*Policy CO-2.2: Unstable Geologic Features.* Retain geologic features known to be unstable, including serpentine rock, areas of known landsliding, and fault lines, as open space. Where feasible, allow such lands to be used for low-intensity recreational activities.

*Policy CO-2.3: Development on Filled Soils.* Require development on filled soils to make special provisions to safeguard against subsidence and seismic hazards.

*Policy CO-2.4: Hillside Cuts and Fills.* Minimize hillside cuts and fills and the removal of desirable vegetation. Limit large-scale grading to those areas where it is essential to development. Where hillside grading does occur, reshape the terrain in smooth, naturally appearing contours rather than flat, terraced benches. Immediately replant and reseed graded areas to reduce soil loss.

**Safety Element Policies.** The Safety Element of the Oakland General Plan was adopted in November 2004, after the adoption of the 1998 MND. The Safety Element contains the following policies relevant to the proposed Master Plan amendment (City of Oakland 2004):

*Policy GE-1.* Develop and continue to enforce and carry out regulations and programs to reduce seismic hazards from seismically triggered phenomena.

*Policy GE-2.* Continue to enforce ordinances and implement programs that seek specifically to reduce the landslide and erosion hazard.

### 3.4.3.5 City of Oakland Municipal Code

The City of Oakland Municipal Code includes the construction codes and amendments adopted by the City of Oakland. These include the California Building Code, among other codes used in construction within the City of Oakland. The California Building Code Volumes 1 and 2, 2007 Edition, including the California Building Standards, 2007 Edition, published by the International Conference of Building Officials, and as modified by the amendments, additions, and deletions set forth in Title 15, was adopted by reference as the building code of the City of Oakland on January 1, 2008.



The City of Oakland administers a number of ordinances aimed at mitigating seismic and other geologic hazards as chaptered in the Municipal Code, including:

*Chapter 15.04: Oakland Amendments to the California Building, Electrical, Mechanical and Plumbing Codes.* This chapter identifies City of Oakland amendments to the California Model Building Codes. This chapter of the Oakland Municipal Code is known as the “Oakland Amendments of the 2001 edition of the California Building Standards Code, Part 2 (California Building Code), Part 4 (California Mechanical Code), and Part 5 (California Plumbing Code), and the 2004 edition of the California Building Standards Code, Part 3 (California Electrical Code).”

*Section 15.04.780: Grading, Erosion, and Sedimentation.* Known as the Oakland Grading Ordinance, this section identifies criteria to manage grading, erosion, and sedimentation and requires a grading permit for projects that exceed these criteria.

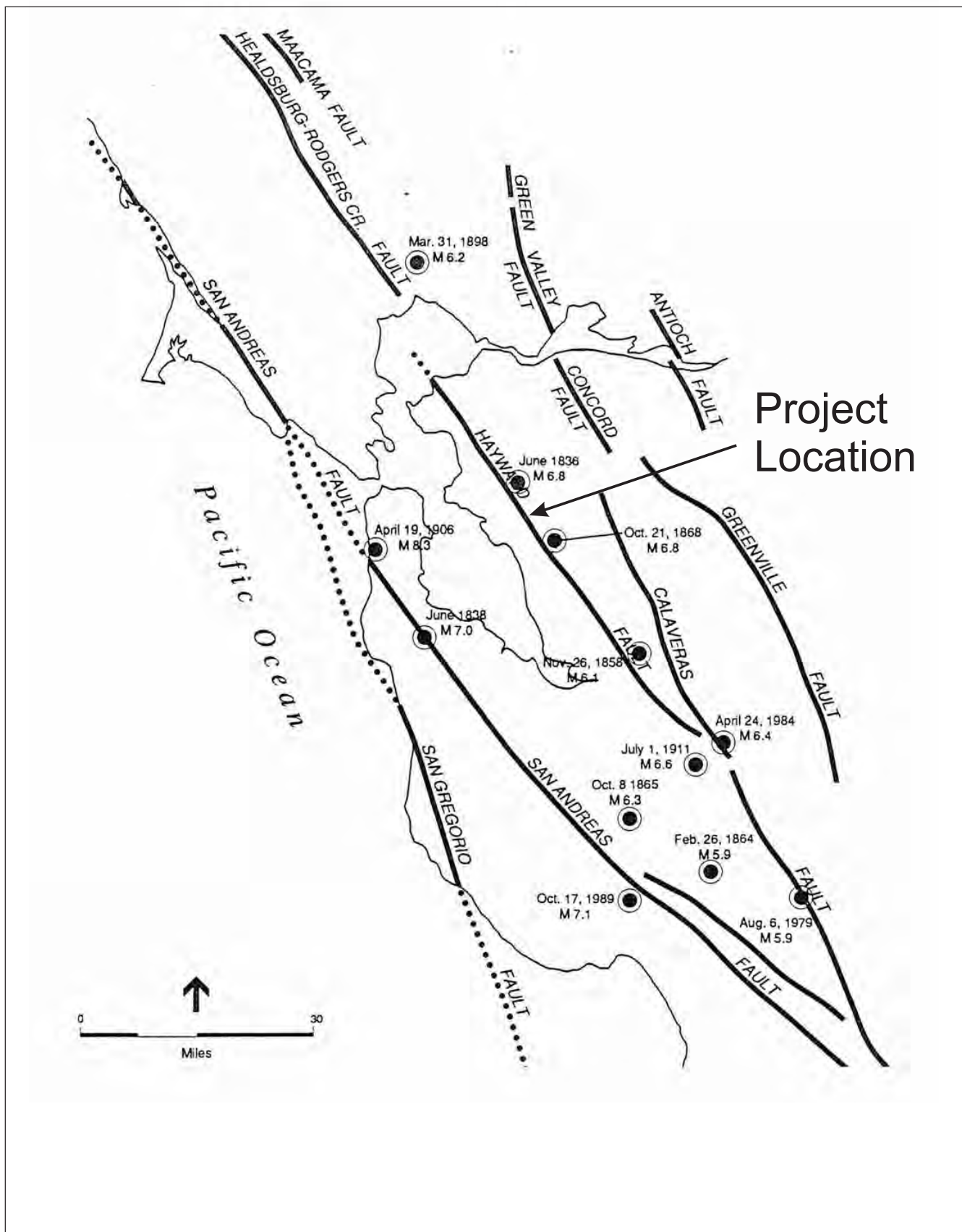
*Chapter 15.20: Geologic Reports.* This chapter mitigates geologic hazards due to fault rupture by limiting the placement of structures for human occupancy across the trace of active faults. This chapter applies to any new structures, major additions or alterations to any existing structures, replacements of existing structures and subdivisions located wholly or partly within the Special Studies Zone. The City requires a geologic report defining and delineating any fault hazard prior to the approval of a project, and requires that no structures for human occupancy shall be permitted to be placed (1) across an active fault trace; or (2) within fifty (50) feet of any active fault trace unless the geologic investigation can demonstrate that the site is not underlain by active branches of the fault.

### 3.4.4 EXISTING CONDITIONS

#### 3.4.4.1 Regional Seismicity

The San Francisco Bay Area is located along the margin between two major tectonic plates, the Pacific Plate and the North American Plate. The faults of the San Andreas Fault system accommodate the tectonic motions that accumulate as strain at the boundary of the two major tectonic plates. This fault system includes the San Andreas Fault and the Hayward Fault, as well as numerous other secondary faults, many of which have produced large earthquakes in the past and are expected to do so again in the future. Many of these faults are located within relatively close proximity to the proposed Master Plan amendment area. **Figure 3.4-1** presents a map showing the locations of major faults and historic earthquakes in the site vicinity. **Table 3.4-1** summarizes the location of faults relative to the proposed Master Plan amendment area, fault activity, date of most recent motion and mean moment magnitude. According to California Geological Survey criteria, faults showing evidence of rupture during the Holocene (past 11,000 years) are considered active earthquake faults. Faults showing evidence of movement within the last 1,600,000 years are considered conditionally active or potentially active faults.

The Working Group on California Earthquakes estimates that there is a 63-percent probability that an earthquake of Richter Magnitude  $\geq 6.7$  will occur on one of the faults in the Bay Area between the years 2007 and 2037. Within that overall probability, there is a 31-percent chance



Source: Modified from Steinbrugge, K., et al, Earthquake Planning Scenario for a Magnitude 7.5 Earthquake on the Hayward Fault in the San Francisco Bay Area CDMG Special Publication 78, 1987



**Figure 3.4-1**  
 Earthquake Faults and Epicenters of  
 Historic Earthquakes in Site Vicinity

**TABLE 3.4-1: ACTIVE AND CONDITIONALLY ACTIVE FAULTS WITHIN 50 MILES OF PROPOSED MASTER PLAN AMENDMENT AREA**

<b>Fault Name</b>	<b>Distance miles (kilometers)</b>	<b>Direction</b>	<b>Last Surface Rupture</b>	<b>Activity</b>	<b>Mean Characteristic Moment Magnitude</b>
Hayward	<0.1(<0.2)	W	Historic	Active	6.91
Pleasanton	10(17)	E	Holocene	Active	--
Concord	13(21)	NE	Historic	Active	6.71
Calaveras	9(14)	E	Holocene	Active	6.93
Clayton	18(31)	ENE	Holocene	Active	--
Green Valley	23(37)	N	Holocene	Active	6.71
San Andreas	19(30)	WSW	Historic	Active	7.90
Napa	29(46)	N	Holocene	Active	6.70
Marsh Creek	19(31)	E	Holocene	Active	--
Rogers Creek	33(53)	NNW	Holocene	Active	6.98
Williams	22(37)	SE	Late Quaternary	Conditionally Active	--
Seal Cove	26(42)	SW	Holocene	Active	--
Greenville	18(29)	ENE	Historic	Active	6.94
Las Positas	18(30)	SE	Historic	Active	--
Midway	20(34)	E	Late Quaternary	Conditionally Active	--
Monte Vista	18(29)	S	Late Quaternary	Conditionally Active	6.80
San Gregorio	37(59)	SSW	Holocene	Active	7.44

Sources: California Division of Mines and Geology, 1994; Working Group on California Earthquakes (2007), 2008.

that a large earthquake will occur on the Hayward Fault, a 21-percent chance that one will occur on the San Andreas Fault, and a seven-percent chance that one will occur on the Calaveras Fault, although seismologists are unsure whether the Calaveras Fault is capable of producing large earthquakes or fails predominantly by producing moderate earthquakes and by fault creep.

### 3.4.4.2 Regional Geology

Oakland lies along the eastern margin of San Francisco Bay, comprising bayside flats, artificial fill, alluvial plain, and steeply sloping hillsides. The proposed Master Plan amendment area is located within the hilly, southeastern portion of the city. Much of the landscape and resources of the San Francisco Bay Area have their origins in the region's complex geological history. San Francisco Bay lies within the California Coast Ranges geomorphic and physiographic province, a region dominated by active tectonics astride the margin between the Pacific and North American tectonic plates. The main basement rocks consist of Jurassic to Cretaceous age sedimentary, igneous and metamorphic rocks of the Franciscan Complex and Great Valley Sequence. Also occurring in the Oakland Hills area are pockets of Ophiolites, Jurassic and

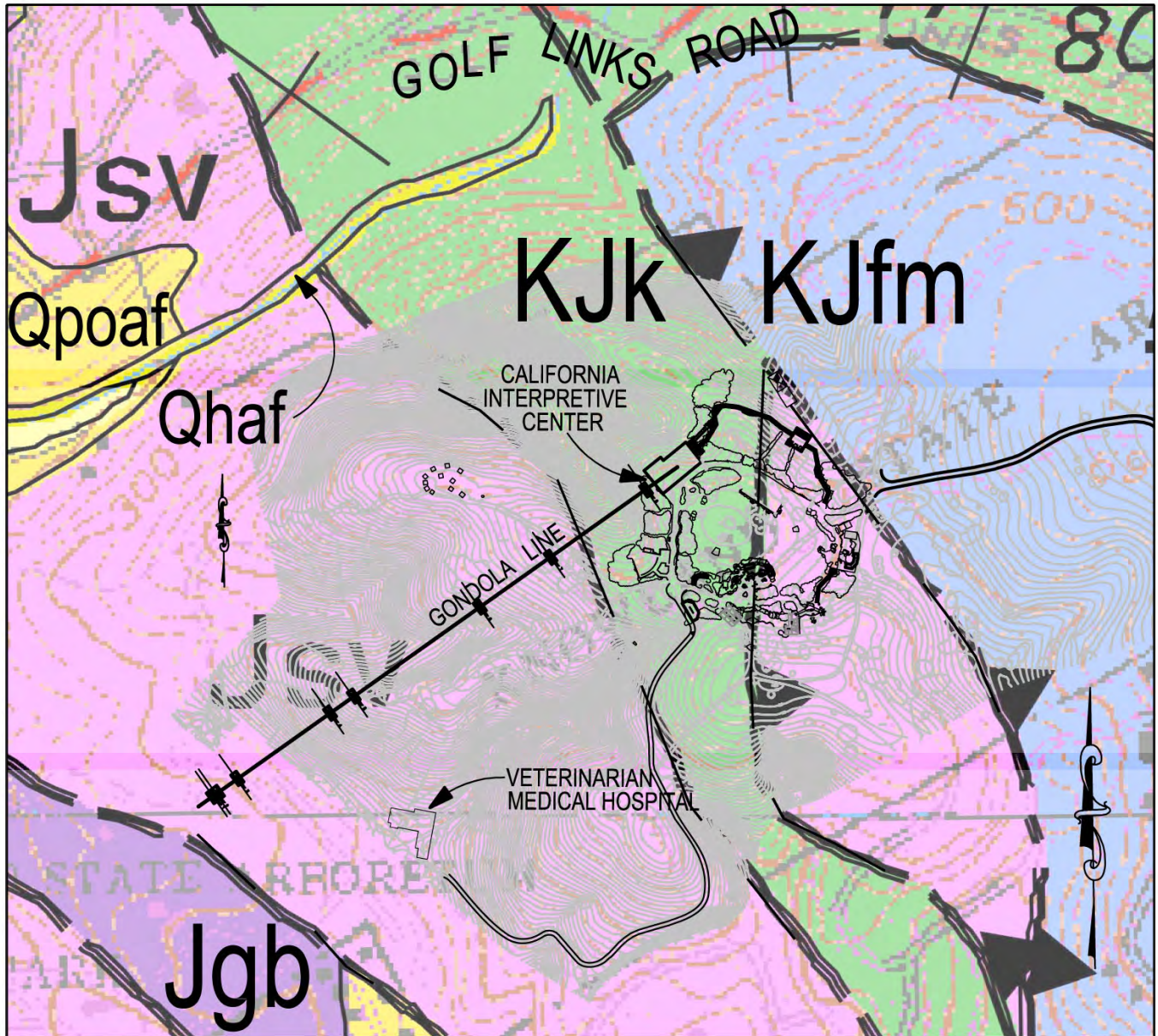
Cretaceous age rocks that are remnants of mafic and ultramafic igneous rocks formed in the mantle. Associated with the Ophiolites are Keratophyre and Quartz Keratophyre, felsic volcanic rocks that generally occur in dikes and sills and are commonly exposed along the Hayward fault zone from San Jose to Richmond. The Keratophyre and Quartz Keratophyre are commonly mistaken for Rhyolite, the most common variety of felsic volcanic rock, because of the cream to orange color of the rocks.

#### 3.4.4.3 Site Geology and Soils

The primary source of bedrock geologic information used in the metropolitan Oakland area is a map issued by the United States Geological Survey (USGS) (Graymer 2000). **Figure 3.4-2** presents a portion of the USGS map showing the proposed Master Plan amendment area. The proposed site plans for the California Exhibit and the Veterinary Medical Hospital are superimposed on the map.

**Veterinary Medical Hospital Site.** The proposed Veterinary Medical Hospital site is located at the mouth of a ravine that extends uphill to the northeast. The center of the site slopes gently down to the southwest and is flanked on the southeast and northwest by steeply sloping hillsides. Geologic maps of the area indicate that the site is located within an area underlain by Jurassic age Keratophyre and Quartz Keratophyre, a volcanic bedrock very similar to Rhyolite. Where exposed at the surface the rock is slightly weathered, fractured, and has a distinct cream to light orange color. Overlying soils are typically stony silt with clay and are non-expansive to slightly expansive. In general, this unit provides good foundation conditions. Fill soils that are present in the Veterinary Medical Hospital site area include expansive soils derived from other portions of the site.

**California Exhibit Area.** The proposed California Exhibit area contains steep slopes and ravines with a high potential for erosion. Within the ravines there are scarps, indicating mobilization of soils and severely weathered rock along the flanks of the ravines. This material has moved down-slope to the ravine floor or traveled down the ravine to its mouth as a debris flow. Areas where animal exhibits are proposed consist chiefly of rolling grassland with occasional clusters of trees. Soils in this area are thin and bedrock is located at or near the ground surface. Along the existing fire roads there are many areas where the bedrock is exposed in the roadbed, and occasional large outcrops of bedrock are present. Additionally, there are areas of existing fill soils of unknown origin and quality; soils were not observed and tested during construction by a geotechnical professional. The fill soils may have been placed in a loose, uncompacted condition and are subject to the effects of down-slope soil creep and settlement.



**LEGEND**

QUATERNARY DEPOSITS

Qhaf ALLUVIAL FAN & FLUVIAL DEPOSITS

Qpoaf OLDER ALLUVIAL FAN DEPOSITS

GREAT VALLEY COMPLEX

KJk KNOXVILLE FM.

Jsv KERATOPHRE & QUARTZ KERATOPHYRE

COAST RANGE OPHIOLITE (JURASSIC)

Jgb GABBRO

FRANCISAN COMPLEX

KJfm MELANGE



SHEAR ZONE (DASH INDICATES LOCATION APPROX. SAW TEETH INDICATE DIP DIRECTION OF SHEAR ZONE)



GEOLOGIC CONTACT



SOURCE: U.S.G.S Geologic Map MF-2342 Ver. 1



**Figure 3.4-2**  
USGS Geologic Map of Project Area

According to the site geologic map (**Figure 3.4-3**), the site of the proposed California Interpretive Center building is underlain by the Knoxville formation of the Great Valley Complex, described as early Late Jurassic to Cretaceous aged, mainly dark, greenish-gray siltstone or shaly claystone with thin layers of interbedded sandstone. Weathering of this bedrock results in the development of very closely spaced fractures and a loss of strength. The bedrock typically weathers to silty clay soils that are highly expansive. Due to the deep weathering of this unit, the resulting soils can have a substantial loss of strength and are typically susceptible to heave and settlement (expansion and contraction) during periods of wetting and drying.

**Site Soils.** Soils found in the proposed Master Plan amendment area include:

*Millsholm Silt Loam – 30-50 Percent Slopes.* Millsholm silt loam is a relatively thin, well drained soil that forms from residuum weathered from sedimentary rock. Typically the surface layer consists of silty loam about 10 to 20 inches thick. This is underlain by lithic bedrock. Millsholm silt loam soil is generally characterized by a liquid limit of approximately 30 and a plasticity limit of approximately 5. This soil is well drained and moderately corrosive to steel and concrete. Millsholm silt loam soil (30-50 percent slopes) is found in the location of the proposed Veterinary Medical Hospital and portions of the location of the proposed California Exhibit.

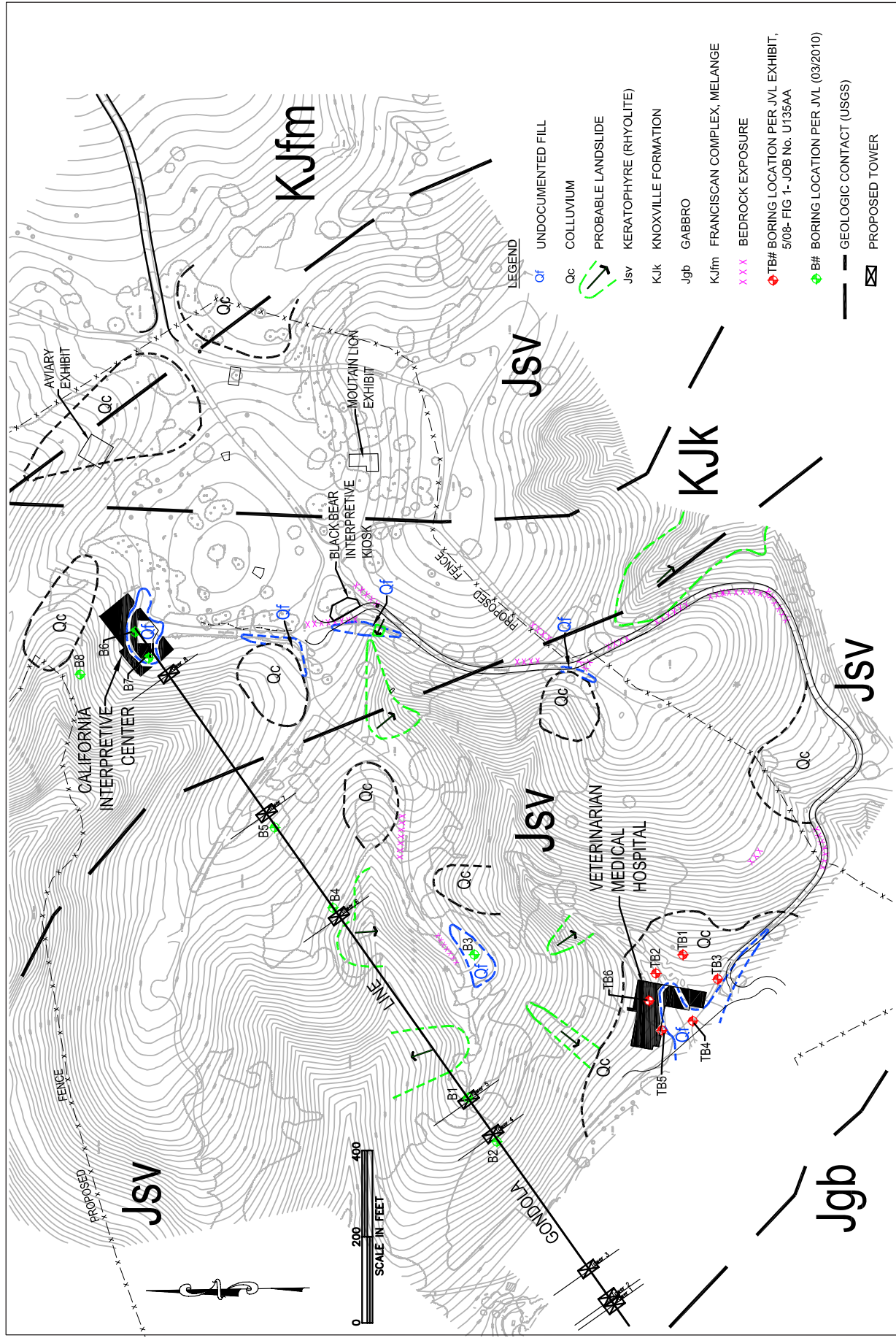
*Millsholm Silt Loam – 50-75 Percent Slopes.* The description of this soil is generally the same as that described above, but with steeper slopes. This soil is found in portions of the area of the proposed California Exhibit.

#### **3.4.4.4 Expansive Soils**

Expansive soils are those containing clay and silt that expand in volume in response to an increase in water content and shrink in volume upon drying. Changes in soil volume as a result of moisture fluctuations, including seasonal fluctuations, can cause damage to concrete slabs, foundations, and pavements.

Expansive soils are generally identified by the use of two types of soils tests. Expansion index tests determine the potential for expansion of soils. Soils with expansion indices greater than 20 have the potential to damage site improvements. Atterberg limits testing, including liquid limit and plastic limit testing, is another type of physical properties test used to determine the plasticity index (PI) and potential for expansion. Soils with plasticity indices of 12 or greater are considered expansive.

The geotechnical investigation performed for proposed construction of the Veterinary Medical Hospital in May 2008 (Jensen-Van Lienden Associates, Inc. 2008) included Atterberg limits testing on shallow soils. Most of the soils in this area are non-expansive to slightly expansive. Testing on one sample of fill soil indicated a plasticity index of 44, which would be considered highly expansive. Soils located in the vicinity of the California Interpretive Center and other



SOURCE: Darwin Meyers Associates – Surficial Geologic Data  
 USGS Map MF-2342 Ver. 1 – Bedrock Data

**Figure 3.4-3**  
 Geologic Map of Project Site

portions of the California Exhibit include soils derived from the Knoxville Formation (KJk) bedrock as shown on **Figure 3.4-3** and are anticipated to be expansive soils.

#### **3.4.4.5 Landsliding and Slope Instability**

Mapping of landslides and quaternary deposits has been performed in the vicinity of the proposed Master Plan amendment area. The USGS Open-File Report 99-504 presents a digital summary of the landslide maps prepared by Tor Nilsen (Nilsen 1975a and 1975b). Nilsen mapped the slope stability of the Oakland East and San Leandro quadrangles. Landslides are present in the general vicinity of the proposed Master Plan amendment area as shown on the Nilsen (1975a and 1975b) maps. A more recent map, the Quaternary Geologic Map of Alameda County (Helley and Graymer 1997), does not show any landslide deposits in the vicinity of Knowland Park. Examination of aerial photographs of the proposed Master Plan amendment area shows the presence of steep slopes. The Veterinary Medical Hospital site is located in an area with fill soils and possible shallow debris flow deposits. These soils are potentially unstable, but are located in a gently sloping area at the base of the steeper slopes. The California Interpretive Center would be located at the top of the slope in a gently rolling area of the hills outside of the areas where these deposits may form. Shallow bedrock is present in the vicinity of the California Interpretive Center. The gondola footings would be located in an area with shallow bedrock; no landslides have been mapped in this area.

A geologic map prepared by Darwin Myers Associates indicates the presence of several areas of colluvial deposits and fill deposits as shown on **Figure 3.4-3**. A slope stability screening investigation was prepared by Jensen-Van Lienden Associates (2010). The investigation included drilling of eight boreholes on the slopes and in the swales of the proposed Master Plan amendment area. The investigation concluded that the site slopes evaluated were stable.

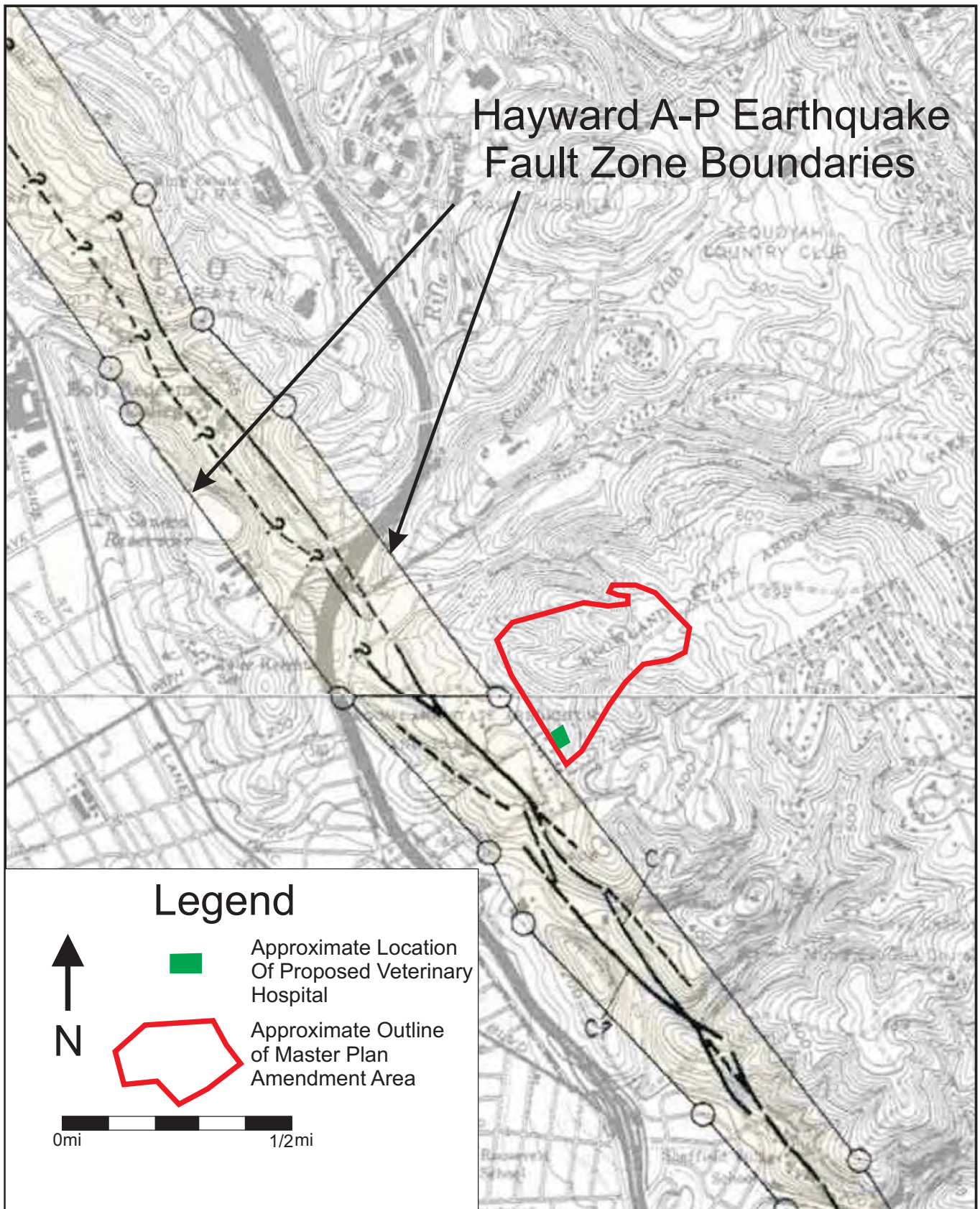
#### **3.4.4.6 Primary Seismic Hazards – Earthquake Faults**

There are no active earthquake faults subject to the Alquist-Priolo Earthquake Fault Zoning Act within the proposed Master Plan amendment area. The Alquist-Priolo Earthquake Fault Zone (EFZ) for the active Hayward Fault passes approximately 200 feet southwest of the Veterinary Medical Hospital site and passes through the westernmost portion of Knowland Park (see **Figure 3.4-4**). Additionally, there are numerous other active faults within a 50-mile radius of the proposed Master Plan amendment area as presented in **Table 3.4-1**.

#### **3.4.4.7 Secondary Seismic Hazards – Ground Shaking**

The city of Oakland area, including all of Knowland Park, is located in an area that may be subjected to strong to violent ground shaking during a large-magnitude earthquake originating on an active seismic zone in the San Francisco Bay region. The levels of potential ground shaking are shown on shake maps developed by the Association of Bay Area Governments





SOURCE: Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones, Oakland East and San Leandro 7.5 Minute Quadrangles California Division of Mines and Geology 2000



**Figure 3.4-4**  
Project Location in Relation to  
Hayward Alquist-Priolo Earthquake Fault Zone

(ABAG) and the United States Geological Survey (USGS) and are available for review at the ABAG web site ([www.abag.ca.gov](http://www.abag.ca.gov)).

**Seismically Induced Ground Shaking.** According to the California Geological Survey's Probabilistic Seismic Hazard Assessment, peak ground acceleration in the proposed Master Plan amendment area due to seismic shaking is predicted to be approximately 74 percent of that due to gravity (0.74 G). Because of the proximity of the Hayward Fault, a major earthquake on this fault is considered to present the greatest risk of seismically triggered damage to properties in Oakland.

In the event of strong to violent earthquake ground shaking, both structural and non-structural damage to buildings, roadways, and facilities is predicted. Historically, the areas most heavily damaged are older buildings that do not meet modern building codes and buildings constructed on soft or marginally stable ground. History also indicates that where there is major structural damage there is an elevated risk of injury to people. Nevertheless, structures that conform to the 2007 California Building Code may suffer damage but are designed to standards that prevent collapse, thereby substantially reducing the potential for severe injury or loss of life. The 2007 California Building Code (2007 CBC) uses mapped spectral response data<sup>1</sup> in conjunction with site-specific soil and bedrock data to establish design criteria. The United States Geological Survey (USGS) provides Seismic Hazard Curves and Uniform Seismic Response Spectra (United States Geological Survey 2009) to be used for determining the seismic design criteria for structures at a specific location. The USGS data provide the specific seismic response based on the latitude and longitude of a site, and the type and depth of soils present, in accordance with the requirements of the 2006 International Building Code and the 2007 California Building Code. **Table 3.4-2** identifies the seismic design criteria required for all structures for human occupancy included in the proposed Master Plan amendment.

**Seismic Hazard Zones.** In 2003, the California Geological Survey issued Seismic Hazard Zone (SHZ) maps for lands within the City of Oakland. The SHZ maps are intended to present a conservative delineation of the Seismic Hazard Zones for safety purposes and include potential earthquake-induced landslide hazards.

**Figure 3.4-5** shows Seismic Hazard Zones located in the proposed Master Plan amendment area and vicinity. Within the area of the proposed California Exhibit, the SHZ map indicates that there are areas considered to be at-risk for earthquake-induced landsliding (see **Figure 3.4-5**). Most of the lands in the SHZ are steep hillside areas that are proposed to remain as permanent open space. However, the northern half of the proposed California Interpretive Center site,

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<sup>1</sup> Spectral response data include earthquake-related ground accelerations and instantaneous peak ground displacement during an earthquake.

**TABLE 3.4-2: APPLICABLE SEISMIC DESIGN CRITERIA FOR STRUCTURES DESIGNED FOR HUMAN OCCUPANCY**

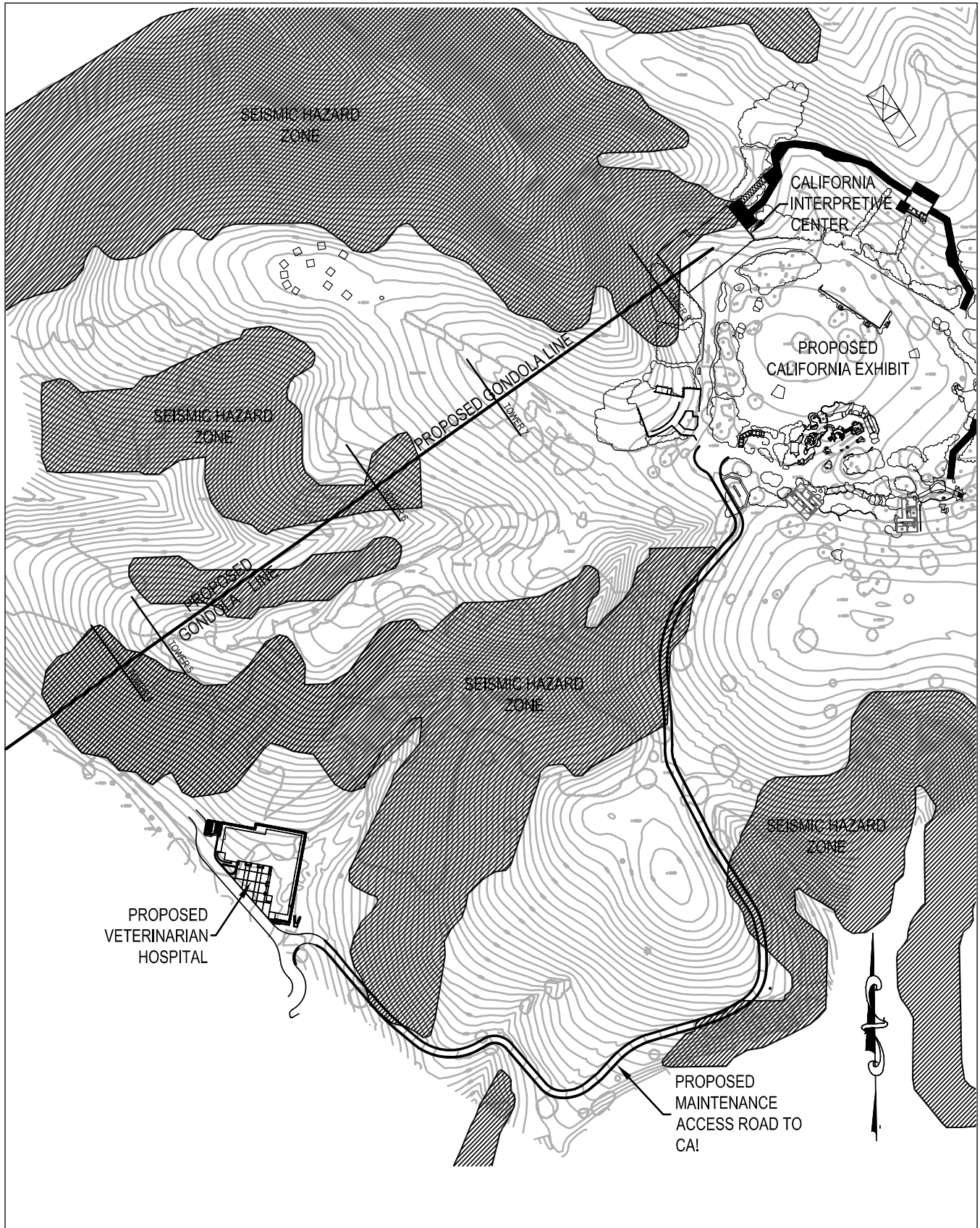
Occupancy Category	II
Site Class	D
Soil Profile Name	Soft Soil Profile
Seismic Design Category	D
Mapped Spectral Response for Short Periods- 0.2 Sec (Ss)	2.384 g
Mapped Spectral Response for Long Periods- 1 Sec (S1)	0.993 g
Site Coefficient- Fa, based on the mapped spectral response for short periods	1.0
Site Coefficient- Fv, based on the mapped spectral response for long periods	1.5
Adjusted Maximum Considered EQ Spectral Response for Short Periods (SMS)	2.384
Adjusted Maximum Considered EQ Spectral Response for Long Periods (SM1)	1.589
Design (5-percent damped) Spectral Response Acceleration Parameters at short periods (SDS)	1.066
Design (5-percent damped) Spectral Response Acceleration Parameters at long periods (SD1)	0.993

Source: Questa Engineering Corporation, 2010, seismic design criteria developed using the Seismic Hazard Curves and Uniform Seismic Response Spectra, v5.0.9a- 10/21/2009, United States Geological Survey.

along with the proposed sites of gondola support structures #4 and #6, fall within the SHZ. Segments of the proposed service road are within areas designated on the SHZ map. The site of the proposed Veterinary Medical Hospital is not located within an SHZ.

**Seismically Induced Liquefaction.** Liquefaction is the temporary transformation of saturated, cohesionless soil into a viscous liquid as a result of ground shaking. According to maps summarized by ABAG, soils in the proposed Master Plan amendment area have a very low susceptibility to liquefaction due to seismic shaking (Association of Bay Area Governments 2001). The SHZ map for the Oakland East Quadrangle (California Geological Survey 2003a) did not indicate that the proposed Master Plan amendment area is located within a liquefaction hazard zone. The geotechnical investigation performed by Jensen-Van Lienden Associates encountered shallow bedrock and plastic soils not subject to the effects of liquefaction. No portions of the proposed Master Plan amendment area are located within any SHZ for seismically induced liquefaction.

**Seismically Induced Landslides.** Areas of steep slopes, and especially existing landslide areas, have the highest potential for seismically triggered landsliding. These risks are most acute in the aftermath of severe rainstorms and during or following wetter than normal winters. Under these conditions, moisture reduces the strength of soils, increases weight, and can serve to lubricate slide planes.



SOURCE: State of California Seismic Hazards Map. Release: Feb 14, 2003

◆  
**Figure 3.4-5**  
 Seismic Hazard Map of Project Area

The most steeply sloping hillsides in the proposed Master Plan amendment area occur in the vicinity of the proposed California Exhibit. As noted above, portions of the California Exhibit area are located within an SHZ due to steeply sloping hillsides potentially subject to seismically induced landslides. While most of these areas are proposed to remain as open space, the northern half of the proposed California Interpretive Center site, along with the proposed sites of gondola support structures #4 and #6 and portions of the service road, fall within the SHZ. The proposed Veterinary Medical Hospital location is located on relatively flat slopes outside of the SHZ and is unlikely to be subject to seismically induced landslides.

### 3.4.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

#### 3.4.5.1 Methodology

This analysis evaluates the potential geology and soils impacts associated with the proposed Master Plan amendment. The analysis employs a two-tiered impact assessment approach that considers:

- Applicability of the geology and soils mitigation measures recommended in the 1998 MND for the approved Master Plan and the City's Standard Conditions of Approval to the proposed Master Plan amendment; and
- The significance of potential impacts of the proposed Master Plan amendment related to geology and soils, based on review of the proposed preliminary grading plans and site development plans, and the recommendations listed in the geotechnical engineering study for the Veterinary Medical Hospital and the slope stability screening investigation (Jensen-Van Linden Associates, Inc. 2010 and 2008). Additionally, the analysis compares these plans and recommendations to the impact assessment in the 1998 MND.

#### 3.4.5.2 Grading Plans and Geotechnical Studies Completed for the Master Plan Amendment Area

**Geotechnical Engineering Study for Veterinary Medical Hospital.** In 2008 Jensen-Van Lienden Associates conducted a design-level geotechnical investigation for the Veterinary Medical Hospital site (Jensen-Van Lienden Associates, Inc. 2008). The investigation included the logging and sampling of six boreholes to depths ranging from 10.5 feet below ground surface (BGS) to 24.5 feet BGS, laboratory testing of soil samples, and engineering analyses of field and laboratory data.

The logs of borings indicated the presence of variable thickness of undocumented fill overlying native soils and weathered bedrock. Three of the boreholes (numbers 2, 5, and 6) penetrated bedrock that consisted of weathered, closely fractured Keratophyre (i.e., Rhyolite), a volcanic bedrock. The geotechnical investigation concluded that the artificial fills and native soils are moderately expansive with low strengths and have poor supporting characteristics for the foundations and other improvements. The report also identified a potential debris flows hazard

associated with the steep slopes of the drainage ravine that lies northeast of the Veterinary Medical Hospital site.

Recommendations of the geotechnical investigation for final design included:

1. The existing artificial fill shall be removed and replaced with engineered fill. This will include installation of a layer of non-expansive, select fill beneath the building footprint. This measure will reduce the impact of expansive clay soils and unstable soils to a level of less than significant.
2. A debris flow deflection wall shall be constructed in the generally level area behind the Veterinary Medical Hospital site to deflect debris flows away from the structure. This structural recommendation has been incorporated into the current design drawings for the Veterinary Medical Hospital.
3. Recommendations of the report included design criteria for spread footings, drilled cast in place concrete piers, retaining walls, concrete slabs, and surface and subsurface drainage measures. These recommendations shall be implemented in the final design of the structure.
4. Construction drawings shall be reviewed by the project geotechnical engineer prior to submittal to the City of Oakland to verify that the designs shown are consistent with the intent of the geotechnical recommendations.
5. The project geotechnical engineer shall be retained to provide observations and testing services during grading- and foundation-related work. The intent of these services is to have the geotechnical engineer confirm that the as-built condition is consistent with the geotechnical design recommendations, and to provide supplemental geotechnical recommendations, as needed, during construction.

**Zoo Master Plan Slope Stability Screening Investigation.** The scope of the *Zoo Master Plan Slope Stability Screening Investigation* (Jensen-Van Lienden Associates 2010) included (1) review of pertinent published literature, (2) geologic interpretation of aerial photographs, (3) field reconnaissance of the California Exhibit area by both the project geotechnical engineer and engineering geologist, (4) the logging of exploratory borings within the Seismic Hazard Zone, (5) laboratory testing of selected samples, (6) engineering and geologic evaluation of the data gathered, and (7) preparation of a report presenting the consultant's evaluation of potential geologic and seismic hazards and recommendations for the design-level investigation.

The stability analyses addressed the following: (1) two hillsides on which proposed gondola support structures #4 and #5 through #7 would be mounted, (2) the hillside northwest of the proposed California Interpretive Center, and (3) the hillside north of the proposed Veterinary Medical Hospital site. Based on the data gathered, geologic cross-sections were prepared using California Geological Survey guidelines (California Geological Survey 2008).

The slope stability screening investigation concluded that there is an absence of seismic landslide hazards in the proposed Master Plan amendment area and that no additional investigation of earthquake-induced landsliding is needed. The investigation included the determination of the factors of safety for slope stability performed in accordance with the California Geological Survey document *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (California Geological Survey 2008), which outlines the required steps to be taken in slope stability screening evaluations. The factor of safety for slope stability is taken to be the ratio of the resisting forces divided by the driving forces. Results with a factor of safety greater than one are considered stable, and those less than one are considered unstable. The results of the evaluation by Jensen-Van Lienden for the four hillslopes analyzed in the study indicated factors of safety ranging from a minimum of approximately 1.3 to a maximum of less than two. In accordance with the California Geological Survey guidelines, the slopes are considered stable.

**Preliminary Grading Plans.** A grading plan that balances cuts and fills is proposed for the California Exhibit. Excess cut material, as shown on the preliminary grading plan (**Figure 2-15**), is estimated at about 14,000 cubic yards (CY). This excess cut soil is proposed to be placed in the area between the mountain lion exhibit, grizzly bear holding building, and California Interpretive Center and in other areas within the exhibit areas. Re-use of the excavated soils is appropriate given that the detailed project plans would incorporate specific geotechnical design measures for site preparation and grading, including stabilization measures for fill soils such as subsurface drainage, excavation and recompaction of weak zones, and other measures as deemed necessary. It is estimated that the fill would increase site elevations by up to three feet, raising the roof line elevations of the California Interpretive Center and the grizzly bear holding building (see **Section 3.1, Aesthetics**).

The preliminary grading plans for the California Exhibit indicate that animal-related shelters would be small and located in areas where bedrock is expected to occur at shallow depths at or near the ground surface based on the available geological information. Retaining walls, cuts, and fills would be constructed as part of the service road construction. Other site grading would include excavations for foundations, concrete slabs, and sidewalks.

The California Interpretive Center is proposed in an area of disturbed land that is partially covered with fill soils. The preliminary grading plans indicate that the first floor of the building would be at an elevation of approximately 595 feet. The existing fill would be removed from the foundation area. Grading is not expected to extend more than approximately five feet beyond the foundation area of the building, except on the southwest side of the building, where grading would be completed for an approach pad for the gondola. The gondola support structures would have small foundation pads (approximately 12 feet by 20 feet in area) that would require only minor grading and excavation into firm supporting materials.

Other proposed facilities include pathways, elevated viewing platforms, and a kiosk. These facilities would be supported on foundations using conventional spread footings, and consequently no substantial grading would be required.

The proposed Veterinary Medical Hospital would require substantial grading in an area of existing fill soils. Existing topography within the foundation area of the proposed building currently ranges from 349 feet to 375 feet. The building pad would have a design grade of 358 feet, indicating the need for cuts ranging up to 17 feet deep and fills of up to nine feet thick. The structure would be supported on a foundation excavated into bedrock with a series of retaining walls to support the structure above the road frontage.

### 3.4.5.3 CEQA Thresholds/Criteria of Significance

The project would have a significant impact on the environment if it would:

- a) Expose people or structures to substantial risk of loss, injury or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map or Seismic Hazards Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publications 42 and 117 and PRC §2690 et. seq.);
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction, lateral spreading, subsidence, collapse; or
  - Landslides;
- b) Result in substantial soil erosion or loss of topsoil, creating substantial risks to life, property, or creeks/waterways;
- c) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as it may be revised), creating substantial risks to life or property;
- d) Be located above a well, pit, swamp, mound, tank vault, or unmarked sewer line, creating substantial risks to life or property;
- e) Be located above landfills for which there is no approved closure and post-closure plan, or unknown fill soils, creating substantial risks to life or property; or
- f) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

These criteria are discussed below.



a) **Would the project expose people or structures to substantial risk of loss, injury or death involving:**

- **Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map or Seismic Hazards Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publications 42 and 117 and PRC §2690 et. seq.);**
- **Strong seismic ground shaking;**
- **Seismic-related ground failure, including liquefaction, lateral spreading, subsidence, collapse; or**
- **Landslides?**

**Fault Rupture.** The proposed Master Plan amendment area is not located within an Alquist-Priolo Earthquake Fault Zone boundary, within which faults determined to be active faults within the last 11,000 years by the California Geological Survey are delineated. The nearest Alquist-Priolo Earthquake Fault Zone boundary is located approximately 200 feet southwest of the Master Plan amendment area. Detailed geologic and fault trenching studies performed by Kleinfelder (2000 and 2001) determined that the active trace of the Hayward fault zone passes approximately 750 feet southwest of the proposed Veterinary Medical Hospital site and more than 2,000 feet southwest of the proposed California Interpretive Center site. The investigation performed by Kleinfelder included exploratory trenching that established the location of the active trace of the Hayward Fault along the westernmost portion of the Oakland Zoo parking lot and trending from the southeast to the northwest in direction. Based on results of this previous work, the risk of surface fault rupture in the Master Plan amendment area is considered very low and would therefore be a less-than-significant impact.

**Strong Seismic Ground Shaking.** The proposed Master Plan amendment area is located within an area where strong to violent earthquake shaking is anticipated within the design life of the proposed structures. The hazard of strong to violent seismic ground shaking is common to Oakland and the entire San Francisco Bay region. A geotechnical report including investigation of existing conditions and requirements for soil mitigation measures and foundation and structural design would be required for all new structures in accordance with the requirements of the 2006 International Building Code and the 2007 California Building Code. All structures designed for human occupancy would also be subject to the seismic design criteria listed in **Table 3.4-2** or their equivalent updates as determined during the geotechnical investigation and structural design of the structures. The geotechnical investigation for the Veterinary Medical Hospital summarized the seismic design criteria required for the design and construction of the facility consistent with the 2007 California Building Code and 1996 Uniform Building Code. The impacts of strong to violent seismic ground shaking would be reduced to levels that are protective of human life and that reduce the impact on property through the use of the most

up-to-date seismic design criteria, the design of structures in accordance with the 2007 California Building Code, and the incorporation of the current requirements of the Oakland Municipal Code and the City's applicable Standard Conditions of Approval (**SCA-GEO-1** and **SCA-GEO-2**). Therefore, the impact of strong seismic ground shaking would be reduced to a less-than-significant level with implementation of code requirements and standards, compliance with the City's Standard Conditions of Approval, and incorporation of the 1998 MND Mitigation Measures 5c, 5d, and 5e.

**Seismic-Related Ground Failure and Landslides.** The following discussion reviews the potential for seismic-related ground failure and landslides to affect the proposed California Exhibit, Veterinary Medical Hospital, and service road improvements.

*California Exhibit.* A part of the proposed California Exhibit area is located within a Seismic Hazard Zone as delineated by the California Geological Survey. The portion of the proposed California Exhibit that is located within the Seismic Hazard Zone is primarily composed of steep hillsides that would remain as open space. The area that would contain the proposed animal exhibits is not located within a Seismic Hazard Zone. The northern half of the proposed California Interpretive Center and proposed gondola support structures #4 and #6 (see **Figure 3.4-5**) would be located within the Seismic Hazard Zone.

The slope stability screening investigation performed by Jensen-Van Lienden Associates (2010) concluded that there is an absence of seismic landslide hazards in the proposed Master Plan amendment area and that no additional investigation of earthquake-induced landsliding is needed. The investigation included the determination of the factors of safety for slope stability performed in accordance with the California Geological Survey document *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (California Geological Survey 2008). The results of the evaluation by Jensen-Van Lienden for the four hillslopes analyzed in the study indicated factors of safety ranging from a minimum of approximately 1.3 to a maximum of less than two. In accordance with the California Geological Survey guidelines, all slopes evaluated were considered stable.

The Seismic Hazard Mapping Act requires that a design-level geotechnical investigation be performed for any site located within a Seismic Hazard Zone. The slope stability screening evaluation provided the first step in satisfying this requirement. Additionally, **SCA-GEO-2** requires completion of a design-level geotechnical investigation for structures located partially or wholly within a Seismic Hazard Zone. Thus, in compliance with **SCA-GEO-2**, a design-level geotechnical investigation must be prepared for the California Interpretive Center and gondola people-moving system because they are partially or wholly located within a Seismic Hazard Zone (see **Figure 3.4-5**). Both the California Interpretive Center and the gondola people-moving system also would be subject to the requirements the 1998 MND Mitigation Measure 1d, which call for conformance with Building Code requirements, and construction inspection, testing and

quality control by a geotechnical professional to ensure the adequacy and appropriateness of site grading plans and geotechnical recommendations. The 1998 MND Mitigation Measures 5c, 5d, and 5e would also apply and call for geotechnical evaluations; conformance with Building Code requirements; earthquake-resistant techniques for interior fixtures, machinery and furnishings; and an updated Emergency Preparedness and Response Plan and Animal Capture Plan.

As specified in **SCA-GEO-2**, the California Interpretive Center geotechnical investigation must address unstable soils specific to this construction site. A site reconnaissance conducted by Darwin Myers, Professional Geologist, confirmed the presence of undocumented fill in a portion of the California Interpretive Center site (see **Figure 3.4-3**). The undocumented fill contains large blocks of concrete and asphalt and may contain other construction debris. The fill is considered to be moderately expansive and potentially subject to settlement, erosion, and sloughing and is not considered suitable for the support of the proposed California Interpretive Center. With implementation of **SCA-GEO-2**, specific measures accounting for the identified unstable soils would be addressed in the required geotechnical investigation for the proposed California Interpretive Center and would supplement the 1998 MND Mitigation Measures 5c, 5d, and 5e.

Implementation of **SCA-GEO-2** shall include the following in the geotechnical investigation prepared for the proposed California Interpretive Center:

- The design-level geotechnical investigation shall identify methods for site preparation and grading to stabilize existing fill areas and prepare the site for foundation and retaining wall construction. Measures may include reworking of existing fill soils, removal of oversized concrete and debris from fill, and crushing of oversized materials.
- The design-level geotechnical investigation shall confirm and revise 2007 California Building Code seismic design parameters as presented in this SMND/Addendum.
- The geotechnical design investigation shall include design recommendations for retaining walls, foundations, concrete slabs, pavements, walkways, surface and subsurface drainage measures, and utility trench construction and backfill. The foundations are anticipated to be spread footings, thickened mat slabs, pier and grade beam and other conventional foundation types.
- The geotechnical investigation shall outline the details of geotechnical plan review. Recommendations of the project geotechnical engineer shall be included in the final construction drawings, as approved by the City of Oakland.
- The geotechnical investigation shall identify the geotechnical observation and testing services recommended during construction. During construction the geotechnical engineer shall perform observations and testing services and shall prepare a final report documenting results of his or her work.

- The City of Oakland shall provide peer review of the design-level geotechnical investigation and grading plan. The Oakland Zoo shall be responsible for the cost of the review. Revisions to the report and the design of project facilities shall be made to satisfy review comments by the City of Oakland peer reviewer.
- During the construction phase, cut slopes, keyways, and grading for the building pad that expose bedrock shall be mapped by the project engineering geologist. An as-graded geologic map shall be prepared showing the details of observed features and conditions.
- The geotechnical investigation shall include a map prepared by a land surveyor or civil engineer that shows the locations and elevation of key features (e.g., keyways, subdrains and their cleanouts, cut slopes, and cut pads). The map shall include a statement that the locations and limitations of the features are accurate representations of said features as they exist on the ground; were placed on this map by the surveyor, the civil engineer or under their supervision; and are accurate to the best of their knowledge.
- Final seismic considerations for the site shall be submitted to and approved by the City of Oakland Building Services Division prior to commencement of the project.

*Veterinary Medical Hospital.* The proposed Veterinary Medical Hospital site is not located within a Seismic Hazard Zone (see **Figure 3.4-5**). The site soils are unlikely to be subject to seismically induced landsliding. The primary impacts associated with the Veterinary Medical Hospital site are undocumented fill, expansive soils, and protection from debris flows originating in the ravine to the northeast of the building site. The existing design-level geotechnical investigation for the Veterinary Medical Hospital (Jensen-Van Lienden Associates 2008) provides recommendations to address those impacts including incorporation of a debris wall, recompaction of existing fills, and inclusion of non-expansive fill under concrete slabs and pavements. The geotechnical investigation also contains seismic design parameters based on the 2007 California Building Code (CBC), the current program standard. Conformance with 2007 CBC provisions and implementation of the recommendations identified in the Jensen-Van Lienden Associates geotechnical investigation for the proposed Veterinary Medical Hospital, as required by **SCA-GEO-2**, and the 1998 MND Mitigation Measures 5b through 5e described above would ensure that the impact of seismic-related ground failure would be less-than-significant.

*Service Road Improvements.* Limited portions of the proposed service road are in a Seismic Hazard Zone (see **Figure 3.4-5**), indicating that some portions of the road would have an elevated risk of landslide damage during seismically induced landsliding. Thus, a design-level geotechnical investigation for the service road improvements must be prepared in accordance with requirements of **SCA-GEO-2** and the 2007 CBC. Susceptible areas of the service road would include slope retention measures to stabilize any areas of potential instability. Compliance with City of Oakland Municipal Code Chapter 15.04 (Oakland Amendments to the California Building, Electrical, Mechanical and Plumbing Codes), Section 15.04.780 (Grading, Erosion, and Sedimentation), and Chapter 15.20 (Geologic Reports) and implementation of the recommendations of the geotechnical investigation would ensure that the impacts of seismically induced landsliding would

be less than significant. Additionally, 1998 MND Mitigation Measure 1d as described above would apply and further ensure that the potential impact would be reduced to a less-than-significant level.

**Liquefaction.** The seismic hazard maps issued by the California Geological Survey do not identify any areas of liquefaction hazard within the proposed Master Plan amendment area (California Geological Survey 2003a and 2003b). This finding is consistent with previous geological and geotechnical investigations of the Oakland Zoo area (Harza 1994, Harza 1996, Subsurface Consultants 1999; Jensen-Van Lienden Associates 2008, and Jensen-Van Lienden Associates 2010). Those investigations confirmed that the soils and Quaternary deposits in the area are composed of material that has significant clay contents, strength, and stiffness that would prevent the soils from undergoing the effects of liquefaction. Since there is no liquefaction potential, there is no risk of lateral spreading (a type of ground failure in which liquefied soil slides toward a free face, such as a creek channel or steep slope).

**Summary.** In summary, all impacts identified would be reduced to less-than-significant levels through (1) compliance with code requirements and the implementation of the geotechnical recommendations and design criteria contained in the geotechnical reports required by these code requirements; (2) **SCA-GEO-1** and **SCA-GEO-2**; and (3) the applicable mitigation measures from the 1998 MND as noted above.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 1d, 5c, 5d and 5e

**Significance after Implementation of Mitigation:** Less-than-significant

**b) Would the project result in substantial soil erosion or loss of topsoil, creating substantial risks to life, property, or creeks/waterways?**

Grading and construction of improvements in upland/hillside areas under the proposed Master Plan amendment have the potential to result in both construction-related, short-term erosion and sedimentation and long-term erosion and sedimentation. These potential erosion and sedimentation impacts would be mitigated by compliance with the City of Oakland Municipal Code Chapter 15.04, Section 15.04.780, and Chapter 15.20 and the City's Standard Conditions of Approval (**SCA-HYDRO-1**, **SCA-HYDRO-2**, **SCA-HYDRO-5**, and **SCA-BIO-9 through SCA-BIO-12**), which regulate grading, erosion control, and creek protection. **SCA-HYDRO-1**, **SCA-HYDRO-2**, and **SCA-HYDRO-5** mandate the development of storm pollution prevention plan, a site drainage plan, and erosion, sediment, and debris control measures. **SCA-BIO-9 through SCA-BIO-12** mandate that the applicant develop specific actions that include a creek protection plan, obtaining applicable State and federal permits, and construction monitoring and final landscaping plans for the creek. See **Section 3.3, Biological Resources**

and **Section 3.7, Hydrology and Water Quality**, of this SMND/Addendum for more detailed descriptions of these measures.

Erosion and sedimentation are natural geologic processes that do not conflict with protection of resource values. The problem arises when grading activities result in increased sediment yields that exceed historic conditions. To provide for long-term control of sedimentation and protection of water quality, the City of Oakland requires submittal and approval of a stormwater control plan. Effective implementation of an erosion control plan and stormwater control plan would be designed to keep both short- and long-term erosion and sedimentation to a practical minimum. Please refer **Section 3.7, Hydrology and Water Quality**, of this SMND/Addendum for a discussion of potential water quality impacts.

In summary, the buildout of the amended Master Plan would result in erosion and sedimentation impacts similar to those described in the 1998 MND and would not create new impacts or increase the severity of impacts. The proposed Master Plan amendment would comply with applicable City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1, SCA-HYDRO-2, SCA-HYDRO-5, and SCA-BIO-9 through SCA-BIO-12**); the City's grading, erosion control, and creek protection ordinances; and 1998 MND Mitigation Measures 2a and 2c, which require certain design specifications for runoff control and drainage improvements, methods to reduce erosion during construction activity, restriction of grading and construction activity to the dry season, watering requirements during construction, and monitoring and modification of erosion control methods and implementation procedures. Consequently, the proposed Master Plan amendment would not result in any new significant or increased severity of significant impacts identified in the 1998 MND related to short-term or long-term erosion or sedimentation. No additional mitigation is required.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**c) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as it may be revised), creating substantial risks to life or property?**

Development allowed by the proposed Master Plan amendment, including the proposed California Interpretive Center and other structures included in the California Exhibit, may be located in areas underlain by expansive soils. Potential impacts associated with development on expansive soils include heave and settlement of soils with seasonal moisture fluctuations resulting in damage to foundations, concrete slabs, roads, utilities and other improvements. The proposed California Interpretive Center would be located on soils that are commonly highly expansive.

The fill soils in the areas of the proposed Veterinary Medical Hospital were analyzed by the Oakland Zoo's geotechnical engineer. The proposed Veterinary Medical Hospital would be located on soils that are largely non-expansive but contain some localized areas with expansive soils. The geotechnical investigation for the Veterinary Medical Hospital recommended that the artificial fill and any expansive soils be removed from the building pad area and be replaced with engineered fill, and that the engineered fill be capped with a non-expansive fill material.

In accordance with **SCA-GEO-2**, geotechnical investigations would be required to be prepared for the California Interpretive Center, gondola people-moving system, and service road improvements because these facilities are partially or wholly in a Seismic Hazard Zone. Each geotechnical investigation will determine the presence of expansive soils at the building site and identify mitigations to control the effects of soil expansion such as (1) removal of expansive soils and replacement with non-expansive fill soils, (2) treatment of soils with stabilizers such as Quick lime to reduce the expansive properties of the soils to an acceptable level, and (3) construction of stiffened structures designed to resist the affects of soil expansion. In accordance with **SCA-GEO-1**, a preliminary soils report would be required for the other construction sites in the California Exhibit. Each preliminary soils report will determine if expansive soils are present; if they are, a geotechnical investigation, including corrective measures, must be prepared.

In summary, the buildout of the amended Master Plan would result in expansive soil impacts similar to those described in the 1998 MND and would not create new impacts or increase the severity of impacts. The proposed Master Plan amendment would be subject to **SCA-GEO-1** and **SCA-GEO-2**, which require preparation of geotechnical and soils reports to identify expansive soils and mandatory incorporation of the geotechnical recommendations in these reports into plans for new structures and facilities. Compliance with these requirements and mitigation measures will ensure that the geotechnical studies investigate and identify the locations of expansive soils and require corrective measures. Consequently, the proposed Master Plan amendment would not result in any new significant or increased severity of previously identified impacts related to expansive soils. No additional mitigation is required.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 1d, 5c, 5d, and 5e

**Significance after Implementation of Mitigation:** Less-than-significant

**d) Would the project be located above a well, pit, swamp, mound, tank vault, or unmarked sewer line, creating substantial risks to life or property?**

There is no evidence that the proposed Master Plan amendment area contains wells, pits, swamps, mounds, tank vaults, or unmarked sewer lines that would create substantial risks to life

or property. A review of historic aerial photographs (stereo pairs flown in 1947, 1953, 1959, 1975, 1988, 1996, and 2002), a site reconnaissance, and a records research by Darwin Myers, Professional Geologist, did not find documentation or physical evidence of soil or groundwater impairments associated with the current or past use of the property. Historic land uses in the proposed Master Plan amendment area include wildlife habitat/watershed land and parkland. Additionally, the area has served as disposal area for earthwork performed elsewhere in the Oakland area (i.e., placement of non-engineered fill). **Figure 3.4-3** shows the approximate limits of undocumented fill in the California Exhibit area. There are no known water wells within the California Exhibit area, and no record of soil or groundwater contamination known to the State of California. The bedrock units in the area are of low permeability and, due to the steepness of the terrain; there is no potential for swamps. The historic aerial photograph review did not reveal the presence of an anomalous mound, underground vault, or an otherwise unknown sewer line.

The proposed Master Plan amendment would have a less-than-significant impact in relation to this criterion. This criterion was not in effect at the time the 1998 MND was prepared and therefore was not addressed during the environmental review of the approved Master Plan.

**Impact:** Less-than-significant

**Mitigation:** None required

**e) Would the project be located above landfills for which there is no approved closure and post-closure plan, or unknown fill soils, creating substantial risks to life or property?**

A review of historic aerial photographs by Darwin Myers, Professional Geologist (stereo pairs flown in 1947, 1953, 1959, 1975, 1988, 1996, and 2002) and a field reconnaissance by Mr. Myers did not find documentation or physical evidence of a landfill within the proposed Master Plan amendment area.

Portions of the California Exhibit are underlain by undocumented non-engineered fill that may be subject to differential settlement. In general, areas susceptible to settlement are underlain by compressible sediments, such as poorly engineered artificial fill or low density expansive soils such as marsh or wetland soils. Special precautions are required in those areas to avoid subsidence or differential settlement. In the California Exhibit area, most of the surficial deposits and bedrock are stiff, very stiff or hard. However, some undocumented non-engineered fill soils were determined to be present at the site of the proposed California Interpretive Center, as discussed in the slope stability screening investigation prepared by Jensen-Van Lienden Associates (2010) and shown on **Figure 3.4-3**.

As discussed under **Criterion a** above, with the preparation of a design-level geotechnical investigation as specified in **SCA-GEO-2**, the impact associated with differential settlement due



to the presence of undocumented fill at the California Interpretive Center site would be reduced to a less-than-significant level.

This criterion was not in effect at the time the 1998 MND was prepared and therefore was not addressed during the environmental review of the approved Master Plan.

**Impact:** Less-than-significant

**Mitigation:** None required

**f) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?**

Both the Veterinary Medical Hospital and the California Exhibit would be connected to the City of Oakland sewer system. The proposed use of composting toilets at the proposed overnight camping area would not depend on the on-site disposal of wastewater. Consequently, analysis of the suitability of soils for on-site wastewater disposal or septic tanks is not required. The proposed Master Plan amendment would have no impact in relation to this criterion.

**Impact:** No impact

**Mitigation:** None required

### 3.4.6 CUMULATIVE IMPACTS

The buildout of the amended Master Plan would not result in new significant geological or soils impacts. Geological and soils impacts generally tend to be specific to each site and its uses; impacts on one site would not typically be common to, or contribute to, or be shared with impacts on other sites. In addition, as described in **Section 3.4.5** above, past developments have been, present projects are, and future reasonably foreseeable developments would be subject to uniform site development and construction standards and code requirements that are designed to protect public safety. For these reasons, no significant cumulative impacts from geology and soils are expected and, through compliance with code requirements, applicable City Standard Conditions of Approval (**SCA-GEO-1** and **SCA-GEO-2**), and the mitigation measures, the proposed Master Plan amendment would not contribute to any significant cumulative geology and soils impacts.

### 3.4.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new geological and soils impacts or a substantial increase in the severity of previously identified geological and soils impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less than significant. Previously imposed mitigation measures

from the 1998 MND have been identified and, where appropriate, have been clarified, refined, revised, or deleted. This section also identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.

#### 3.4.8 REFERENCES

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Aerial Photographs

<u>Date</u>	<u>Photograph ID</u>	<u>Scale</u>	<u>Source</u>
3-24-47	AV11, 3- 20&21	1:20,000	PAS
10-02-53	AV119, 17- 10&11	1:10,000	PAS
7-08-59	AV337, 09- 40&41	1:9,600	PAS
5-06-75	AV1193, 08- 29&30	1:12,000	PAS
3-30-88	AV3268, 8- 34-36	1:36,000	PAS
10-08-96	AV5200, 115- 29&30	1:12,000	PAS
6-02-02	AV8202, 14, 27-29	1:12,000	PAS

Note: PAS-Pacific Aerial Surveys

## 3.5 GLOBAL CLIMATE CHANGE

This section evaluates the potential global climate change impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant global climate change impacts not identified in the 1998 MND. This section also discusses any pertinent new information or changes in circumstances that could result in new significant global climate change impacts not identified in the 1998 MND. The section identifies the applicable provisions of the City's Standard Conditions of Approval.

The section summarizes information provided in a technical report prepared by ENVIRON International Corporation (2010). The report is included as **Appendix H** of this document.

### 3.5.1 PRIOR MND ANALYSIS AND CONCLUSIONS

There was no discussion of climate change in the 1998 MND. This section was prepared in response to recent legislation and changes in CEQA addressing evaluation of global climate change impacts.

### 3.5.2 STANDARD CONDITIONS OF APPROVAL

Since City approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that relate to greenhouse gas (GHG) emissions and global climate change and that would apply to the proposed Master Plan amendment are listed below. If the City approves the Master Plan amendment, these Conditions of Approval would be adopted as requirements of the Master Plan amendment and would ensure no significant impacts on global climate change occur. As a result, the Conditions of Approval are not listed as mitigation measures.

#### **SCA-SERVICES-1: Waste Reduction and Recycling**

(Please refer to **Section 3.10, Public Services and Utilities.**)

#### **SCA-BIO-3: Tree Replacement Plantings**

(Please refer to **Section 3.3, Biological Resources.**)

#### **SCA-TRAF-1: Parking and Transportation Demand Management**

(Please refer to **Section 3.11, Transportation and Circulation.**)

### 3.5.3 UPDATED REGULATORY SETTING

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the regulatory environment related to global climate change has evolved. Presented below is a summary of regulations and policies related to global climate change.

#### 3.5.3.1 Federal Regulations

**Kyoto Protocol.** The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol is a treaty reached under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008 to 2012. Although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the protocol, and the United States is not bound by the protocol's commitments.

The goal of the Kyoto Protocol is to achieve overall emissions reduction targets for six GHGs by the period of 2008 to 2012. The six GHGs regulated under the protocol are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Each nation has an emissions reduction target to reduce GHG emissions a certain percentage below 1990 levels (e.g., eight-percent reduction for the European Union, six-percent reduction for Japan). The average reduction target for nations participating in the Kyoto Protocol is approximately five percent below 1990 levels. Many subsequent measures are tied to these Kyoto Protocol commitments.

**United States Climate Policy and Actions.** The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. In February 2002, the United States government announced a comprehensive strategy to reduce the GHG intensity of the United States economy by 18 percent over the ten-year period from 2002 to 2012. GHG intensity measures the ratio of GHG emissions to economic output.

The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the Environmental Protection Agency (EPA) has the authority to regulate CO<sub>2</sub> emissions under the Clean Air Act (CAA). While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 to implement a regulatory approach to global climate change.

On September 30, 2009, the EPA announced a proposal that focuses on large facilities emitting over 25,000 tons of GHG emissions per year. These facilities would be required to obtain

permits that would demonstrate they are using the best practices and technologies to minimize GHG emissions.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>) constitute a threat to public health and welfare and that the combined emissions from motor vehicles cause and contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. EPA is finalizing the first-ever national GHG emissions standards under the CAA, and NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. The EPA GHG standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO<sub>2</sub> per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg).

### 3.5.3.2 State Regulations

**Assembly Bill 1493 Vehicular Emissions of Greenhouse Gases.** In a response to the transportation sector's significant contribution to California's CO<sub>2</sub> emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493, the New Passenger Motor Vehicle Greenhouse Gas Emission Standards legislation, amended Section 42823 and added Section 43018.5 to the California Health and Safety Code (Division 26, Part 5, Chapter 1) (added by Statutes in 2002, Chapter 200, Section 3).

Section 43018.5 requires the California Air Resources Board (ARB) to set GHG emission standards for passenger vehicles and light-duty trucks (and other vehicles whose primary use is non-commercial personal transportation in the state) manufactured in 2009 and all subsequent model years. In setting these standards, ARB considered cost effectiveness, technological feasibility, and economic impacts. ARB adopted the standards in September 2004. When fully phased in, the near-term (through 2012) standards would result in a reduction in GHG emissions of approximately 22 percent compared to the emissions from the 2002 fleet, while the mid-term (2013 to 2016) standards would result in a reduction of approximately 30 percent.

To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the EPA. However, in December 2007, the EPA denied the request from California for the waiver. In January 2008, the California Attorney General filed a petition for review of the EPA's decision in the Ninth Circuit Court of Appeals. On January 26, 2009, the President issued an

Executive Memorandum directing the EPA to reassess its decision to deny the waiver and to initiate any appropriate action (Obama 2009). On May 18, 2009, the President announced the enactment of a 35.5 miles-per-gallon (mpg) fuel economy standard for automobiles and light-duty trucks that will begin to take effect in 2012. This standard is approximately the same standard that was proposed by California; therefore, the California waiver request was shelved.

**Executive Order S-03-05.** In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order (EO) S-3-05. The EO established the following goals: GHG emissions should be reduced to 2000 levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050. Furthermore, EO S-03-05 requires the Secretary of the California Environmental Protection Agency (Cal EPA) to evaluate the impacts of climate change and establish mitigation measures that would reduce potential impacts. EO S-03-05 is also known as the Greenhouse Gas (GHG) Emission Reduction Targets for California Executive Order.

**Assembly Bill 32 – California Global Warming Solutions Act of 2006.** California's major initiatives for reducing GHG emissions are outlined in AB 32, the Global Warming Solutions Act, passed by the California State legislature on August 31, 2006, and codified in Section 38500 et seq. of the California Health and Safety Code (HSC) (Division 25.5, Part 1 through Part 7) (added by Statutes in 2006, Chapter 488); the 2005 EO discussed above; and a 2004 ARB regulation to reduce passenger car GHG emissions. The statute begins with several legislative findings and declarations of intent, including the following:

Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems. (Health and Safety Code, Section 38501)

The State goal is to reduce GHG emissions to 1990 levels by 2020, a reduction of approximately 25 percent, followed by an 80-percent reduction below 1990 levels by 2050. The main strategies for making these reductions are outlined in a Climate Change Scoping Plan, which, when completed, will include a range of GHG reduction actions that can include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

Pursuant to the requirements of HSC Section 38500 et seq., the State's reduction in global warming emissions will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012. Additional early action items include a



comprehensive framework of regulatory and non-regulatory elements that will result in significant and effective GHG emission reductions. Subsequent to approval of the early action measures, ARB developed a Climate Change Scoping Plan to lower the State's GHG emissions to meet the HSC Section 38500 et seq. 2020 limit that was approved in December 2008. In addition, AB 32 created the Climate Action Team (CAT), a consortium of representatives from State agencies charged with coordinating and implementing GHG emission reduction programs that fall outside of ARB's jurisdiction.

### **ARB 2007 Expanded List of Early Action Measures to Reduce Greenhouse Gas**

**Emissions in California.** ARB, pursuant to the requirements of HSC Section 38500 et seq., has directed its staff to pursue and adopt so-called early action measures that would help the State in achieving its 2020 GHG reduction goals. *The Early Action Measures to Reduce Greenhouse Gas Emissions in California* report, published in 2007, adopted the first 37 measures. Based on additional meetings with stakeholders that included the Bay Area Air Quality Management District (BAAQMD), ARB, and the California Air Pollution Control Officers Association (CAPCOA), existing measures were revised and new action measures were proposed. To report the findings, an *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions* report was published later the same year. In the report, ARB recommends expansion of the adopted 37 strategies to a total of 44 measures. The broad spectrum of strategies includes a Low Carbon Fuel Standard (LCFS), regulations for refrigerants with high Global Warming Potentials (GWPs), guidance and protocols for local governments to facilitate GHG reductions, and green ports. The report describes each measure and either recommends its approval or reclassification, or reports on the input received from the stakeholders group. The report analyzes the potential emissions reductions achieved from each measure, estimates the cost of the implementation, and analyzes the measure's feasibility.

**Executive Order S-01-07.** EO S-01-07 was put forth by Governor Schwarzenegger on January 18, 2007. California further solidified its dedication to reducing GHGs above what was intended in EO S-03-05 by setting a new LCFS for transportation fuels sold within the state. EO S-1-07 sets a declining standard for GHG emissions measured in carbon dioxide equivalent (CO<sub>2e</sub>) grams per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. Essentially, the order mandates the following: (1) that the state establish a goal to reduce the carbon intensity of California's transportation fuels by at least ten percent by 2020, and (2) that an LCFS for transportation fuels be established for California. The Executive Order is also known as the Low Carbon Standard for Transportation Fuels.

**Senate Bill 97, Companion Bill to Global Warming Solutions Act.** To address GHG emissions and global climate change in General Plans and CEQA documents, Senate Bill (SB) 97 (by Statutes in 2007, Chapter 185) added Section 21083.05 and added and repealed Section 21097 of the California Public Resources Code (Division 13, Chapter 2.6) (added by Statutes in 2007,

Chapter 185). Section 21083.05 requires the Office of Planning and Research (OPR) to develop guidelines for addressing global warming emissions and mitigating project-specific GHGs. OPR adopted amendments to the CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the amendments and filed them with the Secretary of State for inclusion in the California Code of Regulations. The amendments became effective on March 18, 2010. These CEQA Guidelines amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents.

**California’s Sustainable Communities Planning Act (Senate Bill 375).** SB 375, which was signed into law on October 1, 2008,<sup>1</sup> provides emissions reduction goals and incentives for local governments and developers to follow new conscientiously planned growth patterns in order to reduce GHG emissions. Section 65080(b)(1)(F)(2)(A) of the California Government Code enhances ARB’s ability to reach AB 32 goals by directing ARB to develop regional GHG emissions reduction targets to be achieved by the automobile and light-truck sectors for 2020 and 2035. ARB will also work with California’s 18 metropolitan planning organizations (MPOs) to align their regional transportation, housing, and land use plans; prepare a “sustainable communities strategy” to reduce the number of vehicle miles traveled (VMT) in their respective regions; and demonstrate the region’s ability to attain its GHG reduction targets.

**Waste Diversion.** AB 75<sup>2</sup> was passed in 1999, and the State Agency Model Integrated Waste Management Act (IWMA) (Chapter 764, Statutes of 1999, Strom-Martin) took effect on January 1, 2000. This bill added new provisions, Sections 40148, 40196.3, and 41821.2, and Chapter 18.5 (commencing with Section 42920) to Part 3 of Division 30 of the Public Resources Code (PRC) mandating that State agencies develop and implement an Integrated Waste Management Plan (IWMP). AB 75 also mandated that community service districts provide solid waste services report disposal and diversion information to the city, county, or regional agency in which the community service district is located. Among other things, the bill established the requirement for community service districts to divert at least 25 percent of their solid waste from landfills or transformation facilities by January 1, 2002, and divert 50 percent on and after January 1, 2004.

The Per Capita Disposal Measurement System Act (SB 1016) was passed in 2008 and codified in the California Public Resources Code.<sup>3</sup> Sections 42920 through 42921.5 changed the way State

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<sup>1</sup> SB 375 was codified to amend Sections 65080, 65583, 65584.01, 65584.02, 65584.04, 65587, and 65588 (Title 7, Division 1, Chapter 2.5), and it added Sections 14522.1, 14522.2, and 65080.01 (Title 2, Division 3, Part 5.3 Chapter 2) to the California Government Code and amended Section 21061.3 and added Section 21159.28 and Chapter 4.2 (commencing with Section 21155) to Division 13 of the California Public Resources Code (added by Statutes in 2008, Chapter 728).

<sup>2</sup> AB 75 repealed Sections 42922, 42923, 42927, and 42928 of the Public Resources Code, related to recycling.

<sup>3</sup> SB 1016 amended Sections 40183, 40184, 41783, 41820.6, 41821) 41850, 42921, and 42926; amended the headings of Article 4 (commencing with Section 41825) and Article 5 (commencing with Section 41850) of Division 30, Part 2, Chapter 7; added Sections 40127, 40145, 40150.1, 41780.05, 42921.5, 42927; and repealed and added Section 41825 of the California Public Resources Code (added by Statutes in 2008, Chapter 343).

agencies and local governments measure their progress toward meeting the statutory waste diversion mandates. Under this Act, State agencies are still required to maintain the 50 percent waste diversion requirement. However, with the passage of the Per Capita Disposal Measurement System Act, State agencies and large State facilities use per capita disposal as an indicator of their progress toward meeting the mandate.

### **3.5.3.3 Regional Regulations: Bay Area Air Quality Management District (BAAQMD)**

BAAQMD is responsible for improving air quality within the San Francisco Bay Area Basin. BAAQMD adopted new thresholds of significance (BAAQMD Thresholds) on June 2, 2010 to assist lead agencies in determining when potential quality impacts would be considered significant under CEQA. BAAQMD also released new CEQA Guidelines (BAAQMD 2010 CEQA Guidelines) in June 2010 that advise lead agencies on how to evaluate potential air quality impacts using the BAAQMD Thresholds.

### **3.5.3.4 City of Oakland Regulations**

The Draft City of Oakland Energy and Climate Action Plan (2010) outlines 150 specific actions (to be implemented over a ten-year period) that will enable the City to achieve a 36-percent reduction in GHG emissions. Based on the plan, much of the reduction would result from the implementation of renewable energy and energy efficiency measures, including measures to reduce electricity consumption by 32 percent and natural gas consumption by 15 percent. These measures include adopting green building ordinance for private development, using property-based financing for alternative energy systems, and advancing the use of transit. The plan has not yet been adopted by the City.

Several elements of the City's General Plan also contain policies related to GHG emissions and climate change. The Land Use and Transportation Element includes policies encouraging transit-oriented development, new bikeways and pedestrian ways, increased public transit, and infill development. The Open Space, Conservation and Recreation Element includes policies to conserve open space, which would protect vegetation to effect cooler climate, reduce excessive solar gain and absorb CO<sub>2</sub>; policies that encourage stormwater management to accommodate increased storms and flooding; and policies that encourage energy efficiency and use of alternative energy sources, which would directly reduce GHG emissions. The Historic Preservation Element encourages the reuse of existing buildings, which would reduce landfill material, avoid the incineration of materials, and the need for new material production. The Safety Element contains policies that address wildfire hazards and flooding hazards, both of which could be affected by climate change.

The City of Oakland has adopted a number of programs and policies designed to reduce GHG emissions and continue Oakland's progress toward becoming a model sustainable city. Some of these programs and policies include:

- *Sustainable Oakland Program*: This program coordinates Oakland's sustainability efforts.
- *Green Building*: The City has implemented Green Building principles in City buildings, adopted Green Building Guidelines, and adopted Green Building Education Incentives.
- *Downtown Housing*: The goal of the City's 10K Downtown Housing Initiative is consistent with smart growth principles.
- *Waste Reduction and Recycling*: The City has implemented a residential recycling program that has increased recycling tonnage by 37 percent and a construction and demolition recycling program requiring certain projects to recycle 100 percent of all asphalt and concrete material and 65 percent of all other materials.
- *Polystyrene Foam Ban Ordinance*: The City adopted an ordinance prohibiting the use of polystyrene foam disposable food service ware and requires, when cost-neutral, the use of biodegradable or compostable disposable food service ware by food vendors and City facilities.
- *Zero Waste Resolution*: The City has adopted a goal for “zero waste” by 2020.
- *Community Gardens and Farmers Markets*: Numerous community gardens and farmers markets locations have been established around the city in recent years, reducing truck and vehicle use and the associated GHG emissions.

### 3.5.4 EXISTING CONDITIONS

#### 3.5.4.1 Global Climate Change and Its Sources

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended period of time. The term “global climate change” is often used interchangeably with the term “global warming,” but “global climate change” is preferred to “global warming” because it helps convey that there are other changes in addition to rising temperatures.

Climate change refers to any change in measures of weather (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity; natural processes within the climate system, such as changes in ocean circulation; or human activities, such as the burning of fossil fuels, land clearing, or agriculture.

The primary observed effect of global climate change has been a rise in the average global tropospheric<sup>4</sup> temperature of 0.36 degrees Fahrenheit (°F) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns, or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and increased intensity of tropical cyclones. Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the Sacramento/San Joaquin Delta.

Global surface temperatures rose by 1.33°F ±0.32°F over the 100-year period from 1906 to 2005. The rate of warming over the last 50 years is almost double that over the last 100 years (IPCC 2007). The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3°F to 10.5°F by the end of the century (California Climate Change Center 2006). The prevailing scientific opinion on climate change is that “most of the warming observed over the last 50 years is attributable to human activities” (IPCC 2007). Increased amounts of carbon dioxide (CO<sub>2</sub>) and other GHGs are the primary causes of the human-induced component of warming. The observed warming effect associated with the presence of GHGs in the atmosphere (from either natural or human sources) is often referred to as the “greenhouse effect.”<sup>5</sup>

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:<sup>6</sup>

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF<sub>6</sub>)

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<sup>4</sup> The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

<sup>5</sup> The temperature on Earth is regulated by a system commonly known as the “greenhouse effect.” Just as the glass in a greenhouse allows heat from sunlight in and reduces the amount of heat that escapes, greenhouse gases like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

<sup>6</sup> The greenhouse gases listed are consistent with the definition in Assembly Bill (AB) 32 (Government Code Section 38505), as discussed later in this section.

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere and enhancing the natural greenhouse effect, which is believed to be causing global warming. While GHGs produced by human activities include naturally occurring GHGs such as CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, some gases, like HFCs, PFCs, and SF<sub>6</sub>, are completely new to the atmosphere. Certain other gases, such as water vapor, are short-lived in the atmosphere as compared to these GHGs that remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is generally excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this SMND/Addendum, the term “GHGs” will refer collectively to the six gases identified in the bulleted list provided above.

These gases vary considerably in their Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere (“atmospheric lifetime”). The GWP of each gas is measured relative to CO<sub>2</sub>, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO<sub>2</sub> over a specified time period. GHG emissions are typically measured in terms of metric tons<sup>7</sup> of “CO<sub>2</sub> equivalents” (CO<sub>2</sub>e). **Table 3.5-1** shows the GWPs for each type of GHG. For example, sulfur hexafluoride is 22,800 times more potent than carbon dioxide in contributing to global warming.

**TABLE 3.5-1: GLOBAL WARMING POTENTIAL OF GREENHOUSE GASES**

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-Year Time Horizon)
Carbon Dioxide (CO <sub>2</sub> )	50–200	1
Methane (CH <sub>4</sub> )	12	25
Nitrous Oxide (NO <sub>x</sub> )	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF <sub>4</sub> )	50,000	7,390
PFC: Hexafluoromethane (C <sub>2</sub> F <sub>6</sub> )	10,000	12,200
Sulfur Hexafluoride (SF <sub>6</sub> )	3,200	22,800

HFC = hydrofluorocarbon  
PFC = perfluorocarbon

Source: Intergovernmental Panel on Climate Change. 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

<sup>7</sup> A metric ton is equivalent to approximately 1.1 tons.

The following discussion summarizes the characteristics of the six primary GHGs.

**Carbon Dioxide.** In the atmosphere, carbon generally exists in its oxidized form, as CO<sub>2</sub>. Natural sources of CO<sub>2</sub> include the respiration (breathing) of humans, animals, and plants; volcanic outgassing; decomposition of organic matter; and evaporation from the oceans. Human-caused sources of CO<sub>2</sub> include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. The Earth maintains a natural carbon balance, and when concentrations of CO<sub>2</sub> are upset, the system gradually returns to its natural state through natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding CO<sub>2</sub> to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of human-made CO<sub>2</sub>, and consequently the gas is building up in the atmosphere. The concentration of CO<sub>2</sub> in the atmosphere has risen approximately 30 percent since the late 1800s (California Environmental Protection Agency 2006).

In 2002, CO<sub>2</sub> emissions from fossil fuel combustion accounted for approximately 98 percent of human-made CO<sub>2</sub> emissions and approximately 84 percent of California's overall GHG emissions (CO<sub>2</sub>e). The transportation sector accounted for California's largest portion of CO<sub>2</sub> emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California's second-largest category of GHG emissions.

**Methane.** CH<sub>4</sub> is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, natural gas, etc.). Decomposition occurring in landfills accounts for the majority of human-generated CH<sub>4</sub> emissions in California, followed by enteric fermentation (emissions from the digestive processes of livestock) (California Air Resources Board 2008a). Agricultural processes such as manure management and rice cultivation are also significant sources of human-made CH<sub>4</sub> in California. CH<sub>4</sub> accounted for approximately six percent of gross climate change emissions (CO<sub>2</sub>e) in California in 2002 (California Air Resources Board 2008a). It is estimated that over 60 percent of global methane emissions are related to human-related activities (IPCC 2007). As with CO<sub>2</sub>, the major removal process of atmospheric CH<sub>4</sub> – a chemical breakdown in the atmosphere – cannot keep pace with source emissions, and CH<sub>4</sub> concentrations in the atmosphere are increasing.

**Nitrous Oxide.** N<sub>2</sub>O is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. N<sub>2</sub>O is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N<sub>2</sub>O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion

are the primary sources of human-generated N<sub>2</sub>O emissions in California. N<sub>2</sub>O emissions accounted for nearly seven percent of human-made GHG emissions (CO<sub>2</sub>e) in California in 2002.

**Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride.** HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.<sup>8</sup> PFCs and SF<sub>6</sub> are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, leads to greater use of PFCs. HFCs, PFCs, and SF<sub>6</sub> accounted for about 3.5 percent of human-made GHG emissions (CO<sub>2</sub>e) in California in 2002 (California Environmental Protection Agency 2006).

#### 3.5.4.2 Emissions Sources and Inventories

An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This subsection summarizes the latest information on global, national, California, and local GHG emission inventories. However, because GHGs persist for a long time in the atmosphere (see **Table 3.5-1**), accumulate over time, and are generally well-mixed, their impact on the atmosphere and climate cannot be tied to a specific point of emission.

**Global Emissions.** Worldwide emissions of GHGs in 2004 were 27 billion metric tons of CO<sub>2</sub>e per year (UNFCC 2007).<sup>9</sup> Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

**United States Emissions.** In 2008, the United States emitted approximately 7.0 billion metric tons of CO<sub>2</sub>e, or approximately 25 tons per year per person. Of the six major sectors nationwide – electric power industry, transportation, industry, agriculture, commercial, residential – the electric power industry and transportation sectors combined account for approximately 62 percent of the GHG emissions. The majority of the electrical power industry and all of the transportation emissions are generated from direct fossil fuel combustion. Between 1990 and 2006, total United States GHG emissions rose approximately 14.7 percent (United States Environmental Protection Agency 2010).

**State of California Emissions.** According to California Air Resources Board (ARB) emission inventory estimates, California emitted approximately 480 million metric tons of CO<sub>2</sub>e (MMT<sub>CO2e</sub>) emissions in 2004 (California Air Resources Board 2008a). This large number is

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<sup>8</sup> The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

<sup>9</sup> Combined total of Annex I and Non-Annex I Country CO<sub>2</sub>eq emissions.



due primarily to the sheer size of California compared to other states. By contrast, California has the fourth-lowest per capita CO<sub>2</sub> emission rate from fossil fuel combustion in the country, due to the success of its energy efficiency and renewable energy programs and commitments that have lowered the state's GHG emissions rate of growth by more than half of what it would have been otherwise (California Energy Commission 2007).

The California Environmental Protection Agency (Cal/EPA) Climate Action Team stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO<sub>2</sub>e) was as follows (California Environmental Protection Agency 2006):

- CO<sub>2</sub> accounted for 83.3 percent
- CH<sub>4</sub> accounted for 6.4 percent
- N<sub>2</sub>O accounted for 6.8 percent
- HFCs, PFCs, and SF<sub>6</sub> accounted for 3.5 percent

The ARB estimates that transportation is the source of approximately 38 percent of the state's GHG emissions in 2004, followed by electricity generation (both in-state and out-of-state) at 23 percent, and industrial sources at 20 percent. The remaining sources of GHG emissions are residential and commercial activities at nine percent, agriculture at six percent, high global warming potential gases at three percent, and recycling and waste at one percent (California Air Resources Board 2008b).

The ARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the AB 32 Climate Change Program. The ARB's current GHG emission inventory covers the years 1990–2004 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands). The emission inventory estimates are based on the actual amount of all fuels combusted in the state, which accounts for over 85 percent of the GHG emissions within California.

ARB staff has projected that, in 2020, statewide unregulated GHG emissions – which represent the emissions that would be expected to occur in the absence of any GHG reduction actions – will be 596 MMTCO<sub>2</sub>e. GHG emissions from the transportation and electricity sectors as a whole are expected to increase but remain at approximately 38 percent and 23 percent of total CO<sub>2</sub>e emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions, and the percentage of the total 2020 emissions is projected to be 17 percent of total CO<sub>2</sub>e emissions. The remaining sources of GHG emissions in 2020 are high global warming potential gases at eight percent, residential and commercial activities at eight percent, agriculture at five percent, and recycling and waste at one percent (California Air Resources Board 2008b).

**Bay Area Emissions.** In the Bay Area, fossil fuel consumption in the transportation sector is the single largest source of the Bay Area's GHG emissions, accounting for just over half of the Bay Area's 85 million tons of GHG emissions in 2002. Industrial and commercial sources were the second largest contributors of GHG emissions, with about 25 percent of total emissions. Domestic sources (e.g., home water heaters, furnaces) account for about 11 percent of the Bay Area's GHG emissions, followed by power plants at seven percent. Oil refining accounts for approximately six percent of the total Bay Area GHG emissions (BAAQMD 2008).

**City of Oakland Emissions.** The City of Oakland, in partnership with ICLEI—Local Governments for Sustainability, has developed a GHG emissions inventory estimating citywide GHG emissions for year 2005 at approximately 3 million metric tons of CO<sub>2</sub>e (City of Oakland, 2010). This citywide GHG emissions inventory reflects all the energy used and waste produced within the Oakland city limits. When emissions from highway transportation are considered in the total, approximately 58 percent of Oakland's annual GHG emissions are associated with the transportation sector. Natural gas consumption represents approximately 22 percent of Oakland's GHG emissions, while electricity use and waste decomposition represent 16 percent and four percent of Oakland's total GHG emissions, respectively.

### 3.5.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

#### 3.5.5.1 Methodology

The Climate Change Technical Report (ENVIRON 2010) provides the quantitative forecasts used in this analysis of GHG emissions expected during construction and operation of the buildout of the amended Master Plan. ENVIRON evaluated the GHG emissions of the buildout of the amended Master Plan using the methodology provided in the BAAQMD 2010 CEQA Guidelines and the City's significance criteria. The GHG inventory for the proposed Master Plan amendment takes into account indirect and direct annual operation emissions from building energy use, non-building energy use, traffic generated by the buildout of the amended Master Plan, enteric fermentation and manure management, water and wastewater supply and treatment, solid waste, and emergency generators. BAAQMD has adopted three different thresholds for determining the significance of a project's GHG emissions. A project would be considered to generate significant GHG emissions if it would generate 1,100 metric tons or more of CO<sub>2</sub>e a year. However, a project would have a less-than-significant impact if it (a) would generate less than 4.6 metric tons of CO<sub>2</sub>e per service population a year for operational emissions, or (b) complies with a Greenhouse Gas Reduction Strategy, as defined by BAAQMD. In addition, a stationary source would be considered to generate significant GHG emissions if it would produce total emissions of more than 10,000 metric tons of CO<sub>2</sub> annually.

BAAQMD does not have a recommended threshold of significance for construction-related emissions, but the BAAQMD 2010 CEQA Guidelines suggest that a lead agency should quantify such emissions.

It should be noted that the BAAQMD 2010 CEQA Guidelines allow for the consideration of reductions in emissions associated with carbon sequestration accomplished through tree planting as part of development projects. However, this analysis takes a conservative approach to calculating the expected GHG emissions of the buildout of the amended Master Plan. In the inventory of GHG emissions calculated for the buildout of the amended Master Plan, GHG emission reductions associated with vegetation change are calculated, but are not taken into account to determine whether the buildout of the amended Master Plan would exceed significance thresholds. This calculation methodology is considered to be conservative because it may over-estimate the GHG emissions associated with the buildout of the amended Master Plan.

### 3.5.5.2 CEQA Thresholds/Criteria of Significance

These thresholds are based on the BAAQMD Thresholds described above. The project would have a significant impact on the environment if it would:

- a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, specifically:

#### ***Project-Level Impacts***

- i. For a project involving a stationary source, produce total emissions of more than 10,000 metric tons of CO<sub>2</sub>e annually. *(NOTE: Stationary sources are projects that require a BAAQMD permit to operate.)*
- ii. For a project involving a land use development, produce total emissions of more than 1,100 metric tons of CO<sub>2</sub>e **AND** more than 4.6 metric tons of CO<sub>2</sub>e per service population annually. *(NOTE: Land use developments are projects that do not require a BAAQMD permit to operate. The service population includes both the residents and the employees of the project. The project's impact would be considered significant if the emissions exceed **BOTH** the 1,100 metric tons threshold and the 4.6 metric tons threshold. Accordingly, the impact would be considered less than significant if a project's emissions are below **EITHER** of these thresholds.)*

*(NOTE: The project's expected greenhouse gas emissions during construction should be annualized over a period of 40 years and then added to the expected emissions during operation for comparison to the threshold. A 40-year period is used because 40 years is considered the average life expectancy of a building before it is remodeled with considerations for increased energy efficiency. The thresholds are based on the BAAQMD thresholds. The BAAQMD thresholds were originally developed for project operation impacts only. Therefore, combining both the construction emissions and operation emissions for comparison to the threshold represents a conservative analysis of potential greenhouse gas impacts.)*

- b) Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing greenhouse gas emissions.

These criteria are discussed below.

**a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

**Table 3.5-3** provides a summary of the GHG emissions that would be generated by the buildout of the amended Master Plan. Findings are discussed below. Construction emissions are discussed first, followed by operational emissions.

**Construction Emissions.** GHG emissions would be generated by two major components of construction: site grading and building construction. The latter component – building construction – is organized into three sub-components: building construction, architectural painting, and asphalt paving. The emissions from these building construction activities are mainly attributable to fuel use associated with the use of construction equipment and worker commutes. Construction emissions were calculated using the same methods used to calculate criteria pollutant emissions (see **Section 3.2, Air Quality**). As shown in **Table 3.5-2**, construction associated with the buildout of the amended Master Plan would generate one-time-only emissions of 495 metric tons of CO<sub>2e</sub>. Annualized over 40 years (the average life expectancy of a building before it is remodeled with considerations for increased energy efficiency), construction activities would account for approximately 12 tons of CO<sub>2e</sub> per year. BAAQMD has not adopted a significance threshold for GHG emissions from construction, but recommends making a determination of the significance of construction GHG emission impacts in relation to meeting AB 32 GHG reduction goals. To determine the significance of construction, the project’s expected greenhouse gas emissions during construction are annualized over a period of 40 years and then added to the expected emissions during operation for comparison to the threshold. A 40-year period is used because 40 years is considered the average life expectancy of a building before it is remodeled with considerations for increased energy efficiency. The thresholds are based on the BAAQMD thresholds. The BAAQMD thresholds were originally developed for project operation impacts only. Therefore, combining both the construction emissions and operation emissions for comparison to the threshold represents a conservative analysis of potential greenhouse gas impacts.

**TABLE 3.5-2 GREENHOUSE GAS EMISSIONS FROM CONSTRUCTION ACTIVITIES<sup>10</sup>**

Project	GHG Emissions by Source Type (Metric tons CO <sub>2e</sub> )		
	On-Site Equipment <sup>1</sup>	Mobile Sources <sup>2</sup>	Total
California Exhibit	162	252	414
Veterinary Medical Hospital	18	63	81
Total	180	315	495

<sup>1</sup> The detailed construction data provided by the Oakland Zoo including phase schedule, manpower, equipment types and quantity are presented in the Appendix B of the Climate Change Technical Report prepared by ENVIRON and included in **Appendix H**.

<sup>2</sup> Includes delivery trucks, hauling trucks and workers’ private vehicles.

Source: ENVIRON

<sup>10</sup> GHG emissions from construction activities are calculated using the same methodology as that used for criteria pollutant emissions calculations described in the Air Quality Technical Report (see **Appendix F**).

**Operational Emissions.** Table 3.5-3 shows the operational emissions associated with the buildout of the amended Master Plan. The calculation of operational emissions includes the following sources: building energy use; non-building energy use (i.e., from structures, such as the animal holding areas, which do not fall into traditional building categories); diesel generators; water and wastewater supply and treatment systems; mobile emissions (i.e., emissions from the use of vehicles by zoo employees and visitors); solid waste; and animal husbandry (including enteric fermentation and on-site composting). One-time emissions associated with construction activities and changes in vegetation are annualized and added to the combined operational emissions. Changes in vegetation represent a conservative analysis of vegetative cover affected with the buildout of the amended Master Plan because the analysis assumes that all vegetation affected by the buildout of the amended Master Plan will be completely removed, including areas of limited and low disturbance (see **Table 3.3.1 in Section 3.3 Biological Resources**).

Table 3.5-3 shows the emissions associated with stationary sources (i.e., emergency generators) and emissions associated with non-stationary sources (i.e., land use development, including annualized construction emissions). In summary, stationary sources would generate 14 tons of CO<sub>2</sub>e per year, which would not exceed the significance threshold of 10,000 metric tons of CO<sub>2</sub>e annually. Non-stationary sources would generate 843 tons of CO<sub>2</sub>e per year, which would not exceed the significance threshold of 1,100 metric tons of CO<sub>2</sub>e per year.

Therefore, emissions associated with the buildout of the amended Master Plan would be less-than-significant.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?**

Although the City has not yet adopted the Oakland Energy and Climate Action Plan, the buildout of the amended Master Plan would not conflict with the draft plan because the plan primarily focuses on the adoption of City-initiated actions and standards (such as creating incentives for the use of transit, adopting a green building ordinance, and making government buildings more energy-efficient) as opposed to energy efficiency measures that would be immediately adopted by private entities. No part of the buildout of the amended Master Plan would interfere with adoption or successful implementation of the plan. The buildout of the amended Master Plan would include green building features that would promote the goals and objectives outlined in the Draft City of Oakland Energy and Climate Action Plan and other GHG-reducing policy initiatives, such as AB 32. For instance, the proposed Veterinary Medical Hospital would be the first LEED-certified facility of its kind in California, and would include: energy- and water-saving features; sustainable building materials; and indoor environments that make optimal use of natural light. Some of the

**TABLE 3.5-3: SUMMARY OF GREENHOUSE GAS EMISSIONS FROM BUILDOUT OF AMENDED MASTER PLAN**

Source	GHG Emissions	Unit	Percent of Annual CO <sub>2</sub> e Emissions
<b>Stationary Sources</b>			
Emergency Generators	14	Metric tons CO <sub>2</sub> e/year	NA
<b>Threshold of Significance</b>	10,000		NA
<b>Exceeds Threshold?</b>	<b>No</b>		
<b>Sources Other Than Stationary Sources</b>			
Buildings <sup>1</sup>	343	Metric tons CO <sub>2</sub> e/year	40.1%
Holding Areas and Gondola	64		7.4%
Mobile	397		46.4%
Water	4		0.5%
Animal Waste – Ruminants	13		1.5%
Animal Waste – Manure	7		0.8%
Municipal Solid Waste <sup>2</sup>	9		1.0%
Annualized Construction <sup>3</sup>	12		1.4%
Annualized Vegetation <sup>4</sup>	6		0.7%
<b>Total (Annual Emissions)</b>	<b>855</b>		
<b>Threshold of Significance</b>	<b>1,100</b>	<b>Metric tons CO<sub>2</sub>e/year</b>	<b>NA</b>
<b>Exceeds Threshold?</b>	<b>No</b>		

GHG = greenhouse gas  
 CO<sub>2</sub>e = carbon dioxide equivalent  
 NA = not applicable

- <sup>1</sup> The emission factor used for Building Energy Use and all other emissions due to indirect electricity use does not take into account the Renewables Portfolio Standard.
- <sup>2</sup> Emissions from solid waste are conservatively included in the inventory for comparison with the threshold of significance. However, BAAQMD's derivation of the 1,100-metric-tons-per-year threshold did not take into account emissions associated with landfills. Therefore, including these emissions represents a conservative analysis.
- <sup>3</sup> Construction emissions are annualized over a period of 40 years and then added to the expected emissions during operation for comparison to the threshold. A 40-year period is used because 40 years is considered the average life expectancy of a building before it is remodeled with considerations for increased energy efficiency. The thresholds are based on the BAAQMD thresholds. The BAAQMD thresholds were originally developed for project operation impacts only. Therefore, combining both the construction emissions and operation emissions for comparison to the threshold represents a conservative analysis of potential greenhouse gas impacts.
- <sup>4</sup> Vegetation emissions are annualized based on a 20-year active growth period as recommended by the Intergovernmental Panel on Climate Changes (IPCC), and are included in the inventory for comparison to the threshold of significance. The BAAQMD CEQA Guidelines do not contain recommendations regarding whether to include GHG emissions from vegetation in an emissions inventory. Since the BAAQMD significance threshold of 1,100 metric tons per year did not factor in vegetation emissions, including these emissions represents a conservative analysis.

proposed animal enclosures would also have green roofs. The buildout of the amended Master Plan would also include the planting of native trees, shrubs, and grasses.

The buildout of the amended Master Plan would also include solid waste reduction strategies that would reduce GHG emissions. These include (1) the sorting of materials such that recyclable or compostable materials are diverted from the landfill; (2) the composting of animal

manure, food waste, and landscaping clippings, and the use of compost for on-site landscaping activities; and (3) the collection of yard waste and vegetable matter from off-site residences, and the use of these materials to feed elephants.

The buildout of the amended Master Plan would be subject to all applicable regulatory requirements, including the City's Standard Conditions of Approval, which would further reduce GHG emissions. These include measures to recycle construction and operational waste, requirements for tree replacement planting, and implementation of a parking and transportation demand management plan.

Therefore, overall, the buildout of the amended Master Plan would entail implementing reduction strategies consistent with AB 32, the Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the State and targeted by the City of Oakland. In addition, the Oakland Zoo is also located in close proximity to a dense urban center. Therefore, the buildout of the amended Master Plan would also realize transportation-related GHG reductions compared to a similar project in a location at a distance from a major urban area.

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.5.6 CUMULATIVE IMPACTS

GHG impacts are, by their very nature, cumulative impacts. Consequently, the cumulative analysis is the same as the foregoing discussion concerning project impacts. Projects that create emissions below the project-level thresholds are not considered to be significant contributors to a cumulative impact. Because emissions associated with the buildout of the amended Master Plan would be well below the significance thresholds, it would not represent a cumulatively considerable contribution to the global atmosphere.

### 3.5.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new global climate change impacts compared to the 1998 MND. Impacts would be less-than-significant. This section identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.

### 3.5.8 REFERENCES

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## 3.6 HAZARDS AND HAZARDOUS MATERIALS

This section evaluates the potential hazards and hazardous materials impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant hazards and hazardous materials impacts not identified in the 1998 MND or a substantial increase in the severity of the previously identified impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant hazards or hazardous materials impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. The section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required.

### 3.6.1 PRIOR MND ANALYSIS AND CONCLUSIONS

#### 3.6.1.1 1998 Prior MND Impact Findings

The 1998 MND concluded that the Master Plan would not have significant hazards and hazardous materials impacts.

The 1998 MND indicated that the Master Plan would not involve the use or disposal of potentially hazardous materials. In 1998, the existing veterinary medical hospital used compressed oxygen gas, x-ray film and developer and an autoclave sterilizer and pharmaceuticals. The oxygen gas tank was handled and refilled by an off-site vendor using safe practices. The x-ray film and developer was removed and disposed of by an off-site vendor. The sterilizer used heat only, no ethylene oxide was required. The veterinary medical hospital used no radioactive materials and pharmaceuticals were dispensed by a veterinarian.

The 1998 MND indicated that the Master Plan would not interfere with any City emergency response plans. The zoo maintains an Emergency Preparedness and Response Plan and Animal Capture Plan that address emergency situations that may arise at the zoo, including health emergencies, animal escapes, fire, and earthquakes. The 1998 MND indicated that this plan would be revised to incorporate the new facilities and programs developed under the Master Plan.

#### 3.6.1.2 1998 MND Mitigation Measures

Since the 1998 MND concluded that the Master Plan would have no significant hazards and hazardous materials impacts, no mitigation measures were identified. Geology Mitigation Measure 5e included certain requirements related to the zoo's Emergency Preparedness and Response Plan (see **Section 3.4 Geology and Soils**).

### 3.6.2 STANDARD CONDITIONS OF APPROVAL

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that relate to hazards and hazardous materials and that would apply to the proposed Master Plan amendment are listed below. If the City approves the Master Plan amendment, these Standard Conditions of Approval would be adopted as requirements of the Master Plan amendment and would ensure no significant hazards and hazardous materials impacts occur. As a result, the Standard Conditions of Approval are not listed as mitigation measures.

#### **SCA-HAZ-1: Hazards Best Management Practices**

##### ***Prior to commencement of demolition, grading, or construction***

The project applicant and construction contractor shall ensure that construction Best Management Practices (BMPs) are implemented as part of construction to minimize the potential negative effects to groundwater and soils. These shall include the following:

- a) Follow manufacture's recommendations on use, storage, and disposal of chemical products used in construction;
- b) Avoid overtopping construction equipment fuel gas tanks;
- c) During routine maintenance of construction equipment, properly contain and remove grease and oils;
- d) Properly dispose of discarded containers of fuels and other chemicals.
- e) Ensure that construction would not have a significant impact on the environment or pose a substantial health risk to construction workers and the occupants of the proposed development. Soil sampling and chemical analyses of samples shall be performed to determine the extent of potential contamination beneath all UST's, elevator shafts, clarifiers, and subsurface hydraulic lifts when on-site demolition, or construction activities would potentially affect a particular development or building.
- f) If soil, groundwater or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums or other hazardous materials or wastes are encountered), the applicant shall cease work in the vicinity of the suspect material, the area shall be secured as necessary, and the applicant shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notification of regulatory agency(ies) and implementation of the actions described in the City's Standard Conditions of Approval, as necessary, to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented under the oversight of the City or regulatory agency, as appropriate.

## SCA-HAZ-2: Hazardous Materials Business Plan

### *Prior to handling, storing or transporting hazardous materials*

The project applicant shall submit a Hazardous Materials Business Plan for review and approval by Fire Prevention Bureau, Hazardous Materials Unit. Once approved this plan shall be kept on file with the City and will be updated as applicable. The purpose of the Hazardous Materials Business Plan is to ensure that employees are adequately trained to handle the materials and provides information to the Fire Services Division should emergency response be required. The Hazardous Materials Business Plan shall include the following:

- a) The types of hazardous materials or chemicals stored and/or used on site, such as petroleum fuel products, lubricants, solvents, and cleaning fluids.
- b) The location of such hazardous materials.
- c) An emergency response plan including employee training information
- d) A plan that describes the manner in which these materials are handled, transported and disposed.

### 3.6.3 UPDATED REGULATORY SETTING

The proposed Veterinary Medical Hospital would use, store, and dispose of biohazardous materials and would be subject to the Medical Waste Management Act (State of California 2007). The existing Veterinary Care Center is also subject to the requirements of this Act. The following discussion reviews applicable regulations at the state and local levels.

#### 3.6.3.1 State Regulations

**Medical Waste.** Within the regulatory framework of the Medical Waste Management Act, the Medical Waste Management Program of the California Department of Health Services (CDHS) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste off-site treatment facilities and transfer stations throughout the state. The CDHS also oversees all medical waste transporters. The Medical Waste Management Program provides support and oversight to the Alameda County Department of Environmental Health (ACDEH), which enforces the Medical Waste Management Act locally.

**Occupational Safety.** The California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations (CFR). Cal/OSHA standards are generally more stringent than federal regulations.

Cal/OSHA regulations concerning the use of hazardous materials in the workplace require employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces hazard communication program regulations, which contain training and information requirements, including procedures for identifying and labeling hazardous substances and communicating hazard information relating to hazardous substances and their handling. The hazard communication program also requires that Materials Safety Data Sheets (MSDS) be available to employees, and that employee information and training programs be documented. These regulations also require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and training in emergency evacuation).

State laws, like federal laws, include special provisions for hazard communication to employees in research laboratories, including training in chemical work practices. Specific, more detailed training and monitoring are required for the use of carcinogens, ethylene oxide, lead, asbestos, and certain other chemicals listed in 29 CFR. Emergency equipment and supplies, such as fire extinguishers, safety showers, and eye washes, must also be provided and maintained in accessible places.

**Emergency Response.** California has developed an emergency response plan to coordinate emergency services provided by federal, state, and local governments and private agencies. Responding to hazardous materials incidents is part of this plan. The plan is administered by the State Office of Emergency Services (OES), which coordinates the responses with other agencies including the California Environmental Protection Agency (Cal EPA), California Highway Patrol, California Department of Fish and Game, San Francisco Bay Regional Water Quality Control Board, Alameda County Fire Department (ACFD) and the Oakland Fire Department. The Oakland Fire Department provides first response capabilities, if needed, for hazardous materials emergencies in the Master Plan area.

The EPM for the existing zoo sets forth specific policies and systematic procedures to be implemented in the event of visitor and/or animal emergencies. The zoo's Park Services and Public Safety Department oversees the planning, development, and execution of the zoo's emergency preparedness protocols and procedures. The zoo conducts Scenario Training Exercises at least once a year with participation by all departments. The primary components of the EPM associated with visitor and community safety address topics related to internal management and operations, emergency access and evacuation procedures, and coordination with the Oakland Police and Fire Departments. Each of these topics is summarized below.

**Internal Management and Operations.** Policy decisions, prioritization, and strategic action plans are determined by a Zoo Emergency Response Team consisting of a management chain of command beginning with the Executive Director and ending with a Lead Supervisor depending on availability. In the event of an emergency, a representative from each department would

report to a designated safe central location for information gathering, prioritizing, and decision-making associated with overall response, including available exit routes, medical needs, animal status, structural assessment, and planning for business recovery. Each department has pre-assigned emergency response and management duties.

**Emergency Access and Evacuation/Visitor Safety.** Emergency procedures and protocols for access and evacuation have been established for a range of scenarios, including animal escapes, earthquakes, natural disasters, and fires. Each department has pre-assigned duties and assembly areas associated with public and staff evacuation. Specific procedures have been developed for each of the zoo rides. Depending on the nature of the emergency, evacuation could involve visitors and staff relocating into secure zoo visitor buildings. The primary entrance road into the zoo, leading from the corner of Golf Links Road and Mountain Boulevard, would remain open for responding emergency vehicles only. All other entering traffic would be stopped. Exiting traffic would be directed down the 106th Avenue exit road.

**Oakland Police and Fire Departments.** The Oakland Police and Fire Departments have been issued instructions and have participated in training scenarios relating to zoo emergency response, including establishment of site communications, disaster support, zoo evacuation, and implementation of protocol associated with setting perimeters to ensure safe animal recapture. Prior to and upon entering the zoo, the Oakland Police and Fire Departments would coordinate closely with zoo officials to understand the nature of the emergency and the status of the implementation of response procedures.

### **Existing Emergency Protocols**

- *Assembly Areas:* Nine pre-designated assembly areas have been identified in the existing zoo. The proposed Veterinary Medical Hospital and the California Interpretive Center within the California Exhibit would serve as two additional assembly areas.
- *Annual Training Exercises:* Emergency scenario training exercises would incorporate the proposed Veterinary Medical Hospital and California Exhibit.
- *Oakland Police and Fire: Departments:* The Oakland Police and Fire Departments would be consulted to review and advise on emergency scenario planning for the Veterinary Medical Hospital and California Exhibit prior to the completion and occupation of these facilities. Additionally, the Oakland Fire Department would review the emergency response plan as required by **SCA-HAZ-2**.
- *First Aid and Disaster Kit Locations:* New locations for first aid and disaster kits would include the Veterinary Medical Hospital, the California Interpretive Center, and various other locations throughout the California Exhibit.
- *Fire Extinguisher Locations:* New locations for first aid and disaster kits would include the Veterinary Medical Hospital, the California Interpretive Center, and various other locations throughout the California Exhibit.

- *Animal Management:* Animal management response vehicles provide vital services including the transportation of supplies and staff. An additional parking space would be allocated within the California Exhibit area. Animal capture equipment is located throughout the existing zoo. New equipment would be placed within the California Exhibit and Veterinary Medical Hospital. Animal escape protocols and procedures would be extended to cover the California Exhibit and the Veterinary Medical Hospital.
- *Damage Assessment and Business Recovery:* Following any emergencies, a comprehensive damage assessment would be undertaken to guide zoo management in setting priorities to guide recovery activities. The Veterinary Medical Hospital and California Exhibit would be included in this assessment and recovery plan.

**Hazardous Materials Transportation.** The State of California regulates the transportation of hazardous waste. State regulations are contained in Title 26 of the California Code of Regulations. The California Highway Patrol and the California Department of Transportation have primary responsibility for enforcing state regulations and responding to hazardous materials transportation emergencies.

### 3.6.3.2 Local Regulations (Oakland General Plan)

The Safety Element of the Oakland General Plan was adopted in November 2004, after the adoption of the 1998 MND. The Safety Element contains the following hazardous materials policies relevant to the proposed Master Plan amendment (City of Oakland 2004):

*Policy HM-1:* Minimize the potential risks to human and environmental health and safety associated with the past and present use, handling, storage and disposal of hazardous materials.

*Policy HM-2:* Reduce the public's exposure to toxic air contaminants through appropriate land use and transportation strategies.

*Policy HM-3:* Seek to prevent industrial and transportation accidents involving hazardous materials, and enhance the city's capacity to respond to such incidents.

See further discussion in **Subsection 3.6.5** below. Please also refer to **Section 3.8, Land Use, Recreation and Planning**, which discusses these policies and other applicable hazard-related General Plan policies.

## 3.6.4 EXISTING CONDITIONS

### 3.6.4.1 Existing Veterinary Care Center

The existing Veterinary Care Center is located within the existing zoo. The facility includes two holding areas for sick and injured animals and one treatment room. The current procedure for the handling, storage and disposal of hazardous materials is as follows (Emanuelson 2010):

- Hazardous pharmaceuticals are stored in the treatment rooms, lab, and supply ward. All hazardous material storage and handling conforms to OSHA hazardous material handling guidelines.
- All MSDS are maintained in a binder located in the treatment room.
- All biohazards (sharps, material contaminated with animal fluids, hazardous empty pharmaceutical vials, culture plates, etc.) are disposed of via a vendor specializing in the disposal of biohazard materials. Biohazard materials are picked up quarterly (every three months). Until pickup, biohazard waste materials are stored in sealed containers. Tissue samples are stored in formalin or sealed in frozen containers.
- Disinfectants are applied to the animals as directed and ultimately hosed into the sanitary sewer.
- Out-of-date (unused) hazardous pharmaceuticals are returned to the vendor.
- Use of digital radiology has eliminated the use of any hazardous substances when developing images for radiographic film.
- General household cleansers, such as bleach, and medical disinfectants (Quaternary ammonium compounds, etc.), once opened, are stored in a lone location in the treatment room. Unopened back stock is stored in the supply ward until it is needed.

#### **3.6.4.2 Historical Use of Master Plan Area**

The proposed Veterinary Medical Hospital and California Exhibit sites are located on undeveloped land within Knowland Park. Historically, a portion of the site of the proposed Veterinary Medical Hospital was used by the zoo to store herbivorous animal manure. For the past 12 years, herbivorous animal manure has been transported to a site located within the zoo where the manure is composted in plastic bags and then used as fertilizer throughout the zoo.

#### **3.6.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT**

The project would have a significant impact on the environment if it would:

- a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials;
- b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;

- e) Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area;
- f) Be located within the vicinity of a private airstrip, and result in a safety hazard for people residing or working in the project area;
- g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

These criteria are discussed below.

**a) Would the project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?**

The buildout of the amended Master Plan would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. During construction, chemicals such as gasoline, diesel fuels, lubricating oil, hydraulic oil, automatic transmission fluid, paints, solvents, glues and other substances could be used. Oversight by the general contractor would ensure that all hazardous materials used during construction activities are properly stored, used, and disposed of. Transport of hazardous materials is governed by state regulations.

With the buildout of the amended Master Plan, the size of the zoo's animal collection would increase over time, resulting in a modest increase in the volume of medical materials currently used. The proposed Veterinary Medical Hospital would include six holding areas and two treatment rooms. Operation of the Veterinary Medical Hospital would include the use of small quantities of hazardous pharmaceuticals to maintain the health of zoo animals. Other hazardous materials would include medical disinfectants and general household cleansers, such as bleach, to maintain hospital facilities and equipment in a clean and sterile condition. All biohazardous waste such as sharps (hypodermic needles and blades), material contaminated with animal fluids, hazardous empty pharmaceutical vials, and culture plates would be disposed of on a quarterly basis by a licensed hazardous waste hauler at a licensed treatment facility. Biohazardous waste would be stored in compliance with the California Department of Public Health Medical Waste Management Program until removal and disposal by a licensed hazardous waste hauler.

In accordance with the Medical Waste Management Act (State of California 2007), preparation of a Hazardous Materials Business Plan (HMBP) would be required to manage the hazardous materials stored at the Veterinary Medical Hospital. The purpose of the HMBP is to foster the prevention of release of hazardous materials into the workplace or environment, and to facilitate



the mitigation of damage to the health and safety of persons and the environment in the event an accidental release occurs. The existing Veterinary Care Center maintains an approved HMBP (Oakland Zoo 2007). The approved HMBP would be updated to address the proposed Veterinary Medical Hospital and submitted for approval to the ACDEH 30 days prior to occupancy of the Veterinary Medical Hospital. Subject to approval by the ACDEH and the Oakland Fire Department in accordance with **SCA-HAZ-2**, the current HMBP would be updated to address the proposed Veterinary Medical Hospital and would include information on the location, type, quantity, and health risks of hazardous materials handled, used, stored, and disposed of on-site, along with an Emergency Response/Contingency Plan and an Employee Training Plan. The information contained in the HMBP is intended to be used by firefighters and other emergency responders, health officials, planners, public safety officers, health care providers, and regulatory agencies as well as interested members of the public. The modest increase in hazardous materials generated by the proposed Veterinary Medical Hospital would be governed by the requirements of the zoo's updated HMBP and overseen by the ACDEH and the Oakland Fire Department to ensure compliance with all regulatory requirements.

The anticipated increase in hazardous materials generated by the buildout of the amended Master Plan is considered a less-than-significant impact. Impacts would be similar to those addressed in the 1998 MND and would continue to be less than significant. Additionally, **SCA-HAZ-2** requires preparation of a HMBP, which would ensure compliance with applicable state and local requirements.

The buildout of the amended Master Plan would not conflict with Policies HM-1, HM-2, or HM-3 of the Safety Element of the Oakland General Plan. The storage and disposal of hazardous materials would be in compliance with applicable state and local requirements and the zoo would update its current HMBP to include the proposed Veterinary Medical Hospital.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?**

Hazardous materials used during construction activities would be properly stored and disposed of. Biohazardous waste generated by the proposed Veterinary Medical Hospital would be disposed of and transported in compliance with the Medical Waste Management Act and would not create a significant hazard to the public or the environment. See **Criterion a** above.

**Impact:** Less-than-significant

**Mitigation:** None required

**c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?**

Marshall Elementary School is located about one-quarter mile southeast of the proposed Veterinary Medical Hospital site. The modest increase in hazardous materials stored at the proposed Veterinary Medical Hospital would be managed in compliance with the Medical Waste Management Act. The proposed Master Plan amendment would result in less-than-significant hazardous emissions and hazardous materials handling impacts. Toxic air contaminants associated with the proposed Master Plan amendment are discussed in **Section 3.2, Air Quality**.

**Impact:** Less-than-significant

**Mitigation:** None required

**d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?**

The Oakland Zoo and Knowland Park are not included on the Cortese List (DTSC 2010). The buildout of the amended Master Plan would not create a hazard impact to the public or the environment.

**Impact:** No impact

**Mitigation:** None required

**e) Would the project be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?**

The proposed California Exhibit and Veterinary Medical Hospital would be located more than two miles northeast of the Oakland International Airport. Thus, the buildout of the amended Master Plan would not result in a safety hazard for zoo visitors, staff, and volunteers.

**Impact:** No impact

**Mitigation:** None required

**f) Would the project be located within the vicinity of a private airstrip, and result in a safety hazard for people residing or working in the project area?**

The Veterinary Medical Hospital and California Exhibit would not be located within two miles of a private airstrip. Thus, the buildout of the amended Master Plan would not result in a safety hazard for people residing or working in the project area.

**Impact:** No impact

**Mitigation:** None required

**g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?**

The zoo's Emergency Preparedness Manual (EPM) (Oakland Zoo 2010) addresses emergencies that may occur at the zoo. The EPM would be updated to incorporate the buildout of the amended Master Plan and maintain consistency with adopted City of Oakland emergency response and evacuation plans. After the EMP update is prepared, the zoo would be required to educate the neighborhood about the EMP as required by 1998 Mitigation Measure 5e (see **Section 3.4 Geology and Soils**).

**Updating the EPM.** Prior to the buildout of the amended Master Plan, the zoo would update the existing EPM to reflect the projected growth in attendance, the development of new visitor facilities and animal exhibits, and the new Veterinary Medical Hospital. The existing emergency protocols would apply to the California Exhibit and the Veterinary Medical Hospital. Certain new facilities, such as the gondola people-moving system, would require new emergency protocols and these would be established with guidance from the manufacturer. Additions and modifications to the EPM to accommodate the California Exhibit and the Veterinary Medical Hospital would include:

***New Emergency Protocols and Procedures***

- *Gondola People-Moving System:* Many of the procedures related to existing zoo rides would apply to the proposed gondola people-moving system. Additional emergency evacuation procedures and protocols in accordance with the manufacturer's recommendations would be implemented.
- *Emergency Access and Evacuation/Visitor Safety:* A primary emergency vehicle access road extending from the end of Snowdown Avenue on the southeast side of Knowland Park into the proposed California Exhibit would continue to be used for access by the Oakland Fire Department and would serve as an emergency evacuation route as needed by visitors. A service road would be extended from the existing upper parking lots at the zoo to the proposed Veterinary Medical Hospital and to the California Exhibit. This road would also serve as a secondary emergency vehicle access road as well as an evacuation route for visitors as needed.
- *Fire Access Improvements:* A fire service plan for the Veterinary Medical Hospital and the California Exhibit has been prepared by the Oakland Zoo and reviewed by the Oakland Fire Department. The plan provides details for fire access throughout the site including locations of fire hydrants, location of fire water service, and improvement of existing trails.

**Summary.** The potential effect of the buildout of the amended Master Plan on emergency response and evacuation plans is considered a less-than-significant impact. The impact would be similar to that addressed in the 1998 MND and would continue to be less than significant.

**Impact:** Less-than-significant

**Mitigation:** None required

**h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?**

The Oakland Zoo and Knowland Park are located within the City of Oakland's 2004 Wildfire Prevention Assessment District. This district was created subsequent to the adoption of the 1998 MND. In coordination with the Wildfire Prevention Assessment District, wildland fire management measures at Knowland Park are implemented annually to reduce the potential for wildland fires. The buildout of the amended Master Plan would provide an emergency vehicle access road from Snowdown Avenue to the California Exhibit and improve the existing service road that would provide access to the California Exhibit in compliance with Oakland Fire Department requirements. The proposed Master Plan amendment would not result in a significant risk of loss, injury, or death involving wildland fires. For more discussion of the Wildfire Prevention Assessment District and Oakland Fire Department requirements, see **Section 3.10, Public Services and Utilities.**

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.6.6 CUMULATIVE IMPACTS

The geographic scope for assessing the potential for cumulative hazards and hazardous materials is the immediately surrounding area, including Knowland Park, the existing zoo facilities, the immediately surrounding residential communities, and the other nearby recreational areas, including Anthony Chabot Regional Park and other parks.

The buildout of the amended Master Plan is the only reasonably foreseeable future project in the immediate geographic area. The Knowland Park area outside of the Master Plan boundary is zoned Open Space (Resource Conservation Area) and no future development is expected at this time. The zoo has been a part of Knowland Park for more than 60 years. The immediately surrounding residential areas are largely built out. Any future improvements to existing houses or the potential construction of houses on any vacant parcels would not be expected to create significant hazards or hazardous materials impacts, and would not be close enough to the Master Plan area to combine with the amended Master Plan to create a cumulative impact.

The two development projects anticipated elsewhere in southeast Oakland – the Leona Quarry and Oak Knoll projects – are located too far from the Master Plan area for the hazards and hazardous materials impacts of these projects to combine with the amended Master Plan to create a cumulative impact.

Additionally, the use, storage, and disposal of hazardous materials have been highly regulated by local, state and federal governments. This historical trend with respect to these regulations has been to strengthen these standards to minimize the risk to public health and safety. Many past projects have been, all present projects are, and all future projects, including the buildout of the amended Master Plan, will be subject to these rigorous controls for handling hazardous materials. Thus, cumulative impacts are not significant.

Consequently, there are no potential significant hazards and hazardous materials-related cumulative impacts in the relevant geographic area. Additionally, neither the original Master Plan reviewed in the 1998 MND nor the amended Master Plan reviewed in this Subsequent Mitigated Negative Declaration/Addendum would result in any significant adverse hazards or hazardous materials impacts. Thus, the buildout of the amended Master Plan would not result in or contribute to any significant cumulative hazards or hazardous materials impacts.

### 3.6.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new hazards or hazardous materials impacts or an increase in severity of previously identified hazards or hazardous materials impacts compared to the 1998 MND. Thus, the impacts would be similar to those addressed in the 1998 MND, and would continue to be less than significant. No mitigation measures were imposed in the 1998 MND. This section also identified the applicable provisions of the City's Standard Conditions of Approval. No mitigation measures are required.

### 3.6.8 REFERENCES

- Oakland Zoo. 2007. *Hazardous Materials Business Plan*. June 16, 2007.
- Oakland Zoo. 2010. *Discussion of Oakland Zoo's Existing Emergency Preparedness Manual and Planned Updates for the California and Veterinary Medical Hospital*. January 11, 2010.
- City of Oakland. 2004. *Oakland General Plan Safety Element*. November 2004.
- Department of Toxic Substances Control (DTSC). 2010. Cortese List. California Environmental Protection Agency website:  
<http://www.calepa.ca.gov/SiteCleanup/CorteseList/default.htm>. Viewed on June 9, 2010.
- Emanuelson, Karen, DVM, Oakland Zoo. 2010. Written correspondence provided January 7, 2010.

State of California. 2007. Medical Waste Management Act. California Health and Safety Code Sections 117600–118360. January 2007.  
[www.cdph.ca.gov/CERTLIC/MEDICALWASTE/Pages/LawsRegs.aspx](http://www.cdph.ca.gov/CERTLIC/MEDICALWASTE/Pages/LawsRegs.aspx).

## 3.7 HYDROLOGY AND WATER QUALITY

This section evaluates potential hydrology and water quality impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant hydrology and water quality impacts not identified in the 1998 MND or a substantial increase in the severity of the previously identified hydrology and water quality impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant hydrology and water quality impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised or deleted. This section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required.

### 3.7.1 PRIOR MND ANALYSIS AND CONCLUSIONS

#### 3.7.1.1 1998 Prior MND Impact Findings

The hydrology and water quality analysis included in the 1998 MND made the following conclusions regarding hydrology and water quality impacts of the Master Plan:

1. Erosion during project construction activities could potentially increase soil deposition in Arroyo Viejo Creek as well as several intermittent and ephemeral waterways scattered throughout the site. Compliance with Ordinance No. 10312 regarding grading, excavation and fill activity and the recommended mitigation measures would reduce the potential impact to a less-than-significant level.
2. Construction of the proposed trail and picnic facilities in the vicinity of Arroyo Viejo Creek could temporarily affect the creek water quality and create changes in channel capacity and morphology. Implementation of the recommended mitigation measures would reduce the potential impact to a less-than-significant level.
3. Conversion of pervious to impervious surfaces would be minimal but had the potentially significant potential to alter existing drainage patterns and increase the rate and amount of surface runoff. Implementation of the recommended mitigation measure would reduce the potential impact to a less-than-significant level.
4. The increase in impervious surfaces had the potential to alter absorption rates, but because recharge over much of the site was already limited by steepness and shallow/clayey soils, significant impacts would not be likely.
5. The relocation of the manure handling operations out of the existing perennial stream within the River Exhibit and the relocation of the existing restrooms in the drainage swale in the Arboretum to an area adjacent to the meadow and parking lot could potentially enhance overall water quality.

6. Development of the California 1820 Exhibit area had the potential to affect the natural flow patterns and degrade water quality in the intermittent drainages within these areas and was considered to be a potentially significant impact. Implementation of the recommended mitigation measures would reduce the potential impact to a less-than-significant level.

### 3.7.1.2 1998 MND Mitigation Measures

The following mitigation measures were adopted with the 1998 MND and were found to reduce the impacts to less-than-significant levels.

To mitigate for increased water turbidity, the following mitigation measure shall be implemented:

- 10a) Mitigation Measures 2a-2d shall be implemented.
  - 2a) Facilities and infrastructure improvements should be designed to control runoff so that it is not directed over unprotected slopes. Drainage improvements shall be designed to adequately collect surface water runoff and convey it to the proper storm drain system. A permanent storm drain shall be designed, installed, and maintained to catch water from the existing natural drainage pattern in Knowland Park above Stella Street. The water will be redirected to City storm drain system. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment and is supplemented with **SCA-HYDRO-1 through SCA-HYDRO-5** see **Section 3.7 Hydrology and Water Quality, Subsection 3.7.5.3, Criteria a, c, d, e, f, g, l and m** below; **SCA-BIO-9 through SCA-BIO-12** see **Section 3.3, Biological Resources, Subsection 3.3.5.2, Criterion c and g**; and **SCA-SERVICES-4** see **Section 3.10 Public Services and Utilities, Subsection 3.10.5, Criteria a, b and c**. These Standard Conditions of Approval regulate drainage, erosion control, water quality and creek protection.)*
  - 2b) The construction contractor shall use water bars, temporary swales and culverts, mulch and june netting, silt fences, straw bales and sediment traps to prevent surface water from eroding soil and transporting it to nearby creeks and natural drainages. These and other methods as outlined in the California Stormwater Best Management Practice Handbook, Construction Activity, shall be implemented to reduce erosion. *(NOTE: This mitigation measure is replaced with **SCA-HYDRO-1 through SCA-HYDRO-5** see **Subsection 3.7.5.3, Criteria a, c, d, f, g and m** below; and **SCA-BIO-9 through SCA-BIO-12** see **Section 3.3, Biological Resources, Subsection 3.3.5.2, Criterion g**. These Standard Conditions of Approval regulate drainage, erosion control, water quality and creek protection.)*
  - 2c) Grading and construction activities shall be restricted to the dry season. Exposed surface areas shall be watered down, especially during construction, to reduce wind erosion. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment see **Subsection 3.7.5.3, Criteria a, c, f, g and m** below; and **Section 3.4 Geology and Soils, Subsection 3.4.5.3, Criterion b**.)*
  - 2d) Erosion control methods and implementation procedures shall be monitored during construction and modified as conditions warrant. *(NOTE: This mitigation measure is replaced with **SCA-HYDRO-1**; see **Subsection 3.7.5.3, Criteria a, c, f, g and m** below. **SCA-HYDRO-1** requires preparation of stormwater pollution prevention plan to prevent erosion and water pollution.)*



To mitigate for the potential degradation of water quality of Arroyo Viejo Creek, the following mitigation measures shall be implemented:

- 10b) The proposed trail and picnic facilities shall be sited at least 100 feet away from the high water level of the creek. *(NOTE: This mitigation measure is not applicable to the proposed Master Plan amendment because the picnic facilities have been constructed and the pedestrian hiking trail connecting the arboretum meadow with the upper area of Knowland Park is eliminated in the proposed Master Plan amendment.)*
- 10c) In the event of a proposed creek crossing and/or the need to access the creekbed during construction, proper permitting and noticing requirements of the Regional Water Quality Control Board, the California Department of Fish and Game and the U.S. Fish and Wildlife Department shall be followed. *(NOTE: This mitigation measure is replaced with **SCA-BIO-9 through SCA-BIO-14**; see **Section 3.3, Biological Resources, Subsection 3.3.5.2, Criterion g**. These Standard Conditions of Approval regulate construction activities within the vicinity of a creek.)*

To mitigate for potential impacts of the conversion of pervious surfaces to impervious surfaces, the following mitigation measures shall be implemented:

- 10d) Project infrastructure improvements shall be designed and sited to adequately control and handle increased surface water runoff. These improvements shall be approved by the City of Oakland Engineering Department, the California Department of Fish and Game and the East Bay Municipal District. *(NOTE: This mitigation measure is replaced with **SCA-HYDRO-1 through SCA-HYDRO-5** see **Subsection 3.7.5.3, Criteria a, d, e, f, g, j, l and m** below; and **SCA-SERVICES-4** see **Section 3.10 Public Services and Utilities, Subsection 3.10.5, Criteria a, b, and c**. These Standard Conditions of Approval require management of stormwater runoff and water quality.)*

To mitigate for potential project impacts on natural flow waters and degradation of water quality in intermittent drainages, the following mitigation measures shall be implemented:

- 10e) Proposed facilities and animal night houses shall be sited at least 100 feet away from drainage channels. *(NOTE: This mitigation measure is replaced with **SCA-HYDRO-1 through SCA-HYDRO-5** see **Subsection 3.7.5.3, Criteria a, c, f, g, l and m** below; and **SCA-BIO-9 through SCA-BIO-14** see **Section 3.3 Biological Resources, Subsection 3.3.5.2, Criteria c and g**. These Standard Conditions of Approval regulate drainage, erosion control, water quality and creek protection.)*
- 10f) In the event that drainage channels cannot be avoided, the project applicant shall comply with the appropriate notification, permitting and monitoring requirements of the Regional Water Quality Control Board, the California Department of Fish and Game, the U.S. Department of Fish and Wildlife, the City of Oakland, Alameda. *(NOTE: This mitigation measure is replaced with **SCA-HYDRO-1 through SCA-HYDRO-5** see **Subsection 3.7.5.3, Criteria a, c, f, g, l and m** below; and **SCA-BIO-9 through SCA-BIO-14** see **Section 3.3, Biological Resources, Subsection 3.3.5.2, Criteria c and g**. These Standard Conditions of Approval regulate drainage, erosion control, water quality and creek protection.)*

### 3.7.2 STANDARD CONDITIONS OF APPROVAL

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that would apply to the proposed Master Plan amendment are listed below. If the City approves the Master Plan amendment, these Conditions of Approval will be adopted as requirements of the Master Plan amendment and would ensure no significant impacts on hydrology and water quality occur. As a result, the Conditions of Approval are not listed as mitigation measures.

#### **SCA-HYDRO-1: Stormwater Pollution Prevention Plan (SWPPP)**

##### ***Prior to and ongoing throughout grading and construction activities***

The project applicant must obtain coverage under the General Construction Activity Storm Water Permit (General Construction Permit) issued by the State Water Resources Control Board (SWRCB). The project applicant must file a notice of intent (NOI) with the SWRCB. The project applicant will be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) and submit the plan for review and approval by the Building Services Division. At a minimum, the SWPPP shall include a description of construction materials, practices and equipment storage and maintenance; a list of pollutants likely to contact stormwater; site-specific erosion and sedimentation control practices; a list of provisions to eliminate or reduce discharge of materials to stormwater; Best Management Practices (BMPs); and an inspection and monitoring program. Prior to the issuance of any construction-related permits, the project applicant shall submit to the Building Services Division a copy of the SWPPP as evidence of submittal of the NOI to the SWRCB. Implementation of the SWPPP shall start with the commencement of construction and continue through the completion of the project. After construction is completed, the project applicant shall submit a notice of termination to the SWRCB.

#### **SCA-HYDRO-2: Drainage Plan for Projects on Slopes Greater Than 20 Percent**

##### ***Prior to issuance of building (or other construction-related permit)***

The project drawings for a building permit (or other construction-related permit) shall contain a drainage plan to be reviewed and approved by the Building Services Division. The drainage plan shall include measures to reduce the post-construction volume and velocity of stormwater runoff to the maximum extent practicable. Stormwater runoff shall not be augmented to adjacent properties or creeks.

### SCA-HYDRO-3: Post-Construction Stormwater Management Plan

#### *Prior to issuance of building permit (or other construction-related permit)*

The applicant shall comply with the requirements of Provision C.3 of the National Pollutant Discharge Elimination System (NPDES) permit issued to the Alameda Countywide Clean Water Program. The applicant shall submit with the application for a building permit (or other construction-related permit) a completed Stormwater Supplemental Form for the Building Services Division. The project drawings submitted for the building permit (or other construction-related permit) shall contain a stormwater pollution management plan, for review and approval by the City, to limit the discharge of pollutants in stormwater after construction of the project to the maximum extent practicable.

- a) The post-construction stormwater pollution management plan shall include and identify the following:
  - i. All proposed impervious surface on the site;
  - ii. Anticipated directional flows of on-site stormwater runoff; and
  - iii. Site design measures to reduce the amount of impervious surface area and directly connected impervious surfaces; and
  - iv. Source control measures to limit the potential for stormwater pollution; and
  - v. Stormwater treatment measures to remove pollutants from stormwater runoff; and
  - vi. Hydromodification management measures so that post-project stormwater runoff does not exceed the flow and duration of pre-project runoff, if required under the NPDES permit.
- b) The following additional information shall be submitted with the post-construction stormwater pollution management plan:
  - i. Detailed hydraulic sizing calculations for each stormwater treatment measure proposed; and
  - ii. Pollutant removal information demonstrating that any proposed manufactured/mechanical (i.e., non-landscape-based) stormwater treatment measure, when not used in combination with a landscape-based treatment measure, is capable of removing the range of pollutants typically removed by landscape-based treatment measures.

All proposed stormwater treatment measures shall incorporate appropriate planting materials for stormwater treatment (for landscape-based treatment measures) and shall be designed with considerations for vector/mosquito control. Proposed planting materials for all proposed landscape-based stormwater treatment measures shall be included on the landscape and irrigation plan for the project. The applicant is not required to include on-site stormwater treatment measures in the post-construction stormwater pollution management plan if he or she

secures approval from Planning and Zoning of a proposal that demonstrates compliance with the requirements of the City's Alternative Compliance Program.

Prior to final permit inspection, the applicant shall implement the approved stormwater pollution management plan.

#### **SCA-HYDRO-4: Maintenance Agreement for Stormwater Treatment Measures**

##### ***Prior to final zoning inspection***

For projects incorporating stormwater treatment measures, the applicant shall enter into the "Standard City of Oakland Stormwater Treatment Measures Maintenance Agreement," in accordance with Provision C.3.e of the NPDES permit, which provides, in part, for the following:

- i. The applicant accepting responsibility for the adequate installation/construction, operation, maintenance, inspection, and reporting of any on-site stormwater treatment measures being incorporated into the project until the responsibility is legally transferred to another entity; and
- ii. Legal access to the on-site stormwater treatment measures for representatives of the City, the local vector control district, and staff of the Regional Water Quality Control Board, San Francisco Region, for the purpose of verifying the implementation, operation, and maintenance of the on-site stormwater treatment measures and to take corrective action if necessary. The agreement shall be recorded at the County Recorder's Office at the applicant's expense.

#### **SCA-HYDRO-5: Erosion, Sedimentation and Debris Control Measures**

##### ***Prior to issuance of demolition, grading, or construction-related permit***

The project applicant shall submit an erosion and sedimentation control plan for review and approval by the Building Services Division. All work shall incorporate all applicable "Best Management Practices" (BMPs) for the construction industry, and as outlined in the Alameda Countywide Clean Water Program pamphlets, including BMP's for dust, erosion and sedimentation abatement per Chapter Section 15.04 of the Oakland Municipal Code. The measures shall include, but are not limited to, the following:

- a) On sloped properties, the downhill end of the construction area must be protected with silt fencing (such as sandbags, filter fabric, silt curtains, etc.) and hay bales oriented parallel to the contours of the slope (at a constant elevation) to prevent erosion into the creek.
- b) In accordance with an approved erosion control plan, the project applicant shall implement mechanical and vegetative measures to reduce erosion and sedimentation, including appropriate seasonal maintenance. One hundred (100) percent degradable erosion control fabric shall be installed on all graded slopes to protect and stabilize the slopes during construction and before permanent vegetation gets established. All graded areas shall be

- temporarily protected from erosion by seeding with fast growing annual species. All bare slopes must be covered with staked tarps when rain is occurring or is expected.
- c) Minimize the removal of natural vegetation or ground cover from the site in order to minimize the potential for erosion and sedimentation problems. Maximize the replanting of the area with native vegetation as soon as possible.
  - d) All work in or near creek channels must be performed with hand tools and by a minimum number of people. Immediately upon completion of this work, soil must be repacked and native vegetation planted.
  - e) Install filter materials (such as sandbags, filter fabric, etc.) at the storm drain inlets nearest to the creek side of the project site prior to the start of the wet weather season (October 15); site dewatering activities; street washing activities; saw cutting asphalt or concrete; and in order to retain any debris flowing into the City storm drain system. Filter materials shall be maintained and/or replaced as necessary to ensure effectiveness and prevent street flooding.
  - f) Ensure that concrete/granite supply trucks or concrete/plaster finishing operations do not discharge wash water into the creek, street gutters, or storm drains.
  - g) Direct and locate tool and equipment cleaning so that wash water does not discharge into the creek.
  - h) Create a contained and covered area on the site for storage of bags of cement, paints, flammables, oils, fertilizers, pesticides, or any other materials used on the project site that have the potential for being discharged to the storm drain system by the wind or in the event of a material spill. No hazardous waste material shall be stored on site.
  - i) Gather all construction debris on a regular basis and place them in a dumpster or other container which is emptied or removed on a weekly basis. When appropriate, use tarps on the ground to collect fallen debris or splatters that could contribute to stormwater pollution.
  - j) Remove all dirt, gravel, refuse, and green waste from the sidewalk, street pavement, and storm drain system adjoining the project site. During wet weather, avoid driving vehicles off paved areas and other outdoor work.
  - k) Broom sweep the street pavement adjoining the project site on a daily basis. Caked-on mud or dirt shall be scraped from these areas before sweeping. At the end of each workday, the entire site must be cleaned and secured against potential erosion, dumping, or discharge to the creek.
  - l) All erosion and sedimentation control measures implemented during construction activities, as well as construction site and materials management shall be in strict accordance with the control standards listed in the latest edition of the Erosion and Sediment Control Field Manual published by the Regional Water Quality Board (RWQB).
  - m) Temporary fencing is required for sites without existing fencing between the creek and the construction site and shall be placed along the side adjacent to construction (or both sides of the creek if applicable) at the maximum practical distance from the creek centerline. This area shall not be disturbed during construction without prior approval of Planning and Zoning.

- n) All erosion and sedimentation control measures shall be monitored regularly by the project applicant. The City may require erosion and sedimentation control measures to be inspected by a qualified environmental consultant (paid for by the project applicant) during or after rain events. If measures are insufficient to control sedimentation and erosion then the project applicant shall develop and implement additional and more effective measures immediately.

**SCA-BIO-9: Creek Protection Plan**

(Please refer to **Section 3.3, Biological Resources.**)

**SCA-BIO-10: Regulatory Permits and Authorization**

(Please refer to **Section 3.3, Biological Resources.**)

**SCA-BIO-11: Creek Monitoring**

(Please refer to **Section 3.3, Biological Resources.**)

**SCA-BIO-12: Creek Landscaping Plan**

(Please refer to **Section 3.3, Biological Resources.**)

**SCA-BIO-14: Creek Dewatering and Diversion**

(Please refer to **Section 3.3, Biological Resources.**)

**SCA-BIO-15: Vegetation Management Plan on Creekside Properties**

(Please refer to **Section 3.3 Biological Resources.**)

3.7.3 UPDATED REGULATORY SETTING

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, certain regulatory requirements have changed. The proposed Master Plan amendment must comply with current regulations. Presented below is a summary of applicable regulations, with an emphasis on those that have changed since the 1998 MND was adopted. The summary includes Oakland General Plan and Municipal Code provisions relevant to the Master Plan amendment.

**3.7.3.1 NPDES Permit Requirements**

The Clean Water Act (CWA) has nationally regulated the discharge of pollutants to the waters of the U.S. from any point source since 1972. In 1987, amendments to the CWA added Section 402(p), which established a framework for regulating non-point source (NPS) stormwater discharges under the National Pollutant Discharge Elimination System (NPDES). The project applicant would be required to comply with two NPDES permit requirements: the general construction permit issued by the State Water Resources Control Board and the

municipal separate storm sewer permit issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB).

**Construction General Permit.** Pursuant to the CWA Section 402(p) and as related to the goals of the Porter-Cologne Water Quality Control Act, described below, the SWRCB has issued a statewide NPDES General Permit for Storm Water Discharges Associated with Construction Activity (Construction General Permit) (Order No. 2009 0009-DWQ, NPDES No. CAR000002), adopted September 2, 2009. Every construction project that disturbs one or more acres of land surface or that is part of a common plan of development or sale that disturbs more than one acre of land surface would require coverage under the Construction General Permit.

To obtain coverage under the Construction General Permit, the land owner or other applicable entity must file Permit Registration Documents (PRDs) prior to the commencement of construction activity. The PRDs include a Notice of Intent (NOI), Stormwater Pollution Prevention Plan (SWPPP), and other documents required by the Construction General Permit. Because development in accordance with the proposed Master Plan amendment would disturb more than one acre, the Master Plan amendment would be subject to the Construction General Permit requirements. The objective of the NOI is to notify the State Water Resources Control Board of the project applicant's intent to begin construction activity and implement the project SWPPP. The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of stormwater discharges, and (2) to describe and ensure the implementation of Best Management Practices (BMPs) to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges. BMPs are intended to reduce impacts to the Maximum Extent Practicable (MEP), a standard created by Congress to allow regulators the flexibility necessary to tailor programs to the site-specific nature of municipal stormwater discharges. Reducing impacts to the MEP generally relies on BMPs that emphasize pollution prevention and source control, with additional structural controls as needed.

The extent that other documents and monitoring will be required for final permits is determined by the project's risk factor. Risk levels are based on a matrix of project sediment risk and receiving water risk. There are three levels of risk: Risk Level 1 projects are subject to minimum BMP and visual monitoring requirements; Risk Level 2 projects are subject to some additional monitoring requirements and numerical thresholds for turbidity and pH; and Risk Level 3 projects are subject to more rigorous monitoring requirements, such as receiving water monitoring and in some cases bioassessment. Discharge to a sediment-sensitive water body is automatically a Risk Level 2 or greater.

Sediment risk is based on estimated soil loss, as calculated by the Revised Universal Soil Loss Equation (RUSLE) where soil loss of less than 15 tons per acre is considered low risk, soil loss between 15 and 75 tons per acre is considered a medium risk, and soil loss over 75 tons per acre is considered a high risk. Receiving water risk is based on whether a project drains to a sediment-

sensitive water body. A sediment-sensitive water body is either on the most recent State Water Resources Control Board list for water bodies impaired for sediment; has a United States Environmental Protection Agency-approved implementation plan for controlling and limiting sediment loads delivered to the water body (Total Maximum Daily Load [TMDL] Plan); or has the beneficial uses of cold freshwater habitat, fish spawning, and fish migration.

The proposed Master Plan amendment area does not discharge to a sediment-sensitive water body; San Leandro Creek and Arroyo Viejo Creek (creeks to which the amended Master Plan would discharge to) are not listed as impaired by sediment and do not have the beneficial uses of cold freshwater habitat, fish spawning, and fish migration. Based on the general erosivity of the area's soils, the buildout of the amended Master Plan would be categorized as a Risk Level 1 or 2 for permitting purposes.

**Alameda Countywide Clean Water Program C.3 Requirements.** Fourteen cities including the City of Oakland, three county agencies, two flood control districts, and the unincorporated area within Alameda County formed the Alameda Countywide Clean Water Program (ACCWP) in 1991. The ACCWP is subject to the joint Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) permit (MRP Permit) from the San Francisco Bay RWQCB that issues waste discharge requirements and NPDES permits for the discharge of stormwater runoff from the municipal separate storm sewer systems (MS4s) of several jurisdictions and entities.

The ACCWP is currently subject to NPDES Permit No. CAS612008 issued by Order No. R2-2009-0074 on October 14, 2009 to the ACCWP to discharge stormwater runoff from storm drains and watercourses within their jurisdictions. The permit includes a comprehensive plan to reduce the discharge of pollutants to creeks, San Francisco Bay, and the ocean to the maximum extent possible. The new permit procedures included new design standards for runoff treatment control measures (Provision C.3) from new development and significant redevelopment. The permit requires new development projects to include permanent control measures to reduce long-term impacts of land development on stormwater quality and creek channels.

Specifically, Provision C.3 requires private or public projects that create and/or replace 10,000 square feet or more of impervious surface to comply with Provision C.3. These projects must incorporate the following stormwater controls:

- Site design measures.
- Source control measures.
- Stormwater treatment measures that are hydraulically sized as specified by the municipal stormwater permit.



- Hydromodification management measures, for projects that create one acre or more of impervious surface, if the project is located in an area susceptible to hydromodification.

*Site design measures* are site planning techniques that help reduce stormwater pollutants and increases in the peak runoff flow and duration, by protecting existing natural resources and reducing impervious surfaces of development projects.

*Source control measures* consist of either structural project features or operational “good housekeeping” practices that prevent pollutant discharge and runoff at the source and keep pollutants from coming into contact with stormwater.

*Stormwater treatment measures* are engineered systems that are designed to remove pollutants from stormwater using natural processes such as filtration, infiltration, flotation, and sedimentation. Stormwater treatment measures must be sized to comply with one of the hydraulic design criteria listed in the municipal stormwater permit’s Provision C.3.d.

*Hydromodification management (HM) measures* include site design and source control measures that promote infiltration or otherwise minimize the change in the rate and flow of runoff, when compared to the pre-development condition. HM measures also include constructed facilities (such as basins, ponds, or vaults) that manage the flow rates of stormwater leaving a site, and under some conditions can also include re-engineering of at-risk channels downstream from the site. In some cases a single stormwater treatment measure may be used to meet both the treatment and HM objectives for a project.

### **3.7.3.2 City of Oakland Creek Protection Ordinance**

The City’s Creek Protection Ordinance is contained in Chapter 13.16 (Creek Protection, Stormwater Management and Discharge Control) of the Oakland Municipal Code. The ordinance prohibits activities that would result in the discharge of pollutants to Oakland’s waterways or damaging of the creeks, creek functions, or habitat. The ordinance aims to reduce pollutants in stormwater by regulating grading, excavation, and filling activities. The ordinance requires that all construction projects develop a site map, grading plan, and drainage plan prior to approval. The ordinance includes permitting guidelines for development and construction projects taking place on creekside property.

### **3.7.3.3 City of Oakland General Plan**

The Open Space, Conservation and Recreation (OSCAR) Element of the Oakland General Plan was adopted in June 1996, before the 1998 MND was adopted. The OSCAR Element contains the following key hydrology- and water quality-related policies that are relevant to the proposed Master Plan amendment (City of Oakland 1996):

*Policy CO-5.1: Protection of Groundwater Recharge.* Encourage groundwater recharge by protecting large open space areas, maintaining setbacks along creeks and other recharge features, limiting impervious surfaces where appropriate, and retaining natural drainage patterns within newly developing areas.

*Policy CO-5.2: Improvements to Groundwater Quality.* Support efforts to improve groundwater quality, including the use of non-toxic herbicides and fertilizers, the enforcement of anti-litter laws, the clean-up of sites contaminated by toxics, and on-going monitoring by the Alameda County Flood Control and Water Conservation District.

*Policy CO-5.3: Control of Urban Runoff.* Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program, to: (a) reduce water pollution associated with stormwater runoff; (b) reduce water pollution associated with hazardous spills, runoff from hazardous materials areas, improper disposal of household hazardous wastes, illicit dumping, and marina “live aboards;” and (c) improve water quality in Lake Merritt to enhance the lake’s aesthetic, recreational, and ecological functions.

*Policy CO-6-1: Creek Management.* Protect Oakland’s remaining natural creek segments by retaining creek vegetation, maintaining creek setbacks, and controlling bank erosion. Design future flood control projects to preserve the natural character of creeks and incorporate provisions for public access, including trails, where feasible. Strongly discourage projects which bury creeks or divert them into concrete channels.

*Policy CO-6.2: Creek Maintenance and Safety.* Strictly enforce local, state, and federal laws and ordinances on the maintenance of creeks and watercourses. Abate health and safety hazards along and within creeks through a variety of measures, including creek clean-up programs, stronger enforcement of litter and anti-dumping laws, and vegetation maintenance requirements for properties abutting creeks.

These policies, along with other hydrology- and water quality-related General Plan policies, are discussed in **Section 3.8, Land Use, Recreation and Planning**.

#### 3.7.4 EXISTING CONDITIONS

A drainage report for the proposed Master Plan amendment (Aliquot 2010) has been prepared (see **Appendix I**). The report includes preliminary drainage design for the proposed Veterinary Medical Hospital and proposed access road to the California Exhibit (see **Chapter 2, Project Description**, and **Subsection 3.7.5.2** below). A preliminary drainage design for the California Exhibit itself is also included, with figures depicting concept detention and treatment.

The Master Plan area drains into various drainages. The primary drainage for the existing zoo is Arroyo Viejo Creek. The proposed California Exhibit is located at the apex of San Leandro Creek and Arroyo Viejo Creek. The majority of the proposed Master Plan amendment area drains to subwatersheds of Arroyo Viejo Creek, and nine acres drain into a tributary of San Leandro Creek.

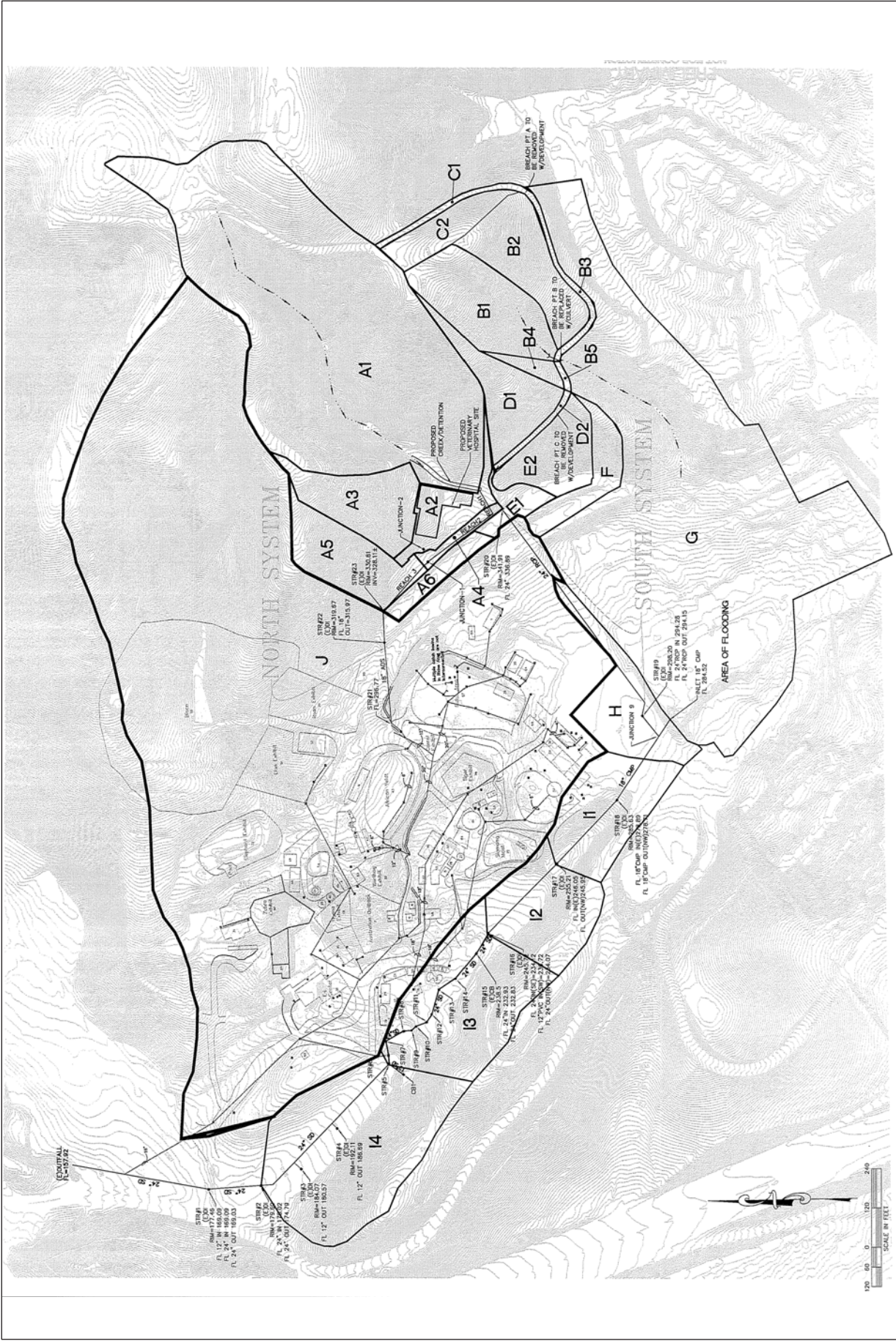
Given the area's existing condition, the stormwater runoff water quality would be expected to be typical of a combination of commercial use and open space/rangeland watersheds. As such, the quality of such surface water is affected primarily by non-point source pollutants, i.e., materials and chemicals that are washed into the storm drain system from a variety of sources. Unlike water pollutants that come from single point sources such as factories or sewage treatment plants, non-point source pollutants are washed by rainwater and other means from streets, parking lots, construction sites, and grazing areas.

For the Master Plan area, stormwater pollutants are likely to be comprised primarily of suspended sediment due to the open space nature of the upper watershed portion of the area. Downstream, the commercial areas of the Oakland Zoo and associated facilities would be expected to contribute typical urban pollutants to the creek's pollutant load, including heavy metals, oil and grease, fertilizers, as well as animal waste and other materials.

The drainage report prepared by Aliquot Associates, Inc. (Aliquot 2010) evaluated the potential effects of the buildout of the amended Master Plan on the drainage system within the existing zoo and the adjacent residential areas that are within two subwatersheds of Arroyo Viejo Creek above the existing zoo storm drainage system. The drainage report is included as **Appendix I**. Approximately 46.6 acres of watershed drain into the zoo drainage system. There are two entry points into the drainage system, which have been termed the north and south entrance points. Approximately 18.9 acres drain to the north system and approximately 27.7 acres drain to the south system. These two drainage systems are shown on **Figure 3.7-1**. The two systems collectively drain the zoo property and join just northwest of the zoo at a confluence approximately 100 feet above the primary outlet to Arroyo Viejo Creek along Golf Links Road. Both the north and south systems are insufficient to carry the ten-year flow and excess runoff from temporary ponded areas on the property.

#### **3.7.4.1 North Drainage System**

The drainage report divides existing hydrologic conditions of the north system into two contributing areas: upland and downstream. The approximately 18.9-acre upland area encompasses the drainage area above the proposed Veterinary Medical Hospital site, a small portion of the proposed California Exhibit area and adjacent hillsides, and impervious areas in and around the existing upper parking lots. The primary watershed above the proposed Veterinary Medical Hospital site is 14.1 acres and includes portions of the proposed California Exhibit. This is a defined drainage that outlets through a swale adjacent to the proposed Veterinary Medical Hospital site. Currently, drainage from the swale sheet flows across the storage yard and into the overflow parking lot below, where it then enters either the north system or the south system. It is estimated that 90 percent of the drainage flows to the north and ten percent flows to the south under design conditions.



SOURCE: Aliquot



**Figure 3.7-1**  
 Proposed Master Plan Amendment  
 Drainage Area Map: Pre-Development

The remaining 4.8 acres of watershed area that drains to the north system include a portion of the existing dirt service road leading to the proposed California Exhibit and hill slope areas above the roadway. Sheet flow from hill slopes above the road enters the road bed and during low flows is carried along the inside edge of the road to the storage yard near the proposed Veterinary Medical Hospital site and enters the north drainage system. During high flows, the drainage system is overwhelmed and flow crosses the dirt roadway and drains at several breach points into drainages that eventually end up in the south drainage system. Along the lower stretch of the service road, breached flows are intercepted by the existing upper parking lots below the proposed Veterinary Medical Hospital site and enter drainage facilities within the zoo during high flows. Along the upper stretch of the road, breached flows or overflows drain into the rear yards of the existing neighborhood below during high flows. Minor flooding from drainage breaching the upper section of the road has been reported by adjacent residents.

Drainage from the north system downstream of the proposed Veterinary Medical Hospital site is collected and conveyed through an antiquated system of pipes and ditches contributed by the upper reaches of the zoo property and various exhibits along its route. The pipe route is interrupted with open ditches. Although improvements have improved drainage throughout, due to the contribution of tributary drainage areas within the zoo property, the overall existing system remains undersized to convey flow from the ten-year storm event.

#### **3.7.4.2 South Drainage System**

The contributory watershed to south system is approximately 27.7 acres and includes the main parking areas of the zoo property, the neighborhood to the southeast of the main parking lot, and portions of the upland area along the proposed service road to the California Exhibit. This drainage system begins just below the proposed Veterinary Medical Hospital site in the southern portion of the existing overflow parking lot. From this location, a 24-inch pipe runs westerly through the main parking lot and connects to an 18-inch pipe running north to south, parallel to the zoo's western boundary, before discharging into the creek along Golf Links Road. The 18-inch pipe begins at the zoo's southern boundary at the bottom of the slope of the main parking lot, where it collects drainage from the creek that runs through the adjoining neighborhood to the southeast (see **Figure 3.7-1**). Minor flooding occurs at this inlet location and the adjacent neighborhood due to an existing backwater condition (a rise in the upstream water surface elevation due to a constriction in flow; i.e., when the south pipe system is full, water backs up behind the inlet). Flow in this watershed originates above the residential areas in a defined swale/drainage above the end of Hood Street. Flows from this drainage typically are collected, make a sharp right turn, and then enter the south drainage system through a series of catch basins linked by a 12-inch culvert. High flows in the drainage may overflow into Hood Street and travel along residential streets, eventually draining to the 18-inch pipe described above. The watershed above the Hood Street swale is approximately six acres.

### 3.7.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

#### 3.7.5.1 Methodology

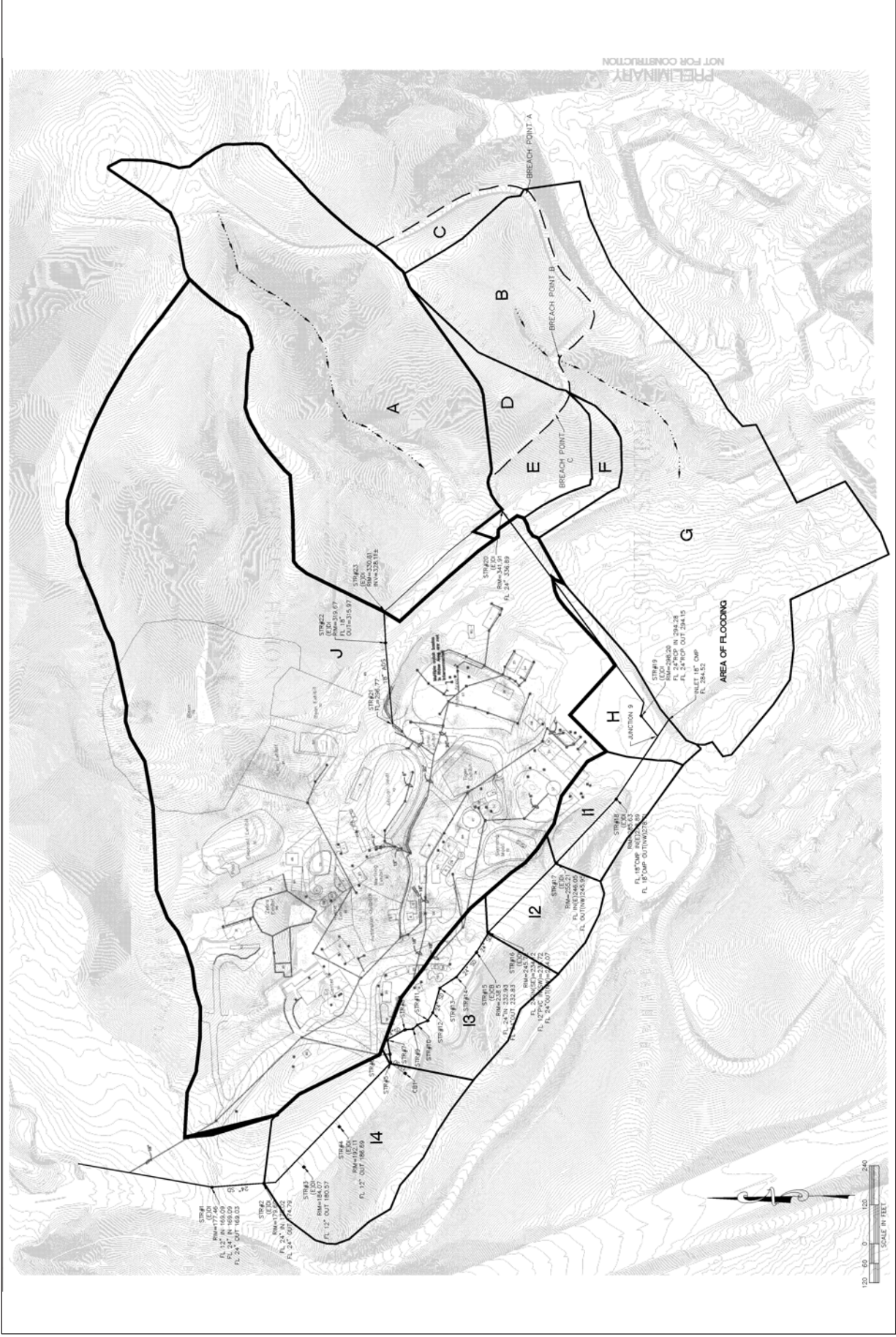
The analysis evaluates the potential hydrology and water quality impacts associated with the buildout of the amended Master Plan and employs a two-tiered approach that considers:

- Impacts of the buildout of the amended Master Plan on hydrology and water quality based on review of proposed drainage, detention, and water quality components, and construction elements, referencing the drainage report prepared for the proposed Master Plan amendment (Aliquot 2010).
- Applicability of the hydrology and water quality mitigation measures recommended in the 1998 MND for the approved Master Plan and the City's Standard Conditions of Approval to the proposed Master Plan amendment and compliance with regulatory requirements.

#### 3.7.5.2 Drainage and Water Quality Features of Proposed Master Plan Amendment

The proposed Master Plan amendment includes a stormwater management system that would offset any increases in runoff over existing conditions due to the buildout of the amended Master Plan and would reduce existing drainage problems in some portions of the adjacent residential area. This would be done by upgrading the current collection and conveyance system and routing it through a series of water quality and detention structures that link into the existing zoo drainage system (see **Figure 3.7-2**). The stormwater management system also incorporates water quality features to improve the quality of stormwater runoff from the Master Plan area. Though specific project features have not yet been fully designed, the hydrology report calculates necessary runoff volumes to comply with NPDES permit conditions and ample space has been set aside for this purpose.

**Service Road Improvements.** The proposed paving and improvements to the existing service road would control breaching of runoff to the neighborhood below it, and increased flows from the paved service road would be mitigated by altering the road and hill slope drainage. The proposed roadway improvements are considered adequate BMPs and would be credited toward compliance with NPDES regulations. The roadway and hill slope drainage would be collected and conveyed via drop inlets and then routed to a storm drain under the road. Rain gardens would be connected to the storm drain system and located at the outside bends of the road where applicable. Rain gardens are planted depressions that filter roadway runoff and allow pollutants to infiltrate the ground instead of being conveyed to the creek. The storm drain under the road would route all runoff to a diversion structure. This diversion structure would then meter flow into the south system via a ten-inch pipe and into the north drainage system via an 18-inch pipe. The diversion structure's outlet pipes to the south and north drainage systems were sized to accommodate the ten-year-flow. The water in the diversion structure would be split so that 50 percent enters the north system via the detention basin and 50 percent enters the south



SOURCE: Aliquot



**Figure 3.7-2**  
Proposed Master Plan Amendment  
Drainage Area Map: Post-Development

system. Drainage from one hill slope area, Sub-Basin B1 (two acres), is an exception and would be collected and conveyed to the nearest drainage swale (i.e., Hood Street) at the base of B1, as under pre-development conditions.

The proposed drainage and diversion structure layout would effectively reduce the drainage area to the Hood Street channel by two acres or 30 percent in relation to existing conditions. Though this may not eliminate overflows at this point, it would aid in reducing the severity and frequency of those overflows and would effectively reduce hill slope runoff entering the back yards of adjacent residents. Local residential drainage system networks are typically designed to carry the 10- to 25-year recurrent storm events depending on the size of the upstream watershed. Flow events greater than this are conveyed as overflows into streets and other common areas not susceptible to flood damage. In order to eliminate overflows completely the downstream drainage system would have to be enlarged and additional inlet capacity created. Because the proposed Master Plan amendment would reduce the upstream watershed it would increase the level of protection that currently exists in the drainage system.

**Veterinary Medical Hospital Detention Basin.** An open stormwater detention basin located along the east side of the proposed Veterinary Medical Hospital would be a key feature controlling flows to the north system from the service road and hospital (see **Figure 3.7-3** and **Table 3.7-1**). The detention basin would also be used to regulate and control peak stormwater flows so that they match or improve existing flow conditions. This function is necessary to comply with the hydro-modification requirements identified in the NPDES permit. The runoff stored within and released from the basin is designed to offset the increase in post-development flow from the following improvements:

1. Increase in flow produced by the proposed Veterinary Medical Hospital.
2. Increase in flow produced by the paving of the service road to the California Exhibit.
3. Increase in flow from a 20-percent pavement increase in the upper zoo parking lots below the proposed Veterinary Medical Hospital site. (The existing improvements to the parking lots are not part of the proposed Master Plan amendment but have been included in this analysis to ensure that all conditions on the site are adequately accounted for in the drainage plan.)
4. Increase in flow produced by impervious surfaces in the California Exhibit in Sub-Basin A1.

All of the flow from the watershed above the proposed Veterinary Medical Hospital (including portions of the California Exhibit) and portions of the service road drainage would be collected in the detention basin. The increased flow generated by the proposed Veterinary Medical Hospital would be compensated for by detention of flows from Sub-Basin A1 and the portion of service road drainage that would be routed directly into the detention basin via the diversion structure.



**TABLE 3.7-1: PRE- AND POST-PROJECT PEAK FLOWS ENTERING NORTH AND SOUTH ZOO DRAINAGE SYSTEMS**

Storm	North System		South System	
	Pre-Project (cubic feet per second)	Post-Project (cubic feet per second)	Pre-Project (cubic feet per second)	Post-Project (cubic feet per second)
6-hour 15-year	20.37	20.18	31.52	30.15
6-hour 100-year	28.67	27.87	43.61	41.58
24-hour 100-year	28.82	28.25	43.83	41.79

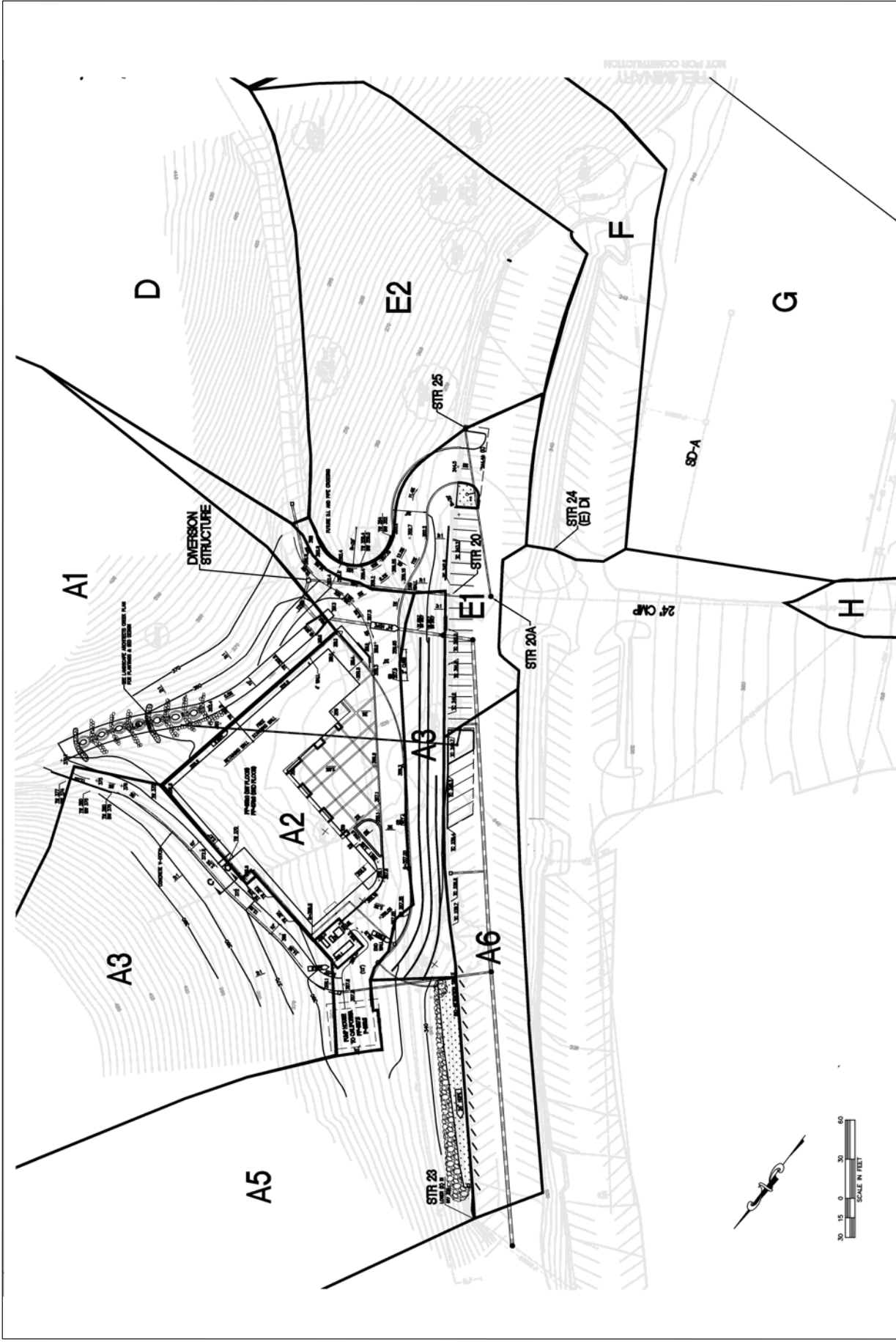
Source: Aliquot

The detention basin is proposed to run along the east side of the Veterinary Medical Hospital, at the base of a succession of step pools. The proposed detention basin collecting flows from the service road and upper watershed would regulate the 6-hour 15-year and 100-year flow events, as well as the 24-hour 100-year flow event, while maintaining the required two-foot freeboard for the 100-year event. While only runoff from the upland areas and the post-development paved road would be routed through the detention basin, the proposed detention basin would be sized to offset the increased flows from the proposed Veterinary Medical Hospital and overflow parking lot as well. By use of an orifice and metering flow, the proposed design of the detention basin would leave additional capacity for detention. There would be no net increase in peak stormwater flows at the entrances of either the north or south drainage systems. **Table 3.7-1** above shows the pre- and post-project peak flows entering the north and south zoo drainage systems.

Additionally, the proposed detention basin would serve as a stormwater treatment measure for flows detained in the basin by allowing particles and associated pollutants to settle out of the water column.

**California Exhibit (Areas Not Draining to North or South Zoo Systems).** The California Exhibit would be constructed on the top of a broad knoll and drain downslope within four separate sub-basins: A1, K, L, and M. The only portion of the California Exhibit that would flow into the zoo drainage is from Sub-Basin A1; these flows have been accounted for within the proposed Veterinary Medical Hospital and service road drainage and proposed detention basin. The three other sub-basins (Sub-Basins K, L, and M) are shown on **Figure 3.7-4**.

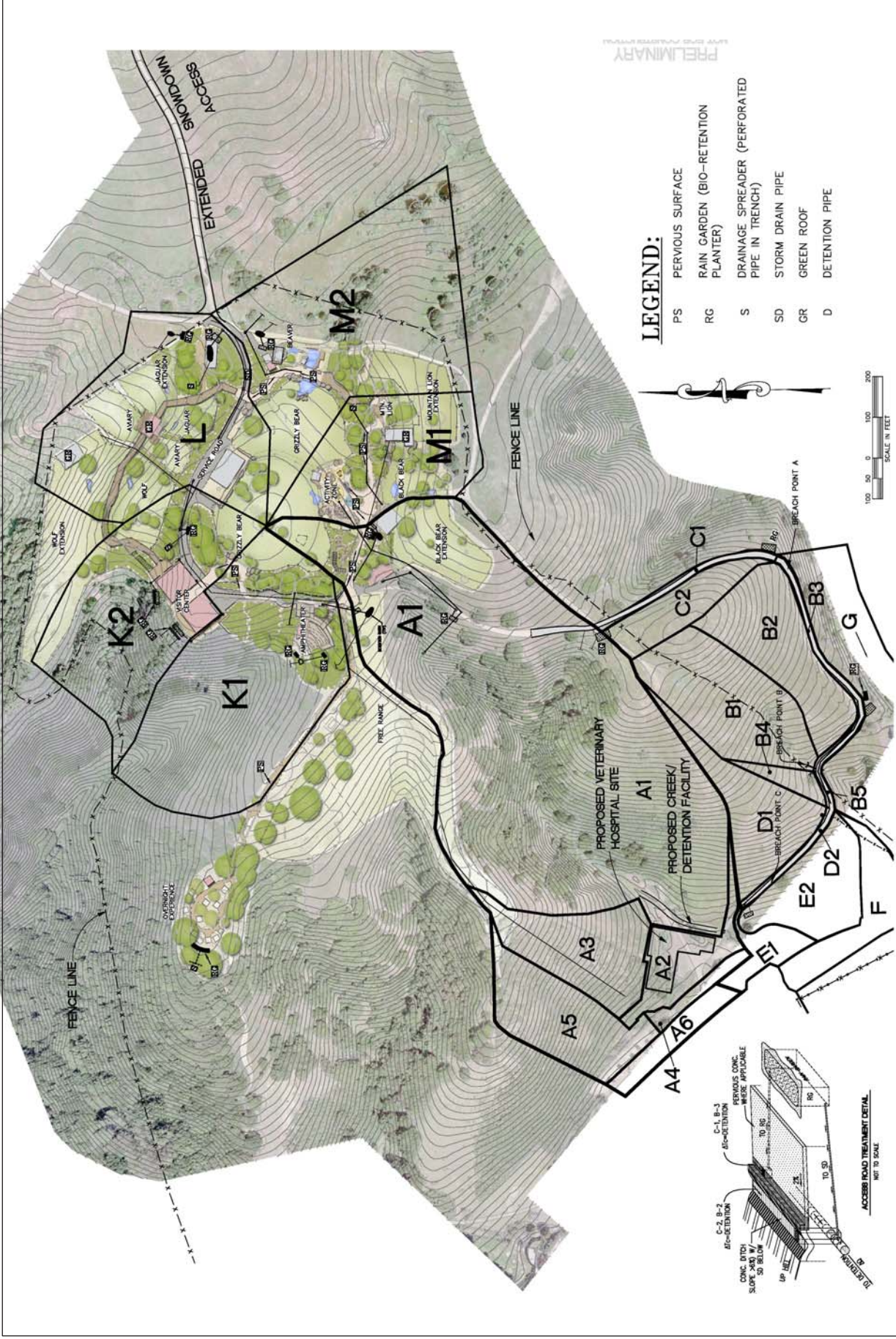
In evaluating impervious surface areas for Sub-Basins K, L, and M of the California Exhibit, the project designers used the City of Oakland's "Modified Triangular Hydrograph Method" to determine preliminary stormwater storage requirements for each of the watersheds to ensure that adequate space is available. Components such as the paved road through the California Exhibit and any roofs that would not be green roofs were considered impervious. **Table 3.7-2** shows



SOURCE: Aliquot



**Figure 3.7-3**  
 Proposed Master Plan Amendment Drainage Area Map:  
 Veterinary Medical Hospital Post-Development



SOURCE: Aliquot

Figure 3.7-4  
Proposed Master Plan Amendment C3 Improvements

**TABLE 3.7-2: CALIFORNIA EXHIBIT SUB-BASINS NOT DRAINING TO NORTH OR SOUTH ZOO SYSTEMS: WATERSHED STORAGE VOLUMES**

Watershed	Existing Peak Runoff (cubic feet per second)	Developed Peak Runoff (cubic feet per second)	Required Storage Volume (cubic feet)
Drainage Area K1 (Amphitheater + Asphalt Concrete Paving)	13.47	13.93	400
Drainage Area K2 (California Interpretive Center + Asphalt Concrete Paving)	9.75	10.42	624
Drainage Area L (Asphalt Concrete, Grizzly Roof, + Jaguar Roof)	10.33	11.08	756
Drainage Area M1	5.55	5.55	0
Drainage Area M2	9.54	9.73	267

Source: Aliquot

pre- and post-development 100-year peak flow rates for the three California Exhibit sub-basins (K, L, and M). **Table 3.7-2** also shows the predicted storage volumes necessary to detain flows such that post-project flows do not exceed pre-project flows. The structures for required storage volumes can be accommodated within the Master Plan area. The calculations are conservative, in that they estimate the required storage volume for each impervious area individually. It is likely that final sub-basin storage volume requirements would be less than shown in **Table 3.7-2**.

The drainage report (Aliquot 2010) also determined that hydromodification and treatment/storage volumes indicated in **Table 3.7-2** would be mitigated on-site by reducing flows and treating runoff for water quality through use of some or all of the following: rain gardens, pervious surfaces, runoff coefficient reduction due to landscaping plantings, and green roof systems. In accordance with post-construction Best Management Practices for water quality (Provision C.3 of the NPDES permit), the necessary surface areas would be provided in the Master Plan amendment area for both treatment and hydromodification of estimated impervious surfaces.

**Perimeter Fence.** The proposed Master Plan amendment proposes to establish the final alignment of the perimeter fence. The proposed alignment would reduce the overall area enclosed by the fence by approximately 5.28 acres. The changes in final location of the fence would not create any increased or new hydrology or water quality impacts, compared to the impacts identified in the 1998 MND. Any hydrology and water quality impacts associated with the installation of the fence would be mitigated by compliance with the City's Standard Conditions of Approval. The fence would not increase runoff or erosion or otherwise affect on- or off-site hydrology or water quality.

**Outfall Replacement.** An existing outfall located at Arroyo Viejo Creek near the main entrance to the zoo would be replaced. Please see **Chapter 2, Project Description, Subsection 2.4.7.3, Storm Drain Facilities**, for a description of the proposed outfall replacement.

### 3.7.5.3 CEQA Thresholds/Criteria of Significance

The project would have a significant impact on the environment if it would:

- a) Violate any water quality standards or waste discharge requirements;
- b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
- c) Result in substantial erosion or siltation on- or off-site that would affect the quality of receiving waters;
- d) Result in substantial flooding on- or off-site;
- e) Create or contribute substantial runoff which would exceed the capacity of existing or planned stormwater drainage systems;
- f) Create or contribute substantial runoff which would be an additional source of polluted runoff;
- g) Otherwise substantially degrade water quality;
- h) Would the project place housing within a 100-year flood hazard area structures which would impede or redirect flood flows;
- i) Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- j) Expose people or structures to a substantial risk of loss, injury or death involve flooding;
- k) Result in inundation by seiche, tsunami, or mudflow;
- l) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course, or increasing the rate or amount of flow, of a creek, river or stream in a manner that would result in substantial erosion, siltation, or flooding, both on- or off-site; or
- m) Fundamentally conflict with the elements of the City of Oakland Creek Protection (OMC Chapter 13.16) ordinance intended to protect hydrologic resources. Although there are no specific, numeric/quantitative criteria to assess impacts, factors to be considered in determining significance include whether there is a substantial degradation of water quality through (a) discharging a substantial amount of pollutants into a creek; (b) significantly modifying the natural flow of the water or capacity; (c) depositing substantial amounts of new

material into a creek or causing substantial bank erosion or instability; or (d) substantially endangering public or private property or threatening public health or safety.

These criteria are discussed below.

**a) Would the project violate any water quality standards or waste discharge requirements?**

The proposed Master Plan amendment would not violate any water quality standards or waste discharge requirements. The buildout of the amended Master Plan would reduce the potential for water quality, drainage, and flooding impacts, in comparison with the approved Master Plan, because the overall area of disturbance would be reduced from approximately 27.39 acres to approximately 23.95 acres, thereby reducing the potential for erosion, reducing impervious surfaces, and reducing the potential for development to affect natural drainage patterns on the site. The elimination of the loop road and shuttle bus system included in the approved Master Plan accounts for the significant reduction in site drainage disturbance. All components of the proposed Master Plan amendment, including the California Exhibit, would be required to comply with all required water quality permits. Potential water quality impacts associated with specific elements of the buildout of the amended Master Plan are discussed below.

**Service Road Improvements.** The paving and other proposed improvements to the existing service road would improve drainage and water quality conditions in the Master Plan area. Rain gardens (bio-retention planters) installed along the road would provide treatment of roadway runoff before conveyance to the north or south zoo drainage systems. Potential water quality and sedimentation impacts associated with construction activities would be similar to those of the approved Master Plan. The 1998 MND Mitigation Measures 2a and 2c and the City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5**) would mitigate temporary water quality and sedimentation impacts associated with construction activities as well as permanent impacts associated with flooding risk and increased site runoff. No additional mitigation is required.

**Veterinary Medical Hospital.** The proposed Veterinary Medical Hospital would be located at the site of the former River Exhibit, which was analyzed in the 1998 MND. The proposed Veterinary Medical Hospital would result in approximately one acre of development in comparison with the eliminated River Exhibit, which would have resulted in approximately 3.7 acres of development. Consequently, the proposed Veterinary Medical Hospital would not result in new or more severe significant drainage and water quality impacts. The 1998 MND Mitigation Measures 2a and 2c and the City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5 and SCA-BIO-9 through SCA-BIO-12** identified in **Subsection 3.7.2** above) would mitigate temporary water quality and sedimentation impacts associated with construction activities as well as permanent impacts associated with flooding risk and increased site runoff. No additional mitigation is required.

**California Exhibit.** Compared to the California 1820 exhibit in the approved Master Plan, the California Exhibit in the proposed Master Plan amendment would represent a similar area of development, but the location would be shifted to the north. The proposed changes would reduce the area of land disturbance previously approved under the Master Plan by approximately 3.44 acres. Because the overall area proposed for disturbance in the California Exhibit would be reduced compared to the California 1820 exhibit in the approved Master Plan, no new or increased water quality impacts would occur. In addition, the California Exhibit would result in drainage impacts equal to or less than those identified in the 1998 MND. Increased runoff in the California Exhibit would be handled through a variety of techniques including rain gardens, pervious pavement, vegetated swales, and temporary detention and storage ponds. The 1998 MND Mitigation Measures 2a and 2c and the City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5 and SCA-BIO- 9 through SCA-BIO-12** identified in **Subsection 3.7.2** above) would mitigate temporary water quality and sedimentation impacts associated with construction activities as well as permanent impacts associated with flooding risk and increased site runoff. No additional mitigation is required.

**Perimeter Fence.** The proposed adjustments to the perimeter fence location would not result in an increase in water quality impacts; water quality impacts associated with construction of the perimeter fence would be similar to those of the approved Master Plan. The 1998 MND Mitigation Measures 2a and 2c and the City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1 and SCA-HYDRO-2**) would mitigate temporary water quality and sedimentation impacts associated with construction activities to less-than-significant levels. No additional mitigation is required.

**Outfall Replacement.** The proposed outfall replacement located in Arrojo Viejo Creek would improve drainage and water quality conditions in the creek. The City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1, SCA-HYDRO-5, and SCA-BIO-9 through SCA-BIO-12**) would mitigate temporary water quality and sedimentation impacts associated with construction activities to less-than-significant levels.

**Summary.** The proposed Master Plan amendment would comply with all applicable new or revised water quality standards and waste discharge permits through compliance with the NPDES permits governing stormwater discharges into the City's municipal separate storm sewer system, the City's Creek Protection Ordinance, and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5 and SCA-BIO-9 through SCA-BIO-12** identified in **Subsection 3.7.2** above). Consequently, the proposed Master Plan amendment would not result in any new or increased impacts related to water quality standards or waste discharge requirements. Through conformance with listed regulatory requirements, 1998 MND Mitigation Measures 2a and 2c, and the City's Standard Conditions of Approval, the proposed Master Plan amendment would not result in any new or increased impacts related to any water quality standards or waste discharge requirements. No additional mitigation is required.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

Neither the proposed Master Plan amendment nor the approved Master Plan involves activities that would significantly affect groundwater supplies or recharge. Water service to the amended Master Plan would be provided by the East Bay Municipal Utility District (see **Section 3.10 Public Services and Utilities**); no groundwater from the Master Plan amendment area would be used. As described above under Subsection **3.7.5.2**, the buildout of the amended Master Plan would incorporate design features such as rain gardens, constructed pervious surfaces, extensive landscaping and open space to facilitate continued groundwater recharge. The proposed Master Plan amendment would have a less-than-significant impact in relation to this criterion. No mitigation is required.

**Impact:** Less-than-significant

**Mitigation:** None required

**c) Would the project result in substantial erosion or siltation on-or off-site that would affect the quality of receiving waters?**

The proposed Master Plan amendment would not result in substantial erosion or siltation on- or off-site that would adversely affect the quality of receiving waters.

**Service Road Improvements.** Construction of the proposed service road improvements would not result in additional significant erosion and water quality impacts in comparison with the approved Master Plan. Runoff from the paved service road would be conveyed intermittently beneath the road to bio-retention rain gardens and treated before conveyance farther downstream. These rain gardens would be placed on the outside bend of the road where the natural topography widens.

**Veterinary Medical Hospital.** Construction of the proposed Veterinary Medical Hospital would not result in additional significant erosion and water quality impacts in comparison with the approved Master Plan. All flow from above the Veterinary Medical Hospital that is destined for the north drainage system would be conveyed through the proposed open detention basin to allow for settling of silts and particulates. Runoff from the Veterinary Medical Hospital site itself would be conveyed through a vegetated bioswale that runs along the eastern side of the upper parking lot and is designed to remove silts and pollutants from the surface runoff water. The



vegetated swale was sized using the flow-based sizing criteria from ACCWP's C.3 Stormwater Technical Guidance (ACCWP 2006).

**California Exhibit.** Because the overall area proposed for disturbance in the California Exhibit would be reduced compared to the approved Master Plan, no new or increased water quality impacts would occur. The California Exhibit would also use some or all of the following stormwater Best Management Practices: rain gardens, use of pervious surfaces to the extent possible, green roof systems, landscaped vegetated swales, and minor detention areas. In addition, all runoff from the three sub-basins of the California Exhibit that do not drain to the zoo's north or south systems would first be first treated in accordance with NPDES water quality regulations and then routed to open detention basins that would allow for the settling of silt and other pollutants.

**Perimeter Fence.** The proposed adjustments to the perimeter fence location would not result in additional significant water quality impacts.

**Outfall Replacement.** The proposed outfall replacement located in Arrojo Viejo Creek would improve drainage and water quality conditions in the creek. The City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1, SCA-HYDRO-5, and SCA-BIO-9 through SCA-BIO-12**) would mitigate temporary water quality and sedimentation impacts associated with construction activities to less-than-significant levels.

**Summary.** The proposed Master Plan amendment would result in a significant reduction in site disturbance in comparison with the approved Master Plan, reducing the potential for erosion, reducing impervious surfaces and stormwater runoff, and reducing the potential to affect natural drainage patterns in the Master Plan area. The original 1998 MND Mitigation Measures 2a and 2c and the City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5 and SCA-BIO-9 through SCA-BIO-12** identified in **Subsection 3.7.2** above) would mitigate temporary water quality and sedimentation impacts associated with construction activities. Through conformance with listed regulatory requirements, 1998 MND Mitigation Measures 2a and 2c, and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5 and SCA-BIO-9 through SCA-BIO-12**), the proposed Master Plan amendment would not result in any new or increased impacts that would result in substantial erosion or siltation on-or off-site that would affect the quality of receiving waters. No additional mitigation is required.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**d) Would the project result in substantial flooding on- or off-site?**

The proposed Master Plan amendment would not result in substantial flooding on- or off-site.

**Service Road Improvements.** The road drainage to the below-ground storm drain would prevent previously breached flows from flowing to the neighborhood below. The new roadway drainage system would effectively reduce contributory watershed to the neighborhood by nearly two acres. This would slightly reduce existing flood conditions south of the zoo and would not worsen flooding conditions in the neighborhoods southeast of the main parking lot.

**Veterinary Medical Hospital.** The increased flows from site improvements would be mitigated by the proposed open detention basin. Runoff from the upland drainage area and the proposed paved maintenance road would be routed through the detention basin, which is designed to be over-sized to offset the increased runoff from the Veterinary Medical Hospital site and previously expanded upper parking lot. There would be no net increase in peak stormwater flows at the entrances of either the north or south drainage systems.

With the proposed drainage routing and detention system, runoff during high flows that previously entered the flooded south system would instead be re-routed to the detention basin and, ultimately, the north system.

**California Exhibit.** According to the drainage report (Aliquot 2010), three sub-basins of the California Exhibit do not drain into either the north or south systems. Future storage volumes for the three sub-basins were calculated assuming that components such as the asphalt concrete paved road through the California Exhibit and any roofs that would not be green roofs would be impervious. The California Exhibit would include control structures that would contain predicted storage volumes such that post-project flows would not exceed pre-project flows (Aliquot 2010).

The proposed gondola people-moving system support structure foundations would create approximately 0.2 acre of development, as compared with the approved 5.7-acre loop road analyzed in the 1998 MND. The small amount of impervious area associated with the gondola system would not have a significant impact on increased runoff quantities.

The proposed overnight camping area (approximately 0.36 acre) would include approximately 11 tent cabins clustered within a loop access road constructed of pervious surface materials. The small amount of impervious area included in the overnight camping area would not have a significant impact on increased runoff quantities.

**Perimeter Fence.** The proposed adjustments to the perimeter fence location and the fence itself would not have a significant impact on increased runoff quantities.

**Outfall Replacement.** The proposed outfall replacement located in Arrojo Viejo Creek would improve drainage and water quality conditions in the creek. The City of Oakland Standard Conditions of Approval (**SCA-HYDRO-1, SCA-HYDRO-5, and SCA-BIO-9 through SCA-BIO-12**) would mitigate temporary water quality and sedimentation impacts associated with construction activities to less-than-significant levels.

**Summary.** With the proposed Master Plan amendment, all post-development increase in runoff would be mitigated on-site by reducing the flows through use of some or all of the following techniques: rain gardens, pervious surfaces, spreader pipes, run-off coefficient reduction due to landscaping plantings, cisterns, recycling of water, green roof systems, and other mitigating features (Aliquot 2010). In summary, the proposed Master Plan amendment would result in similar or reduced stormwater runoff in comparison with the approved Master Plan. The 1998 MND Mitigation Measures 2a and 2c and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5 and SCA-BIO-9 through SCA-BIO-12** identified in **Subsection 3.7.2** above) would mitigate flooding impacts. No additional mitigation is required. Through conformance with listed regulatory requirements, 1998 MND Mitigation Measures 2a and 2c, and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5 and SCA-BIO-9 through SCA-BIO-12**), the proposed Master Plan amendment would not result in any new or increased significant impacts that would result in substantial flooding on- or off-site.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**e) Would the project create or contribute substantial runoff which would exceed the capacity of existing or planned stormwater drainage systems?**

The proposed Master Plan amendment would not result in an increase in stormwater runoff to Arroyo Viejo Creek and therefore would not adversely affect capacity in existing off-site stormwater drainage systems. The capacity of the City's stormwater drainage system is discussed in **Subsection 3.7.4** above. The buildout of the amended Master Plan would not cause an increase in runoff exceeding the capacity of the existing stormwater system serving the Master Plan area. With the proposed Master Plan amendment, all post-development increase in runoff would be mitigated on-site. Through conformance with listed regulatory requirements, 1998 MND Mitigation Measures 2a and 2c, and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5, SCA-BIO-9 through SCA-BIO-12 and SCA-SERVICES-4**), the buildout of the amended Master Plan would not result in any new or increased significant impacts that would create or contribute substantial runoff that would exceed the capacity of existing or planned stormwater drainage systems. No additional mitigation is required.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**f) Would the project create or contribute substantial runoff which would be an additional source of polluted runoff?**

All runoff from the proposed Master Plan amendment area would be treated via detention basin, bio-retention planters (rain gardens), or landscaped vegetated swales. This runoff therefore would not be an additional source of pollution. Through conformance with listed regulatory requirements, 1998 MND Mitigation Measures 2a and 2c, and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5** and **SCA-BIO-9 through SCA-BIO-12**), the proposed Master Plan amendment would not result in any new or increased significant impacts that would create or contribute substantial runoff that would be an additional source of polluted runoff. No additional mitigation is required.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**g) Would the project otherwise substantially degrade water quality?**

All runoff from the proposed Master Plan amendment area would be treated via detention basins, bio-retention planters (rain gardens), or landscaped vegetated swales. The proposed Master Plan amendment would not otherwise substantially degrade water quality. No additional mitigation beyond the requirements of the 1998 Mitigation Measures 2a and 2c and the Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5** and **SCA-BIO-9 through SCA-BIO-12**) are required.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**h) Would the project place housing within a 100-year flood hazard area structures which would impede or redirect flood flows?**

The proposed Master Plan amendment area is not within a designated 100-year flood hazard area, according to published Federal Emergency Management Agency (FEMA) flood rate maps (Community Panel Numbers 06001C0095 and 06001C0257). Neither the proposed Master Plan

amendment nor the approved Master Plan would include housing. The buildout of the amended Master Plan would have no impact in relation to this criterion.

**Impact:** No impact

**Mitigation:** None required

**i) Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

The proposed Master Plan amendment area is not within a 100-year flood hazard area, and the proposed Master Plan amendment would not include structures that would impede or redirect flood flows in a 100-year flood hazard area. The buildout of the amended Master Plan would have no impact in relation to this criterion.

**Impact:** No impact

**Mitigation:** None required

**j) Would the project expose people or structures to a substantial risk of loss, injury or death involve flooding?**

Neither the proposed Master Plan amendment nor the approved Master Plan would expose people or structures to substantial risk of loss, injury or death from floods. See discussion under **Criterion d** above.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

**k) Would the project result in inundation by seiche, tsunami, or mudflow?**

The Master Plan area is not subject to inundation by seiche, tsunami, or mudflow. Therefore, the proposed Master Plan amendment would have no impact in relation to this criterion.

**Impact:** No impact

**Mitigation:** None required

- 1) **Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course, or increasing the rate or amount of flow, of a creek, river or stream in a manner that would result in substantial erosion, siltation, or flooding, both on- or off-site?**

The proposed drainage for the Veterinary Medical Hospital, service road, and California Exhibit would conform to pre-existing drainage pathways. To control breaching of runoff to the neighborhood below the service road, roadway and hill slope drainage would be collected and conveyed via drop inlets and then routed to a storm drain under the road that would route all runoff to a diversion structure that splits flow equally between north and south drainages.

Drainage from one hill slope area, Sub-Basin B1 (two acres), is an exception and would be collected and conveyed to the nearest drainage swale (i.e., Hood Street) at the base of Sub-Basin B1, as under pre-development conditions. The proposed roadway drainage and diversion structure layout would effectively reduce the drainage area to the Hood Street channel by two acres or 30 percent. Though this may not eliminate overflows at this point, it would aid in reducing the severity and frequency of these existing overflows and would effectively reduce hill slope runoff entering the backyards of adjacent residents.

The buildout of the amended Master Plan would not substantially alter the existing drainage pattern of the Master Plan amendment area; would not result in substantial erosion, siltation, or flooding on- or off-site; and would not result in new or increased significant impacts. The 1998 MND mitigation measures and the City's Standard Conditions of Approval (**SCA-HYDRO-2** and **SCA-HYDRO-5** identified in **Subsection 3.7.2** above) would mitigate stormwater runoff, erosion, siltation, and flooding impacts to less-than-significant levels. No additional mitigation is required. Through conformance with listed regulatory requirements, 1998 MND mitigation measures, and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5** and **SCA-BIO-9 through SCA-BIO-12**), the buildout of the amended Master Plan would not result in any new or increased significant impacts that would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course, or increasing the rate or amount of flow, of a creek, river or stream in a manner that would result in substantial erosion, siltation, or flooding, both on- or off-site.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

- m) **Would the project fundamentally conflict with the elements of the City of Oakland Creek Protection (OMC Chapter 13.16) ordinance intended to protect hydrologic resources? Although there are no specific, numeric/quantitative criteria to assess impacts, factors to be considered in determining significance include whether there is a substantial degradation of water quality through (a) discharging a substantial amount of pollutants into a creek; (b) significantly modifying the natural flow of the water or capacity; (c) depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability; or (d) substantially endangering public or private property or threatening public health or safety.**

The proposed Master Plan amendment would be required to comply with the City's Creek Protection Ordinance and would not conflict with any elements of the ordinance. The buildout of the amended Master Plan would not result in an increase in stormwater runoff to Arroyo Viejo Creek and would not cause an increase in runoff exceeding the capacity of existing stormwater systems serving the Master Plan area. The proposed outfall replacement located in Arroyo Viejo Creek would be required to comply with **SCA-BIO-14** which would protect the creek during construction of the new outfall. All post-development runoff would be treated on-site with detention basins, bio-retention planters, or landscaped vegetated swales (see **Criteria a, c, d, f, and g** above). There would be no substantial degradation of water quality through (a) discharge of pollutants into a creek, (b) modification of the natural flow of water or capacity, (c) deposition of new material into a creek or substantial bank erosion or instability, or (d) endangerment of public or private property or threatening of public health or safety. The proposed Master Plan amendment would be required to comply with **SCA-BIO-9**, which requires preparation of a Creek Protection Plan that is to be included with the project drawings submitted to the City. Through conformance with listed regulatory requirements, 1998 MND Mitigation Measures 2a and 2c, and the City's Standard Conditions of Approval (**SCA-HYDRO-1 through SCA-HYDRO-5, SCA-BIO-9 through SCA-BIO-12 and SCA-BIO-14**), the buildout of the amended Master Plan would not result in any new or increased significant impacts that would fundamentally conflict with the elements of the City of Oakland Creek Protection Ordinance (Oakland Municipal Code Chapter 13.16) ordinance intended to protect hydrologic resources.

**Impact:** Potentially significant

**Mitigation:** 1998 MND Mitigation Measures 2a and 2c

**Significance after Implementation of Mitigation:** Less-than-significant

### 3.7.6 CUMULATIVE IMPACTS

The geographic scope for assessing the potential for cumulative hydrology and water quality impacts is the immediately surrounding area, including Knowland Park, the existing zoo facilities, and the immediately surrounding residential communities located within the same drainage area. **Section 3.8, Land Use, Recreation and Planning**, describes the past and present development in this area.

The buildout of the amended Master Plan is the only reasonably foreseeable future project in the area. The Knowland Park area outside of the Master Plan boundary is zoned Open Space (Resource Conservation Area) and future development is not anticipated. The zoo and its related support facilities have been part of Knowland Park for more than 60 years. The immediate surrounding residential areas are largely built out. Future improvements to existing homes or the potential construction of homes on any vacant parcels would represent minor changes to drainage conditions in the surrounding area and would not be close enough to the California Exhibit and Veterinary Medical Hospital to combine with the amended Master Plan to create a cumulative impact. Overall, for the Master Plan amendment area, collection and detention of flows that (1) historically breached the existing service road and (2) historically drained from above the Veterinary Medical Hospital site would relieve existing areas of flooding downstream of the Master Plan amendment area. The proposed Master Plan amendment would not increase post-development flows over pre-development flows; thus, the proposed Master Plan amendment would not contribute substantially to cumulative flows in Arroyo Viejo Creek. The two development projects anticipated elsewhere in southeast Oakland – the Leona Quarry and Oak Knoll projects – are located too far from the Master Plan area for the hydrology and water quality impacts of these projects to combine with the amended Master Plan in a local creek.

Cumulative development, however, does contribute to runoff into the central San Francisco Bay. The regulations discussed in this section have been designed to reduce adverse water quality impacts and mandate that past, present, and reasonably foreseeable future projects comply with these permitting requirements.

Consequently, there are no potential significant hydrology and water quality cumulative impacts in the relevant geographic area. Thus, the buildout of the amended Master Plan would not result in, or contribute to, any significant cumulative hydrology and water quality impacts.

### 3.7.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new hydrology and water quality impacts or a substantial increase in severity of previously identified hydrology and water quality impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND and would continue to be less than significant. Previously imposed mitigation measures from the 1998 MND have been identified and, where appropriate, have been clarified, refined, revised, or deleted. This section also identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.



### 3.7.8 REFERENCES

- ACCWP. 2006. Alameda Countywide Clean Water Program C.3 Stormwater Technical Guidance. August 31, 2006 v. 1.0.
- Aliquot Associates, Inc. 2010. *Drainage Report: Knowland Park Zoo. Preliminary Design—Veterinarian Hospital. Preliminary Design—California Exhibit and Access Road.* August 2010.
- Association of Bay Area Governments. 2009. Dam Failure Inundation Maps, obtained from <http://www.abag.ca.gov/bayarea/eqmaps/damfailure/damfail.html> on May 1, 2009.
- California Department of Water Resources. 2004. Groundwater Bulletin 118 – *Santa Clara Valley Groundwater Basin – East Bay Plain Sub-Basin.* Last Updated 2/27/2004. Obtained from [http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/basins/pdfs\\_desc/2-9.04.pdf](http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/basins/pdfs_desc/2-9.04.pdf)
- City of Oakland. 1998. *Oakland Zoo in Knowland Park Master Plan Initial Study.*
- City of Oakland. 1996. *Open Space, Conservation, and Recreation (OSCAR) Element, An Element of the Oakland General Plan.* June 1996.
- Federal Emergency Management Agency. Flood Rate Maps, Community Panel Numbers 06001C0095 and 06001C0257.
- Questa Engineering Corporation. 2009. Site visit by Questa Engineering Corporation staff. April 30, 2009.
- Sowers, J.M. 1993. *Creek and Watershed Map of Oakland and Berkeley.* Oakland Museum of California. 1993 (revised 1995 & 2000).
- Western Regional Climate Center. 2010. Monthly Climate Summary for Oakland, CA. Obtained from <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6332>

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## **3.8 LAND USE, RECREATION AND PLANNING**

This section evaluates potential land use, recreation and planning impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant land use, recreation or planning impacts not identified in the 1998 MND or a substantial increase in the severity of the previously identified impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant land use, recreation or planning impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. This section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required.

### **3.8.1 PRIOR MND ANALYSIS AND CONCLUSIONS**

#### **3.8.1.1 1998 Prior MND Impact Findings**

The 1998 MND concluded that the Master Plan would not have land use, recreation or planning impacts.

The MND indicated that the Master Plan would not conflict with approved plans for the area or the Oakland General Plan, or alter the present or planned land use for the area. The MND noted that the Master Plan would (1) expand and enhance existing facilities at the park, providing additional recreational opportunities for the community and enhancing habitat conservation at the park; (2) be consistent with the Open Space, Conservation and Recreation (OSCAR) Element of the General Plan; and (3) preserve about 73 percent of Knowland Park as permanent open space.

The MND indicated that the Master Plan would not require relocation of residents or businesses, affect existing housing, or create a demand for additional housing.

The MND indicated that the Master Plan would not cause a substantial alteration in neighborhood land use, density, or character. The MND noted that structures would be sited to minimize their visibility from adjacent properties.

#### **3.8.1.2 1998 MND Mitigation Measures**

Since the 1998 MND concluded that the Master Plan would not have land use, recreation or planning impacts, no mitigation measures were identified.

### 3.8.2 STANDARD CONDITIONS OF APPROVAL

The City of Oakland's Standard Conditions of Approval do not include conditions that relate specifically to land use, recreation or planning. Please refer to **Section 3.1, Aesthetics**, **Section 3.6, Hazards and Hazardous Materials**, **Section 3.9, Noise**, and **Section 3.11, Transportation and Circulation**, for Standard Conditions of Approval that would reduce conflicts between the buildout of the amended Master Plan and surrounding uses.

### 3.8.3 UPDATED REGULATORY SETTING

The following discussion reviews land use, recreation and planning provisions of the City of Oakland General Plan and Planning Code that are relevant to the proposed Master Plan amendment.

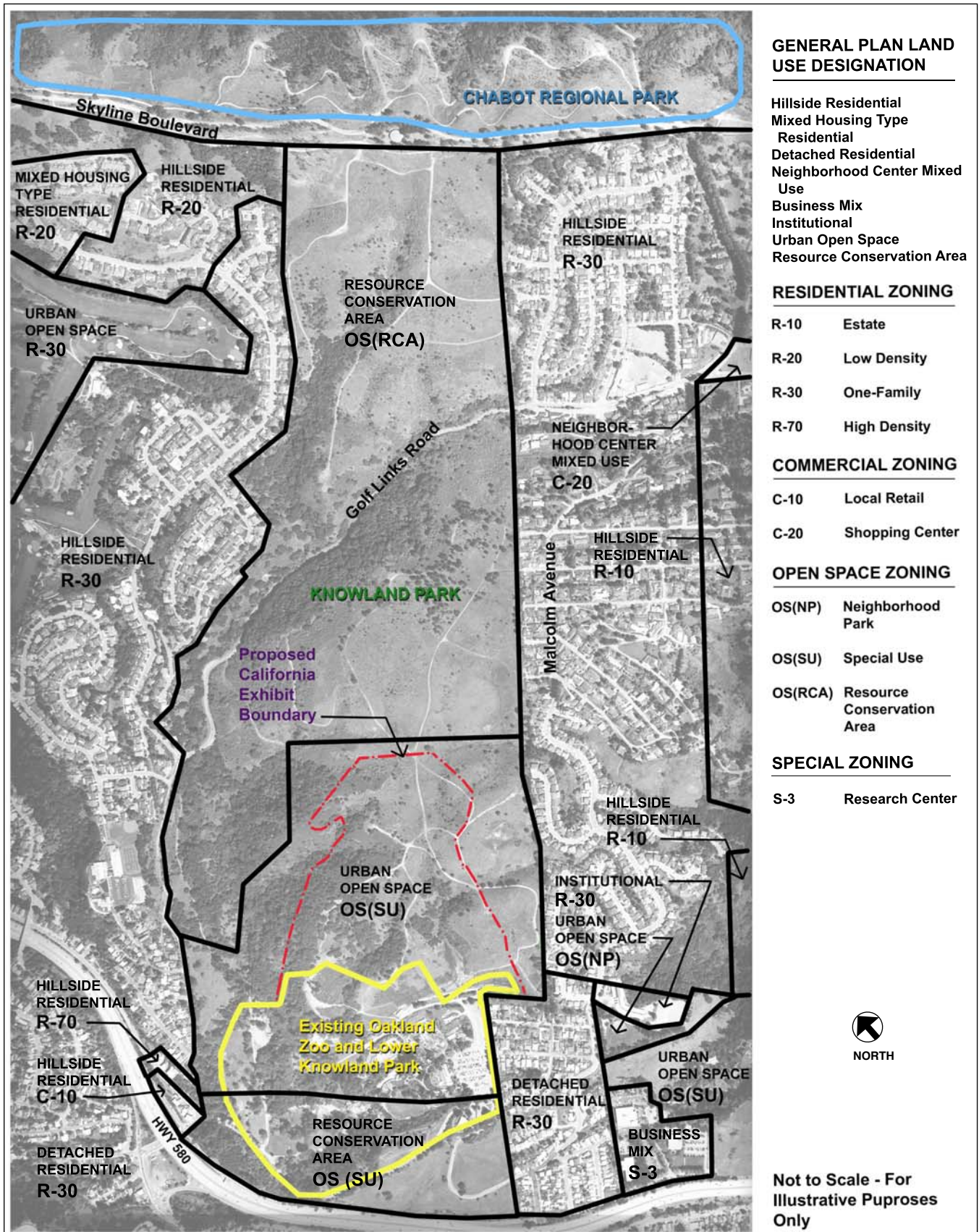
#### 3.8.3.1 City of Oakland General Plan

**Land Use Designations.** As shown on **Figure 3.8-1**, the General Plan land use designation for the existing Oakland Zoo and adjoining area to the east (i.e., the proposed Master Plan amendment area) is Urban Open Space. According to the Land Use and Transportation Element of the General Plan, this designation "is intended to identify, enhance and maintain land for parks and open space," with uses that include "urban parks, schoolyards, cemeteries, and other active outdoor recreation spaces" (City of Oakland 1998).

The adjoining portions of Knowland Park to the east and west of the Master Plan area are designated Resource Conservation Area (see **Figure 3.8-1**). According to the Land Use and Transportation Element of the General Plan, this designation "is intended to identify, enhance and maintain publicly-owned lands for the purpose of conserving and appropriately managing undeveloped areas which have high natural resource value, scenic value, or natural hazards which preclude safe development." Development within this designation "is extremely limited, and must relate to the conservation and management of natural resources, public open space, and natural hazards." Buildings are not permitted in Resource Conservation Areas except as required to facilitate maintenance of these areas (City of Oakland 1998).

The residential areas that adjoin Knowland Park to the north and south are designated Hillside Residential and Detached Unit Residential (see **Figure 3.8-1**). Single-family housing is the main type of land use allowed within these designations (City of Oakland 1998).

**Land Use and Transportation Element Objectives and Policies.** The Land Use and Transportation Element of the Oakland General Plan was adopted in March 1998, before the 1998 MND was adopted. The Land Use and Transportation Element contains the following land use- and recreation-related objectives and policies relevant to the proposed Master Plan amendment (City of Oakland 1998):



SOURCE: SOURCE: City of Oakland

**Figure 3.8-1**  
General Plan Designations and  
Zoning of Project Site and Vicinity

Objective I/C4: Minimize land use compatibility conflicts in commercial and industrial areas through achieving a balance between economic development values and community values.

*Policy I/C4.2: Minimizing Nuisances.* The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls.

Objective N2: Encourage adequate civic, institutional, and educational facilities located within Oakland, appropriately designed and sited to serve the community.

*Policy N2.1: Designing and Maintaining Institutions.* As Institutional uses are among the most visible activities in the City and can be sources of community pride, high-quality design and upkeep/maintenance should be encouraged. The facilities should be designed and operated in a manner that is sensitive to surrounding residential and other uses.

*Policy N2.2: Providing Distributed Services.* Provision of governmental and institutional services should be distributed and coordinated to meet the needs of City residents.

*Policy N2.3: Supporting Institutional Services.* The City should support many uses occurring in institutional facilities where they are compatible with surrounding activities and where the facility site adequately supports the proposed uses.

*Policy N2.4: Locating Services Along Major Streets.* New large scale community, government, and institutional uses should be located outside of areas that are predominantly residential. Preferably, they should be located along major thoroughfares with easy access to freeways and public transit or in the Downtown.

*Policy N2.5: Balancing City and Local Benefits of Institutions.* When reviewing land use permit applications for the establishment or expansion of institutional uses, the decision-making body should take into account the institution's overall benefit to the entire Oakland community, as well as its effects on the immediately surrounding area.

Objective N5: Minimize conflicts between residential and non-residential activities while providing opportunities for residents to live and work at the same location.

*Policy N5.2: Buffering Residential Areas.* Residential areas should be buffered and reinforced from conflicting uses through the establishment of performance-based regulations, the removal of non-conforming uses, and other tools.

### **Open Space, Conservation and Recreation (OSCAR) Element Objectives and Policies.**

The Open Space, Conservation and Recreation (OSCAR) Element of the Oakland General Plan was adopted in June 1996, before the 1998 MND was adopted; however, a previous master plan for the zoo was prepared in 1990 prior to the adoption of the OSCAR Element. The OSCAR Element contains the following land use- and recreation-related objectives and policies relevant to the proposed Master Plan amendment (City of Oakland 1996):

Objective OS-1: Resource Conservation Areas. To conserve and appropriately manage undeveloped areas in Oakland which have high natural resource value, scenic value, or natural hazards which preclude safe development.

*Policy OS-1.1: Wildland Parks.* Conserve existing City and Regional parks characterized by steep slopes, large groundwater recharge areas, native plant and animal communities, extreme fire hazards, or similar conditions. These areas are included in Figure 4 as Potential Resource Conservation Areas. Manage such areas to protect public health and safety and conserve natural resources.

Objective OS-2: Urban Parks, Schoolyards, and Gardens. To maintain an urban park, schoolyard, and garden system which provides open space for outdoor recreation, psychological and physical well-being, and relief from the urban environment.

*Policy OS-2.1: Protection of Park Open Space.* Manage Oakland's urban parks to protect and enhance their open space character while accommodating a wide range of outdoor recreational activities.

Objective OS-3: Institutional and Functional Open Space. To retain major institutional and functional open space areas and enhance their recreational and aesthetic benefits.

*Policy OS-3.1: University, College, and Institutional Open Space.* Retain open space at Oakland's universities, colleges, and other institutions where such open space provides recreational, aesthetic, conservation, or historic benefits to the community. Where such spaces are publicly owned, as at the community colleges, support the permanent retention of athletic fields and other recreational areas as open space, provided that the long-range needs of the institution can be met and that the space can be made accessible to the general public. Such areas should not be converted to development unless they are replaced in kind with comparable areas or facilities in the immediate vicinity.

Objective OS-4: Private Open Space. To supplement public open spaces with outdoor open space for private use.

*Policy OS-4.3: Protection of Rural Character.* Conserve the rural, open character of areas which have historically developed at very low densities, particularly those areas where the prevailing lot size is one acre or larger.

Objective OS-5: Linear Parks and Trails. To develop a system of linear parks and trails which (a) links existing parks together; (b) provides safe, convenient access to open space from residential areas and employment centers; (c) provides places to hike, bike, and experience Oakland's scenery; and (d) provides a means of moving from one place to another without an automobile.

*Policy OS-5.1: Priorities for Trail Improvement.* Improve trail connections within Oakland, emphasizing connections between the flatlands and the hill and shoreline parks; lateral trail connections between the hill area parks; and trails along the waterfront (see Figure 6).

*Policy OS-5.3: Trail Design Principles.* Plan and design all new trails in a manner which: (a) minimizes environmental impacts; (b) fully considers neighbor privacy and security issues; (c) involves the local community in alignment and design; and (d) considers the needs of multiple users, including pedestrians, bicycles, and wheelchairs.

Objective OS-8: Creek Conservation. To conserve open space along Oakland's creeks, restoring the creeks where feasible and enhancing creek access on public lands.

*Policy OS-8.1: Public Access to Creeks.* Pursue additional public access to creeks at feasible locations, including city parks, schools, flood control easements, and City-owned properties along creeks. Encourage the development of trails or linear parks within creek corridors, with priority placed on creeks traversing public, commercial, or institutional properties and creeks traversing vacant properties that may be developed in the future.

Objective REC-1: Park Planning and Management. To establish a rational, systematic approach for planning and managing public parks.

*Policy REC-1.1: Protection of Park Open Space.* Use a variety of measures, including zoning and park classification, to protect the basic functions of parks as public open spaces and to evaluate and review future park projects. Use the park classification system outlined in Table 8 (Oakland Park Classification System) and illustrated in Figure 16 (Oakland Parks by Category) as the basis for determining the kinds of facilities that are appropriate in each park.

*Policy REC-1.2: No Net Loss of Open Space.* Unless overriding conditions exist, allow no net loss of open space within Oakland's urban park system. In other words, the area covered by park buildings or other recreational facilities in the future should be offset in the long-run by acquisition or improvement of an equivalent or larger area of open space. Replacement open space should be of comparable value to the space lost and should generally serve an area identified on Figure 18 (Park Deficient Areas) as having un-met needs.

*Policy REC-1.3: Siting of Buildings in Parks.* To the maximum extent practical, accommodate new recreational buildings in City parks by expanding the park onto nearby vacant or underutilized land rather than covering open space within existing park boundaries. Strongly discourage new non-recreational buildings in City parks unless their construction is a matter of public necessity and the use cannot be reasonably accommodated in another location. Exceptions to this policy may be made in cases where there are (a) no feasible alternatives to placing buildings in parks; (b) the buildings are being developed in accordance with an overall Master Plan for the impacted park; and (c) replacement open space will be provided as specified in Policy REC-1.2.

*Policy REC-1.4: Park Improvement or Change in Use.* Require any improvement or change in use within a City of Oakland park to be subject to a formal review and approval process. Provide potential park users and local residents with opportunities to participate in this process.

*Policy REC-1.5: Park Master Planning.* Use master plans as a tool for making long-range decisions for park land use, determining needs for capital improvements and funding sources, and soliciting community opinion on how parks should be managed.

Objective REC-2: Park Design and Compatibility of Uses. To ensure that parks are well designed, and that facilities and activities within parks are compatible with each other, the natural environment, historic resources, and the surrounding community.



*Policy REC-2.1: Park Conversions to Other Uses.* Protect parks from conversion to other uses, except for minor boundary changes which would improve their value or usefulness. In any case, as prescribed in Policy REC-1.2, replace whatever land and facilities are given up with land and facilities of at least equal value and capacity.

*Policy REC-2.2: Conflicts Between Park Uses.* Site park activities and facilities in a manner which minimizes conflict between park uses. Wherever feasible, use National Recreation and Park Association (NRPA) standards to determine the area and dimensional requirements for new facilities. In new parks, arrange activities and land uses to accommodate all of the intended uses, in optimal relationship to one another and making the most efficient use of the space possible.

*Policy REC-2.3: Environmentally-Sensitive Design.* Protect sensitive natural areas within parks, including creeks and woodlands, and integrate them into park design. Require new recreational facilities to respect existing park character, be compatible with the natural environment, and achieve a high standard of design quality.

*Policy REC-2.4: Off-Site Conflicts.* Manage park facilities and activities in a manner which minimizes negative impacts on adjacent residential, commercial, or industrial areas.

*Objective REC-4: Maintenance and Rehabilitation.* To maintain park facilities so that their ability to meet recreational needs is optimized and to rehabilitate recreational facilities on a regular basis so that they remain useful, attractive, and safe.

*Policy REC-4.1: Systematic Maintenance Provisions.* Provide for on-going, systematic maintenance of all parks and recreational facilities to prevent deterioration, ensure public safety, and permit continued public use and enjoyment.

*Policy REC-4.3: Renovation and Rehabilitation Priorities.* Where cost savings and equivalent benefits would be achieved, renovate and rehabilitate existing facilities before building new facilities. Give rehabilitation priority to projects which would: (a) increase park safety and usefulness; (b) reduce operating and maintenance expenses; and (c) prevent a facility from deteriorating to the point of becoming unusable or expensive to repair. For projects meeting these criteria, give highest priority to projects in areas which are underserved by parks and recreational facilities, and projects which would benefit the greatest number of persons.

The OSCAR Element (pages 5-44 through 5-46) also contains a discussion of “planning area strategies” for the South Hills area of the city, including provisions for the Knowland Park area. The following discussion describes the then-current (1990) master plan for the park, which is substantially consistent with the approved 1998 Master Plan and the proposed Master Plan amendment:

...A Master Plan containing general principles for the park’s development, as well as plans for specific capital improvements, was prepared in 1990.

The Knowland Master Plan divides the park into three physical units: (1) the historic park landscape and arboretum; (2) the zoological gardens; and (3) Wild California. Wild California includes a variety of western landscapes, including grassland, chaparral, oak woodland, and riparian canyons. Wildlife native to these habitat [sic] will be housed in this area.

The Plan calls for many improvements, including additional parking, major traffic circulation changes, improved park entry and picnic areas, a new west gate, an education building, an off-exhibit breeding center, a wild habitat preserve, a variety of “California 1820” exhibits and upgrades to existing exhibits. The total cost of these improvements is estimated at \$17 million. A significant share of the funding is being provided through Measure K.

The master plan does not address the substantial portion of Knowland Park above the zoo and picnic grounds. This area is to remain in its natural state and be managed for resource conservation and fire hazard reduction. The area’s unimproved hiking trails should be upgraded, marked, and used to link residential neighborhoods around the park, nearby open spaces such as Dunsmuir Ridge, and the regional parks on the east side of Skyline.

The relationship between Knowland Park and the South Hills community should be improved through better after-hours security at the park, introduction of neighborhood-oriented recreation programs, and clarification of park boundaries. City-owned land adjacent to the park along Golf Links Road should be merged with the park itself.

Figure 29 (“South Hills Major Recommendations”) of the OSCAR Element contains a recommendation to “improve trail links from Knowland to Anthony Chabot Park.”

### 3.8.3.2 City of Oakland Planning Code

**Zoning of Oakland Zoo Master Plan Area.** As shown on **Figure 3.8-1**, the existing Oakland Zoo and adjoining area to the east (i.e., the proposed Master Plan amendment area) are zoned Open Space (Special Use) (OS[SU]). The City of Oakland Planning Code (Section 17.11.060) permits a wide range of recreational uses in the OS(SU) zone, including “park, recreational, and civic uses, consistent with a Master Plan adopted by the City Council” (City of Oakland 2010a).

Other relevant Planning Code provisions for the OS(SU) zone are as follows (City of Oakland 2010a):

- No general maximum building height limit or minimum yard requirements are prescribed for the OS(SU) zone. Appropriate yard requirements are to be determined by the Director of City Planning through the conditional use permit procedure (Sections 17.11.130 and 17.11.140).
- The maximum impervious surface area for a park of more than 10 acres is 10 percent (Section 17.11.150).
- All uses are subject to the applicable buffering regulations in Planning Code Chapter 17.110, which address screening and location of parking, loading, and storage areas; control of artificial illumination; and other matters (Section 17.11.160).
- Unless overriding considerations exist, approval of any structure coverage within any OS zone shall be contingent on a finding that there has been no net loss of urban parkland from the establishment of the OS zone regulations in 1998 (Section 17.135.060).

**Zoning of Adjoining Areas.** The adjoining Knowland Park areas to the east and west are zoned Open Space (Resource Conservation Area) (OS[RCA]) (see **Figure 3.8-1**). The Oakland Planning Code (Section 17.11.060) permits only certain limited, low-intensity recreational activities in the OS(RCA) zone (City of Oakland 2010a).

The residential areas that adjoin Knowland Park to the north and south are zoned One-Family Residential (R-30), a single-family residential zoning (see **Figure 3.8-1**).

### 3.8.4 EXISTING CONDITIONS

#### 3.8.4.1 Existing Land Uses

Knowland Park contains a total of approximately 490 acres. Of this total, the existing Oakland Zoo occupies approximately 93 acres, and the additional expansion area approved under the Oakland Zoo Master Plan comprises approximately 62 acres. The approximately 62-acre expansion area approved for the California Exhibit is currently undeveloped and contains public trails and fire roads. This area adjoins the eastern edge of the existing upper parking lot and other developed portions of the zoo.

The remaining 335 acres of Knowland Park (the upper and lower areas of the park) are undeveloped and contain public trails and fire roads. Golf Links Road extends generally in a northwest-southeast direction through the upper area of the park.

**Adjoining Land Uses.** Residential neighborhoods adjoin the zoo and the park to the north and south. To the north, Golf Links Road and undeveloped portions of the park separate the developed portions of the existing zoo (e.g., exhibit areas) from adjoining housing. To the south, parking lots are the existing zoo-related uses that are closest to adjoining housing.

To the south, single-family houses adjoin the park along a series of dead-end streets extending off Malcolm Avenue and Scotia Avenue. In the vicinity of the approved Master Plan area, informal trail entrances to Knowland Park are located off most of these streets (e.g., Cameron Drive, Snowdown Avenue, Etrick Street, Fallbrook Way, Elvessa Street, Lockard Street, Caloden Lane, Edgemont Way).

North of the park, single-family houses are located on the north side of Golf Links Road (which forms a portion of the park's northern boundary) and on other streets extending off Golf Links Road. Compared to access from the south side of the park, pedestrian access from the north side of the park (e.g., off Golf Links Road) is generally more limited due to steep terrain, dense vegetation, and fewer trails.

#### **3.8.4.2 Existing Use of Knowland Park (Park Use Survey)**

To obtain general information on recreational use at Knowland Park, an informal survey was conducted to record park use at different times of day and on different days of the week. The survey focused on the informal network of trails and fire roads that traverse Knowland Park. The survey also generally focused on the portion of the park west of Golf Links Road, which contains the approximately 62-acre approved California Exhibit area and also appears to be more heavily used than the portion east of Golf Links Road.

The survey was conducted during the following time periods:

- Saturday, March 20, 2010, 11:00 AM to 2:00 PM
- Sunday, March 21, 2010, 11:00 AM to 2:00 PM
- Wednesday, March 24, 2010, 7:30 AM to 9:00 AM and 4:30 PM to 6:00 PM

The recording periods were chosen to represent times when more people could be expected in the park (i.e., midday on weekends and before and after work on weekdays). Weather during each of the recording periods was fair (partly cloudy to sunny, with temperatures ranging from approximately the mid-50s to approximately the mid-70s).

Surveyors walked the trails during each of the recording periods, noting the number of people on the trails and in the immediate vicinity. Park users were recorded for each day and time period.

The survey found that use of Knowland Park was generally low. Approximately 10 or fewer users were observed during each of the recording periods. The exception was on Sunday, March 21, when an organized event (sponsored by an “orienteeing” organization) attracted a larger group to the park (estimated at approximately 40 to 100 people during the recording period). During the other recording periods, use of the park appeared to be limited to a few hikers or dog walkers. It appeared that Oakland Zoo visitors generally did not venture into the undeveloped portion of the park.

#### **3.8.4.3 Other Parks in the Vicinity**

Oakland has approximately 3,381 acres of parkland, including parkland within the East Bay Regional Park District (EBRPD) (City of Oakland 2009).

In addition to Knowland Park, City of Oakland parks in the vicinity of the Oakland Zoo include (1) the approximately 30-acre Dunsmuir House and Gardens and the adjoining Hellman Park, located off Malcolm Avenue and Peralta Oaks Court immediately south of Knowland Park; and (2) the approximately 1.34-acre Sheffield Village Recreation Center, located off Marlow Drive approximately one-half mile south of Knowland Park (City of Oakland 2010b). The City of

Oakland's Office of Parks and Recreation manages the City's parks and recreation centers. Oakland's Public Works Agency maintains the parks and park facilities (City of Oakland 2009).

The EBRPD acquires and develops regional parks, open spaces, and trails throughout the East Bay, including within and near Oakland. EBRPD properties in the vicinity of Knowland Park include the approximately 5,067-acre Anthony Chabot Regional Park, located on the east side of Skyline Boulevard adjoining the eastern boundary of Knowland Park; and the approximately 290-acre Leona Canyon Regional Open Space Preserve, located approximately one mile north of Knowland Park (EBRPD 2010; City of Oakland 2009).

### 3.8.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

The project would have a significant impact on the environment if it would:

- a) Physically divide an established community;
- b) Result in a fundamental conflict between adjacent or nearby land uses;
- c) Fundamentally conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment;
- d) Fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan;
- e) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- f) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

These criteria are discussed below.

#### **a) Would the project physically divide an established community?**

The proposed Master Plan amendment involves an approximately 57-acre undeveloped area of Knowland Park covered by the Oakland Zoo's approved Master Plan and adjoining the existing zoo (see **Figure 2-3 in Chapter 2, Project Description**). Knowland Park currently forms a natural boundary between the established residential neighborhoods to the north and south. The Master Plan amendment area would be physically separated from these neighborhoods by Knowland Park. Consequently, the proposed Master Plan amendment would not physically divide an established community.

As with the approved Master Plan, the buildout of the amended Master Plan would extend zoo-related land uses into portions of the approximately 57-acre area of the park. The zoo and its related facilities have been a part of Knowland Park for more than 60 years. Thus, Knowland Park has long accommodated a mix of public recreational uses ranging from passive open space to the more intense activities of the zoo and its facilities. The extension of the zoo for the California Exhibit has been approved by the City since 1998. Both the City's General Plan Open Space, Conservation and Recreation (OSCAR) Element and zoning for Knowland Park acknowledge the Master Plan approval and the area planned for the California Exhibit. Public access to the remaining 278 undeveloped acres of upper Knowland Park would be maintained, and a fire road and public access path in this area would be improved (see **Figure 2-4 in Chapter 2, Project Description**). Compared to the approved Master Plan, the proposed Master Plan amendment would reduce the area of the proposed California Exhibit by approximately five acres, thereby reducing the area for zoo activities and increasing the area remaining as passive open space.

The buildout of the amended Master Plan would not result in a physical division of an established community. Thus, the potential impact under this criterion is less than significant and no mitigation is necessary. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of the impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) Would the project result in a fundamental conflict between adjacent or nearby land uses?**

The buildout of the amended Master Plan would not result in a fundamental conflict with adjacent or nearby land uses. The remaining undeveloped portions of Knowland Park would separate the proposed zoo-related uses from existing residential areas to the north and south (see **Figure 2-3 in Chapter 2, Project Description**). The proposed zoo-related uses would not create fundamental conflicts with ongoing use of the undeveloped portions of Knowland Park for passive recreational purposes (e.g., hiking, dog walking). Both zoo activities and the passive recreational uses have co-existed in Knowland Park for many years. The City's General Plan policies and land use designations for Knowland Park and the City's zoning of Knowland Park allow and support both the zoo and the passive recreational uses in separate areas of Knowland Park. In the proposed Master Plan amendment area, zoo uses are allowed under both the General Plan land use designation (Urban Open Space) and the zoning (Open Space [Special Use]) (see **Figure 3.8-1**). As already noted, public access to the remaining undeveloped portions of Knowland Park would be retained.

The proposed Master Plan amendment includes changes to the 1998 Master Plan perimeter fence location that would help reduce land use conflicts and improve public access to the remaining undeveloped portions of the park. The 1998 perimeter fence location would cut off access to one knoll that offers panoramic views of San Francisco Bay and environs (see **Section 3.1, Aesthetics**). The proposed Master Plan amendment would pull back the perimeter fence along the southern boundary of the California Exhibit, providing public access to the Lower Knoll (see **Figure 2-22 in Chapter 2, Project Description**). The proposed Master Plan amendment would also pull back the perimeter fence so that it is farther away from the houses to the south (on Hellman Street, Maggiora Drive, and Edgemont Way) (see **Figure 2-22 in Chapter 2, Project Description**). Additionally, the perimeter fence would serve to avoid potential safety conflicts between the zoo and other areas of the park.

The potential for the buildout of the amended Master Plan to result in a fundamental land use conflict would represent a less-than-significant impact and no mitigation is necessary. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of impact in relation to this criterion.

See also **Section 3.1, Aesthetics, Section 3.2, Air Quality, Section 3.6, Hazards and Hazardous Materials, Section 3.8, Noise, and Section 3.11, Transportation and Circulation**, for discussion of the potential for visual, air quality, hazardous materials, noise, and traffic impacts on adjacent or nearby land uses.

**Impact:** Less-than-significant

**Mitigation:** None required

- c) **Would the project fundamentally conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment?**

The buildout of the amended Master Plan would not fundamentally conflict with any applicable land use plans, policies, or regulations of the City of Oakland, which has land use jurisdiction over the Master Plan area. The following discussion summarizes the relationship of the proposed Master Plan amendment to relevant land use, recreation and planning provisions of the City of Oakland General Plan and Planning Code. **Table 3.8-1** lists all relevant City of Oakland General Plan policies and describes the relationship of the proposed Master Plan amendment to these policies in more detail. In addition to land use- and recreation-related policies, **Table 3.8-1** includes policies related to other environmental topic areas addressed in this Subsequent Mitigated Negative Declaration/Addendum (e.g., aesthetics, air quality, biological

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Land Use and Transportation Element</i></b>	
<p><i>Policy I/C4.2: Minimizing Nuisances. The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls.</i></p>	<p><i>Consistent.</i> The remaining undeveloped portions of Knowland Park would separate proposed zoo-related uses from residential areas to the north and south, minimizing the potential for nuisances. See further discussion under Policy N2.1 below.</p>
<p><i>Policy T3.5: Including Bikeways and Pedestrian Walks. The City should include bikeways and pedestrian walks in the planning of new, reconstructed, or realized streets, wherever possible.</i></p>	<p><i>Consistent.</i> The proposed Master Plan amendment would provide for pedestrian and bicycle access to the Oakland Zoo and the rest of Knowland Park. In lieu of vehicle access to the California Exhibit, the proposed Master Plan amendment would provide for visitor access via a gondola people-moving system. Visitors would travel through the California Exhibit on foot. The proposed Master Plan amendment would provide adequate pedestrian amenities; in addition to pedestrian access within the California Exhibit, a public access path would be provided to allow pedestrian access between the fire roads and knolls within Knowland Park. The path would be for pedestrian use only and would not be designed for motorized traffic. See further discussion in <b>Section 3.11, Transportation and Circulation.</b></p>
<p><i>Policy T3.9: Providing Parking for Transportation. The City should strive to provide parking for multiple modes of transportation throughout the city where it is needed and does not unduly disrupt traffic flow.</i></p>	<p><i>Consistent.</i> With the buildout of the amended Master Plan, existing vehicle parking at the Oakland Zoo would be adequate to meet weekday and weekend peak period demand, and bicycle parking would also be adequate to meet peak period demand. See further discussion in <b>Section 3.11, Transportation and Circulation.</b></p>
<p><i>Policy T4.1: Incorporating Design Features for Alternative Travel. The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking.</i></p>	<p><i>Consistent.</i> See discussion of Policy T3.5 above. In addition to pedestrian and bicycle access, bicycle parking facilities would be provided in accordance with Oakland Planning Code requirements.</p>
<p><i>Policy T6.2: Improving Streetscapes. The city should make major efforts to improve the visual quality of streetscapes. Design of the streetscape, particularly in neighborhoods and commercial centers, should be pedestrian-oriented and include lighting, directional signs, trees, benches, and other support facilities.</i></p>	<p><i>Consistent.</i> See discussion of pedestrian amenities under Policy T3.5 above.</p>
<p><i>Policy T6.5: Protecting Scenic Routes. The City should protect and encourage enhancement of the distinctive character of scenic routes within the city, through prohibition of billboards, design review, and other means.</i></p>	<p><i>Consistent.</i> The Scenic Highways Element identifies Interstate 580 in the Knowland Park vicinity as a scenic route. The buildout of the amended Master Plan would not obstruct panoramic vistas of San Francisco Bay and the city skylines and would minimize disturbance of natural landforms, vegetation, and views of ridgelines and grasslands.</p>



**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Land Use and Transportation Element (cont.)</i></b>	
<i>Policy T6.5 (cont.)</i>	The buildout of the amended Master Plan therefore would not conflict with this policy. See further discussion in <b>Section 3.1, Aesthetics</b> .
<i>Policy N2.1: Designing and Maintaining Institutions. As Institutional uses are among the most visible activities in the City and can be sources of community pride, high-quality design and upkeep/maintenance should be encouraged. The facilities should be designed and operated in a manner that is sensitive to surrounding residential and other uses.</i>	<i>Consistent.</i> The Oakland Zoo could be considered an institutional facility. The remaining undeveloped portions of Knowland Park would separate proposed zoo-related uses from existing residential areas to the north and south. The buildout of the amended Master Plan would be required to comply with zoning requirements for buffering, which would help to reduce potential land use conflicts. The proposed Master Plan amendment includes changes to the 1998 Master Plan perimeter fence location that would help reduce land use conflicts and improve public access to the remaining undeveloped portions of the park.
<i>Policy N2.2: Providing Distributed Services. Provision of governmental and institutional services should be distributed and coordinated to meet the needs of City residents.</i>	<i>Consistent.</i> The buildout of the amended Master Plan could be seen as providing an institutional service (i.e., expanded Oakland Zoo) that meets the needs of City residents.
<i>Policy N2.3. Supporting Institutional Services. The City should support many uses occurring in institutional facilities where they are compatible with surrounding activities and where the facility site adequately supports the proposed uses.</i>	<i>Consistent.</i> See discussion of Policy N2.1 above.
<i>Policy N2.4: Locating Services Along Major Streets. New large scale community, government, and institutional uses should be located outside of areas that are predominantly residential. Preferably, they should be located along major thoroughfares with easy access to freeways and public transit or in the Downtown.</i>	<i>Consistent.</i> The Oakland Zoo adjoins Interstate 580 and Golf Links Road and has freeway and transit access. The remaining undeveloped portions of Knowland Park would separate proposed zoo-related uses from existing residential areas to the north and south.
<i>Policy N2.5. Balancing City and Local Benefits of Institutions. When reviewing land use permit applications for the establishment or expansion of institutional uses, the decision-making body should take into account the institution's overall benefit to the entire Oakland community, as well as its effects on the immediately surrounding area.</i>	<i>Consistent.</i> See discussion of Policy N2.1 above.
<i>Policy N2.7: Designing Community Facilities. Site design, architecture and operating practices of community facilities should be compatible with the area's desired character, and should include public art where possible.</i>	<i>Consistent.</i> Proposed site and building design would not have any significant impacts on scenic vistas, scenic resources, or the visual character or quality of the site and its surroundings; see <b>Section 3.1, Aesthetics</b> . See also discussion of Policy N2.1 above.
<i>Policy N5.2. Buffering Residential Areas. Residential areas should be buffered and reinforced from conflicting uses through the establishment of performance-based regulations, the removal of non-conforming uses, and other tools.</i>	<i>Consistent.</i> See discussion of Policy N2.1 above.

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b>Land Use and Transportation Element (cont.)</b>	
<p><i>Policy N12.1: Developing Public Service Facilities. The development of public facilities and staffing of safety-related services, such as fire stations, should be sequenced and timed to provide a balance between land use and population growth, and public services at all times.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan is not expected to require development of safety-related facilities (see <b>Section 3.10, Public Services and Utilities</b>) and therefore would not create any conflicts with this policy.</p>
<p><i>Policy N12.4: Undergrounding Utility Lines. Electrical, telephone, and related distribution lines should be undergrounded in commercial and residential areas, except where special local conditions such as limited visibility of the poles and wires make this unneeded. They should also be underground in appropriate institutional, industrial, and other areas, and generally along freeways, scenic routes, and heavily traveled streets. Programs should lead systematically toward the eventual undergrounding of existing lines in such places. Where significant utility extensions are taking place in these areas, such as in new subdivisions, utilities should be installed underground from the start.</i></p>	<p><i>Consistent.</i> Proposed electrical and gas lines would be underground (see <b>Chapter 2, Project Description</b>). The buildout of the amended Master Plan would not create any conflicts with this policy.</p>
<b>Open Space, Conservation and Recreation (OSCAR) Element</b>	
<p><i>Policy OS-1.1: Wildland Parks. Conserve existing City and Regional parks characterized by steep slopes, large groundwater recharge areas, native plant and animal communities, extreme fire hazards, or similar conditions. These areas are included in Figure 4 as Potential Resource Conservation Areas. Manage such areas to protect public health and safety and conserve natural resources.</i></p>	<p><i>Consistent.</i> <u>Under the buildout of the amended Master Plan</u>, zoo-related uses would not be located in the portions of Knowland Park that are designated as resource conservation areas (see <b>Figure 3.8-1</b>).</p>
<p><i>Policy OS-1.3: Development of Hillside Sites. On large sites with subdivision potential, generally conserve ridges, knolls, and other visually prominent features as open space. Maintain development regulations which consider environmental and open space factors such as land stability, plant and animal resources, earthquake and fire hazards, and visual impacts, in the determination of allowable density. Where hillside development does occur, encourage creative architecture and site planning which minimizes grading and protects the natural character of the hills.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would minimize disturbance of natural landforms, vegetation, and views of ridgelines and grasslands. Development would be subject to regulations that address land stability, vegetation and wildlife, earthquake and fire hazards, and visual impacts. See further discussion in <b>Section 3.1, Aesthetics, Section 3.3, Biological Resources, Section 3.4, Geology and Soils, and Section 3.10 Public Services and Utilities</b>.</p>
<p><i>Policy OS-2.1: Protection of Park Open Space. Manage Oakland’s urban parks to protect and enhance their open space character while accommodating a wide range of outdoor recreational activities.</i></p> <p>(NOTE: Figure 3 [“Open Space Plan”] of the OSCAR Element identifies a portion of Knowland Park as “Urban Parks.” The boundaries of this area generally correspond to those of the Urban Open Space designation shown on the General Plan land use map [see <b>Figure 3.8-1</b>].)</p>	<p><i>Consistent.</i> With the buildout of the amended Master Plan, zoo-related uses would be located within the area of Knowland Park identified as “Urban Parks” on Figure 3 of the OSCAR Element. The buildout of the amended Master Plan would provide outdoor recreational activities and would protect the open space character of the Master Plan area consistent with this policy.</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy OS-3.1: University, College, and Institutional Open Space. Retain open space at Oakland’s universities, colleges, and other institutions where such open space provides recreational, aesthetic, conservation, or historic benefits to the community. Where such spaces are publicly owned, as at the community colleges, support the permanent retention of athletic fields and other recreational areas as open space, provided that the long-range needs of the institution can be met and that the space can be made accessible to the general public. Such areas should not be converted to development unless they are replaced in kind with comparable areas or facilities in the immediate vicinity.</i></p>	<p><i>Consistent.</i> Knowland Park is publicly owned and the existing Oakland Zoo may be considered a form of “institutional open space.” The buildout of the amended Master Plan would provide recreational activities and therefore would not create any conflicts with this policy.</p>
<p><i>Policy OS-3.6: Open Space Buffers Along Freeways. Maintain existing open space buffers along Oakland’s freeways to absorb noise and emissions and enhance the scenic quality of the roadways. Manage steeply sloping or wooded parcels adjacent to highways owned by the State of California (Caltrans) to conserve natural resources and protect open space. Where compatible with adjacent land uses, support the use of land along, under, or over freeways in urban setting for greenbelts, recreation, public art, or other activities which enhance the usefulness and appearance of such land.</i></p>	<p><i>Consistent.</i> Knowland Park and the existing Oakland Zoo adjoin Interstate 580. The buildout of the amended Master Plan would minimize disturbance of natural landforms, vegetation, and views of ridgelines and grasslands and therefore would not conflict with this policy. See further discussion in <b>Section 3.1, Aesthetics, Section 3.2, Air Quality, Section 3.3, Biological Resources, Section 3.4, Geology and Soils, and Section 3.9, Noise.</b></p>
<p><i>Policy OS-4.3: Protection of Rural Character. Conserve the rural, open character of areas which have historically developed at very low densities, particularly those areas where the prevailing lot size is one acre or larger.</i></p> <p>(NOTE: The OSCAR Element text indicates that “this policy addresses concerns over lot splits and minor subdivisions in several Oakland neighborhoods known for their rural character...”)</p>	<p><i>Consistent.</i> The proposed Master Plan amendment does not involve a lot split or minor subdivision but would be located in a low-density area. The remaining undeveloped portions of Knowland Park would separate proposed zoo-related uses from low-density residential areas to the north and south. The buildout of the amended Master Plan therefore would not conflict with this policy.</p>
<p><i>Policy OS-5.1: Priorities for Trail Improvement. Improve trail connections within Oakland, emphasizing connections between the flatlands and the hill and shoreline parks; lateral trail connections between the hill area parks; and trails along the waterfront (see Figure 6).</i></p> <p>(NOTE: Figure 6 [“Citywide Pedestrian Trail System”] of the OSCAR Element identifies trails to “connect Upper Knowland and Chabot,” Connect Lower Knowland and Chabot via Dunsmuir Ridge with Spur to Dunsmuir House,” “Interconnect/ Improve Knowland Trails,” and “Connect Leona and Knowland via redeveloped Naval Hospital.” The OSCAR Element text discussion of Figure 6 and Policy OS-5.1 identifies “Castlemont to Knowland” as a potential improvement, stating that “a trail along the [Arroyo Viejo] creek and in the right-of-way of Fontaine/Golf Links Roads would link the Castlemont area with large open spaces in the South Hills.”)</p>	<p><i>Consistent.</i> By providing for improvement of a fire road and public access path in Knowland Park, the proposed Master Plan amendment could be seen as furthering OSCAR Element policies (e.g., Policy OS-5.1) that call for trail improvements in Knowland Park.</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy OS-5.3: Trail Design Principles. Plan and design all new trails in a manner which: (a) minimizes environmental impacts; (b) full considers neighbor privacy and security issues; (c) involves the local community in alignment and design; and (d) considers the needs of multiple users, including pedestrians, bicycles, and wheelchairs.</i></p>	<p><i>Consistent.</i> Environmental impacts of the proposed new public access path are considered in this SMND/Addendum. Neighbor privacy and security have been considered and the local community has been involved in the planning process for the path. The path would be designed for pedestrian use only.</p>
<p><i>Policy OS-8.1: Public Access to Creeks. Pursue additional public access to creeks at feasible locations, including city parks, schools, flood control easements, and City-owned properties along creeks. Encourage the development of trails or linear parks within creek corridors, with priority placed on creeks traversing public, commercial, or institutional properties and creeks traversing vacant properties that may be developed in the future.</i></p> <p>(NOTE: Figure 8 [“Potential Areas for Creek Improvement”] of the OSCAR Element identifies “trail potential within Knowland Park.”)</p>	<p><i>Consistent.</i> By providing for improvement of a fire road and public access path in Knowland Park, the buildout of the amended Master Plan could be seen as furthering OSCAR Element policies (e.g., Policy OS-8.1) that call for trail improvements in Knowland Park. Public access is already provided to Arroyo Viejo Creek and would be maintained. A proposed outfall replacement in Arroyo Viejo Creek would curtail future erosion and enhance existing habitat values in the area. See <b>Section 3.3, Biological Resources.</b></p>
<p><i>Policy OS-9.1: Protection of Natural Landforms. Design new development to preserve natural topography and terrain. Enhance prominent topographic features where appropriate by parks, plazas, or architectural expressions.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy indicates that “while some ‘cutting’ and ‘filling’ may be inevitable on hillside sites, such activities should be kept to a minimum. Artificial terracing or benching of hillsides...is discouraged.” Figure 9 of the OSCAR Element shows “Arroyo Viejo Canyon” in the vicinity of the Oakland Zoo as a “subarea defined by natural features.” The OSCAR Element text states that “the alteration of these features, for instance through the filling of canyons or the ‘skylining’ of development along ridgelines, should be strongly discouraged. New structures should highlight or accent these features rather than ignoring them.”)</p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would minimize disturbance of natural landforms, vegetation, and views of ridgelines and grasslands. No substantial filling or “skylining” of development along ridgelines is proposed. See further discussion in <b>Section 3.1, Aesthetics.</b></p>
<p><i>Policy OS-9.2: Use of Natural Features to Define Communities. Use open space and natural features to define city and neighborhood edges and give communities within Oakland a stronger sense of identity. Maintain and enhance city edges, including the greenbelt on the eastern edge of the city, the shoreline, and San Leandro Creek. Use creeks, parks, and topographical features to help define neighborhood edges and create neighborhood focal points.</i></p>	<p><i>Consistent.</i> The remaining undeveloped portions of Knowland Park would separate proposed zoo-related uses from existing residential areas to the north and south. Knowland Park would continue to define the boundary between these residential areas.</p>
<p><i>Policy OS-10.1: View Protection. Protect the character of existing scenic views in Oakland, paying particular attention to: (a) views of the Oakland Hills from the flatlands; (b) views of downtown and Lake Merritt; (c) views of the shoreline; and (d) panoramic views from Skyline Boulevard, Grizzly Peak Road, and other hillside locations.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would not obstruct panoramic vistas of San Francisco Bay and the city skylines and would minimize disturbance of natural landforms, vegetation, and views of ridgelines and grasslands. The development would be noticeable in views from</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy OS-10.1 (cont.)</i></p> <p>(NOTE: The OSCAR Element text explaining this policy indicates that “such views should be protected through a combination of development review, zoning (including height limitations in appropriate zones), design review, and proper management of park and open space areas...Development should also be managed to avoid visual intrusion into the regional parks.”)</p>	<p>some hillside locations within Knowland Park, including locations adjoining Chabot Regional Park, but would not obstruct panoramic views. See further discussion in <b>Section 3.1, Aesthetics</b>.</p>
<p><i>Policy OS-10.2: Minimizing Adverse Visual Impacts. Encourage site planning for new development which minimizes adverse visual impacts and takes advantage of opportunities for new vistas and scenic enhancement.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “Good site planning can minimize many negative visual impacts and can also create opportunities for vistas within new development. Development can be more visually sensitive by screening unsightly uses, using landscaping, retaining the natural character and features of a site (including trees and other vegetation), and incorporating architectural details which are attractive and compatible with the surrounding area.”)</p>	<p><i>Consistent.</i> See discussion of Policy OS-10.1 above. The buildout of the amended Master Plan would provide opportunities for new vistas from within Knowland Park and includes provisions for screening, landscaping, and architectural detailing to enhance views. See further discussion in <b>Section 3.1, Aesthetics</b>.</p>
<p><i>Policy CO-1.1: Soil Loss in New Development. Regulate development in a manner which protects soil from degradation and misuse or other activities which significantly reduce its ability to support plant and animal life. Design all construction to ensure that soil is well secured so that unnecessary erosion, siltation of streams, and sedimentation of water bodies does not occur.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “Good soil management practices include soil enrichment, drainage improvements, covering or creating drainage ditches around exposed slopes during the rainy season, and planting of exposed soils to control erosion. Within new construction areas, development should minimize soil removal, grading, and the removal of vegetation, and should stabilize and revegetation those areas where soil is disturbed. The City currently uses its Grading Ordinance and its Sedimentation and Erosion Control Ordinance to protect soil resources and will continue to do so in the future. Further protection is provided by the Clean Water Act, which also require [sic] erosion and sediment control during construction.”)</p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would comply with applicable City of Oakland Standard Conditions of Approval; the City’s grading, erosion control, and creek protection ordinances; and 1998 MND mitigation measures that require certain design specifications for runoff control and drainage improvements, methods to reduce erosion during construction activity, restriction of grading and construction activity to the dry season, watering requirements during construction, and monitoring and modification of erosion control methods and implementation procedures. Additional revegetation, habitat enhancement, and creek protection measures would also be incorporated. (See further discussion in <b>Section 3.3, Biological Resources, Section 3.4, Geology and Soils</b> and <b>Section 3.7 Hydrology and Water Quality</b>.) These measures would help to prevent soil loss and degradation, consistent with this policy.</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy CO-1.2: Soil Contamination Hazards. Minimize hazards associated with soil contamination through the appropriate storage and disposal of toxic substances, monitoring of dredging activities, and clean-up of contaminated sites. In this regard, require soil testing for development of any site (or dedication of any parkland or community garden) where contamination is suspected due to prior activities on the site.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy indicates that "...any fill imported for use within city parks should be checked to make sure it is non-toxic.")</p>	<p><i>Consistent.</i> Soil contamination is not suspected at Knowland Park. Oversight by the general construction contractor and management in accordance with the required Hazardous Materials Business Plan would ensure that impacts would be less than significant and that no conflicts with this policy would result. See further discussion in <b>Section 3.6, Hazards and Hazardous Materials.</b></p>
<p><i>Policy CO-2.1: Slide Hazards. Encourage development practices which minimize the risk of landsliding.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy lists the following applicable "basic design practices":</p> <ul style="list-style-type: none"> <li>• "Proper drainage provisions should be required in new development to avoid oversaturation. Where soil percolation is poor, runoff from roof gutters and graded areas should be intercepted and conveyed to storm drain facilities. Runoff should not be directed onto filled slopes."</li> <li>• "Residential development should not be allowed on deep fill areas. To avoid ground instability in other fill areas, drainage terraces should be provided at intervals and brow ditches should be placed on the top of all cut and filled slopes."</li> <li>• "Wherever fill is placed on a hillside, subdrains should be used to mitigate drainage-related slope stability problems. Where necessary to avoid oversaturation, subdrains should be placed behind retaining walls. All subdrain systems should be properly designed and inspected and should be regularly maintained."</li> <li>• "Overwatering of steep slopes should be minimized. Drought tolerant plants should be used to minimize excessive watering and the risk of oversaturation."</li> <li>• "Wherever possible, setbacks should be maintained between structures and filled slope areas."</li> <li>• "On existing vacant lots in areas of known soil instability, deep piers supporting grade beam foundations should be required to mitigate foundation instability problems.")</li> </ul>	<p><i>Consistent.</i> The buildout of the amended Master Plan would be subject to code requirements and the implementation of the geotechnical recommendations and design criteria contained in the geotechnical reports required by these code requirements, along with applicable City of Oakland Standard Conditions of Approval and mitigation measures identified in the 1998 MND and in this SMND/Addendum to address unstable soils and earthquake hazards. (See further discussion in <b>Section 3.4 Geology and Soils</b> and <b>Section 3.7 Hydrology and Water Quality.</b>) These provisions would minimize landsliding risks, consistent with this policy.</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy CO-2.2: Unstable Geologic Features. Retain geologic features known to be unstable, including serpentine rock, areas of known landsliding, and fault lines, as open space. Where feasible, allow such lands to be used for low-intensity recreational activities.</i></p>	<p><i>Consistent.</i> See discussion of Policy CO-2.1 above. The buildout of the amended Master Plan would provide for low-intensity recreational activities and would generally avoid areas of known landsliding. Development would not occur within the Hayward Fault zone. The Master Plan amendment area does not include any known serpentine rock features. See further discussion in <b>Section 3.4, Geology and Soils.</b></p>
<p><i>Policy CO-2.3: Development on Filled Soils. Require development on filled soils to make special provisions to safeguard against subsidence and seismic hazards.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would be subject to code requirements and the implementation of the geotechnical recommendations and design criteria contained in the geotechnical reports required by these code requirements, along with applicable City of Oakland Standard Conditions of Approval and mitigation measures identified in the 1998 MND and in this SMND/Addendum to address development on filled soils. See further discussion in <b>Section 3.4, Geology and Soils.</b></p>
<p><i>Policy CO-2.4: Hillside Cuts and Fills. Minimize hillside cuts and fills and the removal of desirable vegetation. Limit large-scale grading to those areas where it is essential to development. Where hillside grading does occur, reshape the terrain in smooth, naturally appearing contours rather than flat, terraced benches. Immediately replant and reseed graded areas to reduce soil loss.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy indicates that “building stability can be further improved by setting buildings back from the shoulder of deep fill areas, using consistent fill depths behind graded areas, and using special foundations on lots underlain by fill. Revegetation of slopes is vital to reducing soil erosion and covering graded scars.”)</p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would minimize disturbance of natural landforms and vegetation. Grading and construction activities would be subject to code requirements and the implementation of the geotechnical recommendations and design criteria contained in the geotechnical reports required by these code requirements, along with applicable City of Oakland Standard Conditions of Approval; the City’s grading, erosion control, and creek protection ordinances; and mitigation measures identified in the 1998 MND and in this SMND/Addendum. The buildout of the amended Master Plan would also incorporate additional revegetation, habitat enhancement, and creek protection measures. These provisions would specify grading and revegetation requirements to ensure consistency with this policy. See further discussion in <b>Section 3.1, Aesthetics, Section 3.3, Biological Resources, and Section 3.4, Geology and Soils.</b></p>
<p><i>Policy CO-4.1: Water Conservation. Emphasize water conservation and recycling strategies in efforts to meet future demand.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would be required to comply with City of Oakland and East Bay Municipal Utility District (EBMUD) water conservation and recycling requirements. (See <b>Section 3.10, Public Services and Utilities.</b>) The proposed new Veterinary Medical Hospital would include water conservation features to meet Leadership in Energy and Environmental Design (LEED) certification requirements, and landscaping would incorporate evapotranspiration-based irrigation controllers to minimize water use. (See <b>Chapter 2, Project Description.</b>)</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy CO-4.2: Drought-Tolerant Landscaping. Require use of drought-tolerant plants to the greatest extent possible and encourage the use of irrigation systems which minimize water consumption.</i></p>	<p><i>Consistent.</i> Preliminary plans for landscaping of the California Exhibit provide for the removal of non-native plant species and preservation and planting of native trees, shrubs, and grasses. Evapotranspiration-based irrigation controllers would be used to minimize water use. (See <b>Chapter 2, Project Description</b>.)</p>
<p><i>Policy CO-4.3: Use of Reclaimed Water. Promote the use of reclaimed wastewater for irrigating landscape medians, cemeteries, parks, golf courses, and other areas requiring large volumes of non-potable water.</i></p>	<p><i>Consistent.</i> In accordance with the City’s recycled water ordinance, the Oakland Zoo would coordinate with EBMUD to confirm the feasibility of supplying recycling water to the Master Plan area. The Oakland Zoo would also be required to comply with EBMUD water efficiency measures. (See <b>Section 3.10, Public Services and Utilities</b>.)</p>
<p><i>Policy CO-5.1: Protection of Groundwater Recharge. Encourage groundwater recharge by protecting large open space areas, maintaining setbacks along creeks and other recharge features, limiting impervious surfaces where appropriate, and retaining natural drainage patterns within newly developing areas.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would not involve activities that would affect groundwater supplies or recharge. (See <b>Section 3.7, Hydrology and Water Quality</b>.) In accordance with the Open Space (Special Use) zoning of the Master Plan area, impervious surface area would be limited to a maximum of 10 percent. Setbacks from Arroyo Viejo Creek would be maintained. (See <b>Section 3.3, Biological Resources</b>.)</p>
<p><i>Policy CO-5.2: Improvements to Groundwater Quality. Support efforts to improve groundwater quality, including the use of non-toxic herbicides and fertilizers, the enforcement of anti-litter laws, the clean-up of sites contaminated by toxics, and on-going monitoring by the Alameda County Flood Control and Water Conservation District.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would be subject to the City’s Standard Conditions of Approval, mitigation measures recommended in the 1998 MND, the City’s creek protection ordinance, and other requirements to protect water quality. (See <b>Section 3.7, Hydrology and Water Quality</b>.) Knowland Park is not known to contain sites contaminated by toxics. (See <b>Section 3.6, Hazards and Hazardous Materials</b>.)</p>
<p><i>Policy CO-5.3: Control of Urban Runoff. Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program, to: (a) reduce water pollution associated with stormwater runoff; (b) reduce water pollution associated with hazardous spills, runoff from hazardous material areas, improper disposal of household hazardous wastes, illicit dumping, and marina “live-aboards”; and (c) improve water quality in Lake Merritt to enhance the lake’s aesthetic, recreational, and ecological features.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would comply with applicable City of Oakland Standard Conditions of Approval; the City’s grading, erosion control, and creek protection/stormwater management ordinances; and 1998 MND mitigation measures that require certain design specifications for runoff control and drainage improvements, methods to reduce erosion during construction activity, restriction of grading and construction activity to the dry season, watering requirements during construction, and monitoring and modification of erosion control methods and implementation procedures. (See further discussion in <b>Section 3.3, Biological Resources</b>, <b>Section 3.4, Geology and Soils</b>, and <b>Section 3.7, Hydrology and Water Quality</b>.) Hazardous materials impacts would be prevented through compliance with</p>



**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<i>Policy CO-5.3 (cont.)</i>	applicable state and local requirements, oversight by the general construction contractor, and management in accordance with the required Hazardous Materials Business Plan. (See further discussion in <b>Section 3.6, Hazards and Hazardous Materials.</b> )
<p><i>Policy CO-6.1: Creek Management. Protection Oakland's remaining natural creek segments by retaining creek vegetation, maintaining creek setbacks, and controlling bank erosion. Design future flood control projects to preserve the natural character of creeks and incorporate provisions for public access, including trails, where feasible. Strongly discourage projects which bury creeks or divert them into concrete channels.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “new development along creeks can also be required to take more proactive measures to restore creek habitat, especially where banks have eroded, garbage has been dumped, or vegetation has been removed. Revegetation of creekbanks and stabilization of banks will be promoted wherever feasible and may be required as a condition of development approval where appropriate. Consideration might also be given to establishing conservation easements within the 20-foot creek setback in new developments. Where creekside development is permitted, it should be of a bulk and density appropriate to the site. Building out to the maximum envelope permitted by zoning may be inappropriate for many creekfront properties.”)</p>	<i>Consistent.</i> The buildout of the amended Master Plan would be subject to the City’s creek protection/ stormwater management ordinance and Standard Conditions of Approval related to creek protection, along with additional mitigation measures specified in the 1998 MND, including implementation of a Habitat Enhancement Plan. Setbacks from Arroyo Viejo Creek would be maintained. (See <b>Section 3.3, Biological Resources</b> and <b>Section 3.7, Hydrology and Water Quality.</b> )
<i>Policy CO-6.2: Creek Maintenance and Safety. Strictly enforce local, state, and federal laws and ordinances on the maintenance of creeks and watercourses. Abate health and safety hazards along and within creeks through a variety of measures, including creek clean-up programs, stronger enforcement of litter and anti-dumping laws, and vegetation maintenance requirements for properties abutting creeks.</i>	<i>Consistent.</i> See discussion of Policy CO-6.1 above.
<i>Policy CO-7.1: Protection of Native Plant Communities. Protect native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way which prevents or mitigates adverse impacts to these communities.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would largely avoid impacts on riparian, woodland, and chaparral habitats. Compliance with the City’s Standard Conditions of Approval and mitigation measures identified in the 1998 MND would be required. These measures would ensure that potential impacts on these habitat types would remain less than significant and would ensure compliance with Policies CO-7.1 and CO-7.2 (see below). See further discussion in <b>Section 3.3, Biological Resources.</b>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy CO-7.2: Native Plant Restoration. Encourage efforts should [sic] to restore native plant communities in areas where they have been compromised by development or invasive species, provided that such efforts do not increase an area’s susceptibility to wildfire.</i></p>	<p><i>Consistent.</i> See discussion of Policy CO-7.1 above.</p>
<p><i>Policy CO-7.3: Forested Character. Make every effort to maintain the wooded or forested character of tree-covered lots when development occurs on such lots.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “while some vegetation removal is necessary to accommodate structures and avoid fire hazards, excessive tree clearance and creation of large artificial lawns is discouraged.”)</p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would result in tree removal or transplantation. Impacts on trees would be mitigated through implementation of the Tree Protection and Revegetation Plan required in Mitigation Measure 13b of the 1998 MND and compliance with the City’s Tree Protection Ordinance and Standard Conditions of Approval. To account for tree loss, Mitigation Measure 13b from the 1998 MND is revised to ensure that tree loss is further minimized through field adjustments during installation of the perimeter fence and other improvements, where feasible. Implementation of the revised 1998 Mitigation Measure 13b would ensure compliance with Policies CO-7.3 and CO-7.4 (see below). See further discussion in <b>Section 3.3, Biological Resources</b>.</p>
<p><i>Policy CO-7.4: Tree Removal. Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons.</i></p>	<p><i>Consistent.</i> See discussion of Policy CO-7.3 above.</p>
<p><i>Policy CO-7.5: Non-Native Plant Removal. Do not remove non-native plants within park and open space areas solely because they are non-natives. Plant removal should be related to other valid management policies, including fire prevention.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “where non-native plants <u>are</u> removed, they should be replaced with an appropriate native species or with a non-native species that is specifically called for in a landscape or vegetation management plan...Eradication should only occur in conjunction with an overall management strategy.”)</p>	<p><i>Consistent.</i> The California Exhibit is intended to feature native California species. Preliminary plans for landscaping of the California Exhibit provide for the removal of non-native plant species and preservation and planting of native trees, shrubs, and grasses. Signage would highlight “local native” plants. (See <b>Chapter 2, Project Description</b>.)</p>
<p><i>Policy CO-8.1: Mitigation of Development Impacts. Work with federal, state, and regional agencies on an on-going basis to determine mitigation measures for development which could potentially impact wetlands. Strongly discourage development with unmitigatable adverse impacts.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “[mitigation] could require creating new wetlands of comparable value in other parts of the Bay, or providing areas of replacement wetlands larger than the areas sacrificed. When replacement wetlands are provided, efforts should be made to provide them in as close proximity as possible to the impacted site.”)</p>	<p><i>Consistent.</i> Direct impacts on wetlands would be adequately mitigated with implementation of <b>Mitigation Measure BIO-1</b> and the City’s Standard Conditions of Approval and therefore no conflicts with Policy CO-8.1 would result. See further discussion in <b>Section 3.3 Biological Resources</b>.</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy CO-9.1: Habitat Protection. Protect rare, endangered, and threatened species by conserving and enhancing their habitat and requiring mitigation of potential adverse impacts when development occurs within habitat areas.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “field surveys to verify the presence of the [Alameda Whipsnake] should be required for large hillside development projects where such conditions [potential habitat] exist.”)</p>	<p><i>Consistent.</i> The buildout of the amended Master Plan has the potential to affect the State- and federally-listed threatened Alameda whipsnake (AWS). The City’s applicable Standard Conditions of Approval and mitigation measures from the 1998 MND would ensure that the impact would remain less than significant. These measures would ensure compliance with Policy CO-9.1. See further discussion in <b>Section 3.3, Biological Resources</b>.</p>
<p><i>Policy CO-10.1: Flammable Vegetation Control. Subject to the availability of City resources and at the discretion of the City Council and applicable City departments, control flammable vegetation on public and private open space lands in the Oakland Hills to reduce wildfire hazards.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would be subject to the City’s Wildfire Prevention Assessment District requirements and Standard Conditions of Approval related to vegetation management and fire safety. (See <b>Section 3.10, Public Services and Utilities</b>.) These requirements would ensure adequate control of flammable vegetation.</p>
<p><i>Policy CO-10.2: Fire Prevention Measures. As determined necessary by the City, require individual property owners and developers in high hazard areas to reduce fire hazards on their properties through a range of preventative measures. Landscaping and site planning in these high hazard areas should minimize future wildfire hazard.</i></p>	<p><i>Consistent.</i> See discussion of Policy CO-10.1 above.</p>
<p><i>Policy CO-11.1: Protection from Urbanization. Protect wildlife from the hazards of urbanization, including loss of habitat and predation by domestic animals.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “when vegetation clearance occurs on a development site, the cleared areas should be revegetated in a way that restores and enhances the diversity of wildlife habitat as much as possible. Individual plants should be selected to encourage the retention (or return of) local wildlife. In some instances, particularly in large parks, it may be appropriate to designate buffer zones around critical nesting or breeding sites and to restrict public access in those areas.”)</p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would be subject to City of Oakland Standard Conditions of Approval and other requirements for habitat protection, including revegetation and establishment of buffer zones around breeding and nesting areas. (See <b>Section 3.3, Biological Resources</b>.)</p>
<p><i>Policy CO-11.2: Migratory Corridors. Protect and enhance migratory corridors for wildlife. Where such corridors are privately owned, require new development to retain native habitat or take other measures which help sustain local wildlife population and migratory patterns. Wildlife corridors are shown in Figure 14 (Potential Wildlife Corridors).</i></p> <p>(NOTE: Figure 14 of the OSCAR Element identifies wildlife corridors extending generally north-south and east-west through Knowland Park. The OSCAR Element text explaining this policy states that the wildlife corridors shown in Figure 14</p>	<p><i>Consistent.</i> Extending zoo-related development into the currently undeveloped portion of Knowland Park has some potential to interfere with wildlife movement. With implementation of the relevant 1998 MND mitigation measures and the City’s Standard Conditions of Approval related to tree removal and other habitat protections, however, the buildout of the amended Master Plan would have a less-than-significant impact on wildlife movement in the vicinity. As a result, no conflict with Policy CO-11.2 is anticipated. See further discussion in <b>Section 3.3, Biological Resources</b>.</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p>“should be maintained and enhanced where feasible. To be most useful, wildlife corridors should encompass a variety of specialized features, such as rock outcroppings and creeks. It is essential that such corridors contain diverse plant associations and are wide enough to provide shelter. Ideally, provisions to protect wildlife also could be made where corridors bisect roads (Deer Crossing signs, reduced speed limits, etc.)”</p>	
<p><i>Policy CO-12.1: Land Use Patterns Which Promote Air Quality. Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would extend the existing land use pattern (i.e., zoo-related uses) but would include provisions for pedestrian, bicycle, and transit access to the Oakland Zoo and the rest of Knowland Park. In lieu of vehicle access to the California Exhibit, the proposed Master Plan amendment would provide for visitor access via a gondola people-moving system. Visitors would travel through the California Exhibit on foot. The proposed Master Plan amendment would provide adequate pedestrian amenities; in addition to pedestrian access within the California Exhibit, a public access path would be provided to allow pedestrian access between fire roads and knolls within Knowland Park. The path would be for pedestrian use only and would not be designed for motorized traffic. See further discussion in <b>Section 3.2, Air Quality</b>.</p>
<p><i>Policy CO-12.4: Design of Development to Minimize Air Quality Impacts. Require that development projects be designed in a manner which reduces potential adverse air quality impacts. This may include: (a) the use of vegetation and landscaping to absorb carbon monoxide and to buffer sensitive receptors; (b) the use of low-polluting energy sources and energy conservation measures; (c) designs which encourage transit use and facilitate bicycle and pedestrian travel.</i></p>	<p><i>Consistent.</i> See discussion of Policy CO-12.1 above. The buildout of the amended Master Plan would include provisions for landscaping and energy conservation; see <b>Chapter 2, Project Description</b> and <b>Section 3.10, Public Services and Utilities</b>.</p>
<p><i>Policy CO-12.6: Control of Dust Emissions. Require construction, demolition and grading practices which minimize dust emissions.</i></p>	<p><i>Consistent.</i> Construction activities would be subject to dust emission controls. See <b>Section 3.2, Air Quality</b>.</p>
<p><i>Policy CO-13.1: Reliable Energy Network. Promote a reliable local energy network which meets future needs and long-term economic development objectives at the lowest practical cost.</i></p>	<p><i>Consistent.</i> Necessary on-site electrical and gas service connections have been identified. PG&amp;E has indicated that gas and electrical service is available to serve the buildout of the amended Master Plan; see <b>Section 3.10, Public Services and Utilities</b>.</p>
<p><i>Policy CO-13.2: Energy Efficiency. Support public information campaigns, energy audits, the use of energy-saving appliances and vehicles, and other efforts which help Oakland residents, businesses, and City operations become more energy efficient.</i></p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would be required to comply with the standards of Title 24 of the California Code of Regulations. In addition, the following provisions would reduce electrical and natural gas demand: (1) use of energy-saving construction materials and techniques,</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<i>Policy CO-13.2 (cont.)</i>	(2) design of the proposed Veterinary Medical Hospital to meet LEED (Leadership in Energy and Environmental Design) standards, and (3) provision of “green roofs” on several of the proposed animal night houses See <b>Chapter 2, Project Description</b> and <b>Section 3.10, Public Services and Utilities</b> .
<i>Policy CO-13.3: Construction Methods and Materials. Encourage the use of energy-efficient construction and building materials. Encourage site plans for new development which maximize energy efficiency.</i>	<i>Consistent.</i> See discussion of Policy CO-13.2 above.
<i>Policy REC-1.1: Protection of Park Open Space. Use a variety of measures, including zoning and park classification, to protect the basic functions of parks as public open spaces and to evaluate and review future park projects. Use the park classification system outlined in Table 8 (Oakland Park Classification System) and illustrated in Figure 16 (Oakland Parks by Category) as the basis for determining the kinds of facilities that are appropriate in each park.</i>	<i>Consistent.</i> The zoo-related uses would be consistent with the park classification system specified by this policy. As part of the zoo, the proposed California Exhibit would have a citywide service area and as a component of the Master Plan would complement the zoo.
<i>Policy REC-1.2: No Net Loss of Open Space. Unless overriding conditions exist, allow no net loss of open space within Oakland’s urban park system. In other words, the area covered by park buildings or other recreational facilities in the future should be offset in the long-run by acquisition or improvement of an equivalent or larger area of open space. Replacement open space should be of comparable value to the space lost and should generally serve an area identified on Figure 18 (Park Deficient Areas) as having un-met needs.</i>	<i>Not Applicable.</i> As indicated by the OSCAR Element text discussion of Policy REC-1.2, this policy is not applicable to projects that are consistent with park master plans (such as the Oakland Zoo Master Plan). Nevertheless, the buildout of the amended Master Plan would be consistent with this policy as explained in <b>Subsection 3.8.5</b> because the amount of parkland acquired by the City exceeds the amount of park area covered by buildings since 1998 such that the buildout of the proposed Master Plan amendment would not result in a net loss of open space and would be consistent with this policy.
<i>Policy REC-1.3: Siting of Buildings in Parks. To the maximum extent practical, accommodate new <u>recreational</u> buildings in City parks by expanding the park onto nearby vacant or underutilized land rather than covering open space within existing park boundaries. Strongly discourage new <u>non-recreational</u> buildings in City parks unless their construction is a matter of public necessity and the use cannot be reasonably accommodated in another location. Exceptions to this policy may be made in cases where there are (a) no feasible alternatives to placing buildings in parks; (b) the buildings are being developed in accordance with an overall Master Plan for the impacted park; and (c) replacement open space will be provided as specified in Policy REC-1.2.</i>	<i>Not Applicable.</i> As indicated by the OSCAR Element text discussion of Policy REC-1.3, this policy is not applicable to parks that are being developed in accordance with a master plan, such as the Oakland Zoo Master Plan.
<i>Policy REC-1.4: Park Improvement or Change in Use. Require any improvement or change in use within a City of Oakland park to be subject to a formal review and approval process. Provide potential park users and local residents with opportunities to participate in this process.</i>	<i>Consistent.</i> The proposed Master Plan amendment has been subject to a formal review and approval process that has included opportunities for participation by potential park users and local residents.

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<p><i>Policy REC-1.5: Park Master Planning. Use master plans as a tool for making long-range decisions for park land use, determining needs for capital improvements and funding sources, and soliciting community opinion on how parks should be managed.</i></p>	<p><i>Consistent.</i> The proposed Master Plan amendment would provide the long-range decision-making tool specified by this policy.</p>
<p><i>Policy REC-2.1: Park Conversions to Other Uses. Protect parks from conversion to other uses, except for minor boundary changes which would improve their value or usefulness. In any case, as prescribed in Policy REC-1.2, replace whatever land and facilities are given up with land and facilities of at least equal value and capacity.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “parks should be protected from conversion to non-park uses, including freeways, port facilities, and urban development.”)</p>	<p><i>Consistent.</i> The proposed Master Plan amendment would not allow conversion of Knowland Park to other, non-park uses. The proposed zoo-related land uses are a recreational use. See discussion of Policy REC-1.2 above.</p>
<p><i>Policy REC-2.2: Conflicts Between Park Uses. Site park activities and facilities in a manner which minimizes conflict between park uses. Wherever feasible, use National Recreation and Park Association (NRPA) standards to determine the area and dimensional requirements for new facilities. In new parks, arrange activities and land uses to accommodate all of the intended uses, in optimal relationship to one another and making the most efficient use of the space possible.</i></p>	<p><i>Consistent.</i> The proposed zoo-related land uses would not create significant conflicts with ongoing use of the undeveloped portions of Knowland Park for recreational purposes (e.g., hiking, dog walking). The proposed Master Plan amendment includes changes to the 1998 Master Plan perimeter fence location that would help reduce land use conflicts and improve public access to the remaining undeveloped portions of the park.</p>
<p><i>Policy REC-2.3: Environmentally-Sensitive Design. Protect sensitive natural areas within parks, including creeks and woodlands, and integrate them into park design. Require new recreational facilities to respect existing park character, be compatible with the natural environment, and achieve a high standard of design quality.</i></p>	<p><i>Consistent.</i> See discussion of Policy REC-2.2 above. The buildout of the amended Master Plan would avoid and protect sensitive natural areas within Knowland Park; see <b>Section 3.3, Biological Resources</b>.</p>
<p><i>Policy REC-2.4: Off-Site Conflicts. Manage park facilities and activities in a manner which minimizes negative impacts on adjacent residential, commercial, or industrial areas.</i></p>	<p><i>Consistent.</i> See discussion of Land Use and Transportation Element Policy N2.1 above.</p>
<p><i>Policy REC-2.5: Park Visibility. Plan and design parks in a way which maximizes their visibility while minimizing conflicts between pedestrians, bicyclists, and automobiles.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “Community and region serving parks should generally have some frontage on an arterial street to increase the visibility of park activities, promote recognition of the park, and provide direct transit access...Parks should be designed in a manner that minimizes reliance on automobiles...Provisions for bicycles (racks, etc.) and pedestrians should be made at all parks...For those parks that are bisected by roads, measures to discourage or reduce through-traffic should be considered during the master planning process.”)</p>	<p><i>Consistent.</i> The buildout of the amended Master Plan would not significantly change the visibility of the Oakland Zoo. (See <b>Section 3.1, Aesthetics</b>.) No significant conflicts between pedestrians, bicyclists, and automobiles would be created. (See <b>Section 3.11, Transportation and Circulation</b>.)</p>

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<i>Policy REC-4.1: Systematic Maintenance Provisions. Provide for on-going, systematic maintenance of all parks and recreational facilities to prevent deterioration, ensure public safety, and permit continued public use and enjoyment.</i>	<i>Consistent.</i> The Oakland Zoo would continue to be responsible for maintenance of the areas of the park both within and outside the developed zoo area.
<i>Policy REC-4.2: Environmental Responsibility. Encourage maintenance practices which conserve energy and water, promote recycling, and minimize harmful side effects on the environment. Ensure that any application of chemical pesticides and herbicides is managed to avoid pollution of ground and surface waters.</i>	<i>Consistent.</i> Energy and water conservation features would be included in the buildout of the amended Master Plan; see discussion of Policies CO-4.1 and CO-13.2 above. The Oakland Zoo's existing solid waste handling and management program, which includes recycling, would be employed at the proposed California Exhibit, and the buildout of the amended Master Plan would be subject to the City's Standard Condition of Approval requiring and Construction and Demolition Waste Reduction and Recycling Plan; see discussion in <b>Section 3.10, Public Services and Utilities</b> . The buildout of the amended Master Plan would be subject to the City's Standard Conditions of Approval, mitigation measures recommended in the 1998 MND, the City's creek protection ordinance, and other requirements to protect water quality and regulate the use of hazardous materials; see discussion in <b>Section 3.6, Hazards and Hazardous Materials</b> and <b>Section 3.7, Hydrology and Water Quality</b> .
<i>Policy REC-4.3: Renovation and Rehabilitation Priorities. Where cost savings and equivalent benefits would be achieved, renovate and rehabilitate existing facilities before building new facilities. Give rehabilitation priority to projects which would: (a) increase park safety and usefulness; (b) reduce operating and maintenance expenses; and (c) prevent a facility from deteriorating to the point of becoming unusable or expensive to repair. For projects meeting these criteria, give highest priority to projects in areas which are underserved by parks and recreational facilities, and projects which would benefit the greatest number of persons.</i>	<i>Consistent.</i> Under its existing approved Master Plan, the Oakland Zoo has renovated and rehabilitated existing facilities; see <b>Chapter 2, Project Description</b> . The California Exhibit and the new Veterinary Medical Hospital would provide facilities that could not be provided through renovation or rehabilitation of existing zoo facilities.
<i>Policy REC-5.1: Increased Range of Activities. Promote an increased range of activities within Oakland's parks as a means of introducing new users to the parks and improving safety through numbers.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would promote an increased range of activities in Knowland Park.
<i>Policy REC-5.2: Safety-Oriented Design. Use a wide range of physical design solutions to improve safety at Oakland's parks, including lighting, signage, landscape design, fencing, vandal-resistant building materials, and emergency response features.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would include provisions for lighting, signage, landscaping, and fencing; see <b>Chapter 2, Project Description</b> .
<i>Policy REC-5.3: Improve law enforcement in Oakland's parks through a combination of new rangers, reserve officers, neighborhood watch groups, coordination with East Bay Regional Park District rangers, and better communication between enforcement officers and neighborhood residents.</i>	<i>Consistent.</i> The Oakland Zoo would continue to maintain a 24-hour private security force that coordinates with the Oakland Police and Fire Departments; see <b>Section 3.10, Public Services and Utilities</b> .

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Open Space, Conservation and Recreation (OSCAR) Element (cont.)</i></b>	
<i>Policy REC-5.5: Hazardous Conditions. Reduce hazards to parks users resulting from hazardous equipment, building materials, or soil conditions.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would minimize soil contamination hazards through compliance with applicable state and local requirements. Oversight by the general construction contractor and management in accordance with the required Hazardous Materials Business Plan would ensure that impacts would be less than significant and that no conflicts with this policy would result. See further discussion in <b>Section 3.6, Hazards and Hazardous Materials.</b>
<i>Policy REC-8.4: Disabled Persons. Improve access to recreational services for persons with disabilities. Develop recreation programs which are specifically oriented to the needs of disabled persons, while at the same time removing barriers for disabled persons in “mainstream” recreational programs.</i>	<i>Consistent.</i> Provision of parking spaces for disabled people and other measures to meet Americans with Disabilities Act (ADA) requirements would be included; see <b>Section 3.11, Transportation and Circulation.</b> These provisions would improve access to the zoo for people with disabilities.
<p><i>Policy REC-9.3: Involvement of Neighborhood Groups. Promote the involvement of neighborhood groups in park beautification, crime prevention, community gardening, park construction and maintenance, tree planting, creek restoration, and other activities which build pride and stewardship in the local park system.</i></p> <p>(NOTE: The OSCAR Element text explaining this policy states that “park master planning will provide another opportunity for the community to shape the appearance of their parks. Development of any park master plan must involve widely publicized community meetings.”)</p>	<i>Consistent.</i> The City of Oakland and the Oakland Zoo have conducted community meetings to promote neighborhood involvement in the development of the proposed Master Plan amendment.
<i>Policy REC-10.4: Private Sector Provision of Public Services. Promote and support partnerships with the non-profit and private sectors in the development and operation of facilities which serve a public recreational need. Where financially feasible, consider joint financing and operating agreements for recreational facilities with other public and private agencies.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would support the ongoing partnership between the City of Oakland and the Oakland Zoo to provide zoo facilities in Knowland Park.
<b><i>Bicycle Master Plan</i></b>	
<i>Policy 1A – Bikeway Network: Develop and improve Oakland’s bikeway network.</i>	<i>Consistent.</i> Bicycle access to the Oakland Zoo and the rest of Knowland Park would remain. (See <b>Section 3.11, Transportation and Circulation.</b> )
<i>Policy 1B – Routine Accommodation: Address bicycle safety and access in the design and maintenance of all streets.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would not create significant conflicts between bicyclists and automobiles and would provide parking facilities as required by the Planning Code. (See <b>Section 3.11, Transportation and Circulation.</b> )
<i>Policy 1C – Safe Routes to Transit: Improve bicycle access to transit, bicycle parking at transit facilities, and bicycle access on transit vehicles.</i>	<i>Consistent.</i> Bicycle parking would be adequate to meet peak period demand. The extension of AC Transit bus line 46 would improve the transportation link between the Oakland Zoo and the Coliseum BART station. (See <b>Section 3.11, Transportation and Circulation.</b> )



**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Pedestrian Master Plan</i></b>	
<i>Policy 1.1. Crossing Safety: Improve pedestrian crossings in areas of high pedestrian activity where safety is an issue.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would not create significant conflicts between pedestrians and automobiles. Measures are included to address pedestrian safety at intersections. See further discussion in <b>Section 3.11, Transportation and Circulation</b> .
<i>Policy 1.2. Traffic Signals: Use traffic signals and their associated features to improve pedestrian safety at dangerous intersections.</i>	<i>Consistent.</i> See discussion of Policy 1.1 above.
<i>Policy 1.3. Sidewalk Safety: Strive to maintain a complete sidewalk network free of broken or missing sidewalks or curb ramps.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would provide adequate pedestrian amenities. Visitors would travel through the California Exhibit on foot, and a public access path would be provided to allow pedestrian access to two knolls within Knowland Park. The path would be for pedestrian use only and would not be designed for motorized traffic. See further discussion in <b>Chapter 2, Project Description</b> and <b>Section 3.11, Transportation and Circulation</b> .
<i>Policy 2.1. Route Network: Create and maintain a pedestrian route network that provides direct connections between activity centers.</i>	<i>Consistent.</i> See discussion of Policy 1.3 above.
<b><i>Noise Element</i></b>	
<i>Policy 1: Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.</i>	<i>Consistent.</i> Traffic and other operational noise resulting from the buildout of the amended Master Plan would not result in conflicts with the land use/noise compatibility guidelines established by the Noise Element. Mitigation measures are included to reduce noise during construction. The buildout of the amended Master Plan therefore would not conflict with Noise Element Policies 1, 2, or 3. See further discussion in <b>Section 3.9, Noise</b> .
<i>Policy 2: Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.</i>	<i>Consistent.</i> See discussion of Noise Element Policy 1 above.
<i>Policy 3: Reduce the community's exposure to noise by minimizing the noise levels that are received by Oakland residents and others in the City. (This policy addresses the reception of noise whereas Policy 2 addresses the generation of noise.)</i>	<i>Consistent.</i> See discussion of Noise Element Policy 1 above.
<b><i>Safety Element</i></b>	
<i>Policy PS-1: Maintain and enhance the city's capacity to prepare for, mitigate, respond to and recover from disasters and emergencies.</i>	<i>Consistent.</i> The Oakland Zoo would continue to maintain a 24-hour private security force that coordinates with the Oakland Police and Fire Departments; see <b>Section 3.10, Public Services and Utilities</b> .

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b>Safety Element (cont.)</b>	
<i>Policy GE-1: Develop and continue to enforce and carry out regulations and programs to reduce seismic hazards and hazards from seismically triggered phenomena.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would be subject to code requirements and the implementation of the geotechnical recommendations and design criteria contained in the geotechnical reports required by these code requirements, along with applicable City of Oakland Standard Conditions of Approval and mitigation measures identified in the 1998 MND and in this SMND/Addendum to address seismic and other geotechnical hazards. See further discussion in <b>Section 3.4, Geology and Soils.</b>
<i>Policy GE-2: Continue to enforce ordinances and implement programs that seek specifically to reduce the landslide and erosion hazards.</i>	<i>Consistent.</i> See discussion of Policy GE-1 above. The buildout of the amended Master Plan would also be subject to the City’s grading and erosion control ordinances.
<i>Policy GE-3: Continue, enhance or develop regulations and programs designed to minimize seismically related structural hazards from new and existing buildings.</i>	<i>Consistent.</i> See discussion of Policy GE-1 above.
<i>Policy FI-1: Maintain and enhance the city’s capacity for emergency response, fire prevention and fire-fighting.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would not result in significant impacts on Oakland Fire Department or Police Department services. See <b>Section 3.10, Public Services and Utilities.</b>
<i>Policy FI-2: Continue, enhance or implement programs that seek to reduce the risk of structural fires.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would be subject to the City’s Wildfire Prevention Assessment District requirements and Standard Conditions of Approval related to vegetation management and fire safety. (See <b>Section 3.10, Public Services and Utilities.</b> )
<i>Policy FI-3: Prioritize the reduction of the wildfire hazard, with an emphasis on prevention.</i>	<i>Consistent.</i> See discussion of Policy FI-2 above.
<i>Policy HM-1: Minimize the potential risks to human and environmental health and safety associated with the past and present use, handling, storage and disposal of hazardous materials.</i>	<i>Consistent.</i> Construction and zoo operations would involve use, handling, storage, and disposal of hazardous materials. Storage and disposal of hazardous materials would be in compliance with applicable state and local requirements. Oversight by the general construction contractor and management in accordance with the required Hazardous Materials Business Plan would ensure that impacts would be less than significant and that no conflicts with Policies HM-1, HM-2, or HM-3 would result. See further discussion in <b>Section 3.6, Hazards and Hazardous Materials.</b>
<i>Policy HM-2: Reduce the public’s exposure to toxic air contaminants through appropriate land use and transportation strategies.</i>	<i>Consistent.</i> See discussion of Policy HM-1 above. See also <b>Section 3.2, Air Quality.</b>
<i>Policy HM-3: Seek to prevent industrial and transportation accidents involving hazardous materials, and enhance the city’s capacity to respond to such incidents.</i>	<i>Consistent.</i> See discussion of Policy HM-1 above.

**TABLE 3.8-1: CONSISTENCY BETWEEN PROPOSED MASTER PLAN AMENDMENT AND RELEVANT OAKLAND GENERAL PLAN POLICIES (continued)**

Policy	Consistency Between Proposed Master Plan Amendment and Policy
<b><i>Safety Element (cont.)</i></b>	
<i>Policy FL-1: Enforce and update local ordinances, and comply with regional orders, that would reduce the risk of storm-induced flooding.</i>	<i>Consistent.</i> The buildout of the amended Master Plan would be subject to City of Oakland Standard Conditions of Approval and 1998 MND mitigation measures that would reduce the risk of storm-induced flooding. See <b>Section 3.7, Hydrology and Water Quality</b> .
<i>Policy FL-2: Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.</i>	<i>Consistent.</i> See discussion of Policy FL-1 above.
<b><i>Scenic Highways Element</i></b>	
<i>General Policy 3: Urban development should be related sensitively to the natural setting.</i>	<i>Consistent.</i> The Scenic Highways Element identifies Interstate 580 in the Knowland Park vicinity as a scenic route. The buildout of the amended Master Plan would not obstruct panoramic vistas of San Francisco Bay and the city skylines and would minimize disturbance of natural landforms, vegetation, and views of ridgelines and grasslands. Therefore, no conflicts with this policy would occur. See further discussion in <b>Section 3.1, Aesthetics</b> .
<i>General Policy 4: High standards for preserving and enhancing natural landforms and vegetation should be established and maintained to regulate all activities related to earthwork and the removal of trees, shrubs or ground cover.</i>	<i>Consistent.</i> See discussion of General Policy 3 above.
<i>I-580 Policy 2: Visual intrusions within the scenic corridor should be removed, converted, buffered or screened from the motorist's view.</i>	<i>Consistent.</i> See discussion of General Policy 3 above.
<i>I-580 Policy 3: Panoramic vistas and interesting views now available to the motorist should not be obliterated by new structures.</i>	<i>Consistent.</i> See discussion of General Policy 3 above.
<i>I-580 Policy 4: New construction within the scenic corridor should demonstrate architectural merit and a harmonious relationship with the surrounding landscape.</i>	<i>Consistent.</i> See discussion of General Policy 3 above.

Source: PLACEMAKERS, 2010.

resources, geology, hazards, hydrology, noise, public services and utilities, and transportation). **Table 3.8-1** provides cross-references to other relevant sections of this Subsequent Mitigated Negative Declaration/Addendum, where applicable. As shown in **Table 3.8-1**, the proposed Master Plan amendment would be consistent with the relevant policies.

**Consistency with Key General Plan and Zoning Provisions.** The zoo-related uses allowed by the approved Master Plan and the proposed Master Plan amendment would be consistent with the City of Oakland General Plan land use designation (Urban Open Space) and zoning (Open Space [Special Use]) of the existing zoo site and the adjoining area to the east that was

approved for the California Exhibit. The zoo-related uses would also be consistent with the park classification system and related designations and policies established by the Open Space, Conservation and Recreation (OSCAR) Element of the General Plan (see Policies REC-1.1, OS-1.1, OS-2.1, OS-3.1, and OS-4.3).

The proposed Master Plan amendment includes a change to the approved Master Plan perimeter fence location that would ensure consistency with the applicable General Plan land use designations and zoning. The proposed Master Plan amendment would pull back the perimeter fence along the eastern boundary of the California Exhibit so that the fence line follows the boundary between the Open Space (Special Use) zone and the Open Space (Resource Conservation Area) zone (see **Figure 2-22** in **Chapter 2, Project Description**). This change in the fence location would clarify that zoo-related land uses would not extend into the Open Space (Resource Conservation Area) zone, where such uses are not permitted.

As noted in the listing of OSCAR Element provisions above (see **Subsection 3.8.3.1**), the OSCAR Element contains policies generally stating that park area covered by new buildings should be offset by the acquisition of an equivalent or larger area of open space (REC-1.2) and that new buildings in parks should be accommodated by expanding the park onto nearby vacant or underutilized land rather than by covering open space within the park (REC-1.3). The OSCAR Element further states that these two policies do not apply to projects being developed in accordance with a master plan, and specifically identifies the master plan for the zoo as an example of a master plan exempt from these provisions. The proposed Master Plan amendment, which would result in an expansion within Knowland Park that is substantially consistent with the 1990 Master Plan referenced in the OSCAR Element and with the approved 1998 master plan, would therefore not conflict with these policies.

As noted in the listing of relevant Planning Code provisions (see **Subsection 3.8.3.2**), unless overriding considerations exist, approval of any structure coverage within the OS zone shall be contingent on a finding that there has been no net loss of urban parkland from the establishment of the OS zone regulations in 1998 (Section 17.135.060). This provision was established to implement Policy REC-1.2 of the OSCAR Element concerning the loss of open space, which is discussed above. As explained in the discussion above, Policy REC-1.2 does not apply to project's being developed in accordance with a master plan such as the Oakland Zoo Master Plan. However, if Section 17.135.060 is applied to the Oakland Zoo Master Plan, the Master Plan would comply with the provision. City records indicate that since the establishment of the OS zone in 1998, approximately one acre of structure coverage has been created in Oakland parks while over the same period the City has added approximately 24 acres of new parkland, not including Resource Conservation Area, which, pursuant to Section 17.135.060, is not included in the total. The buildout of the amended Master Plan would add approximately one acre of structure coverage, resulting in a total structure coverage in City parks of approximately

two acres since 1998, which is greatly exceeded by the amount of new parkland acquired since 1998 (approximately 24 acres). Therefore, the buildout of the amended Master Plan would comply with Section 17.135.060 of the Planning Code.

As noted under **Criterion b** above, the remaining undeveloped portions of Knowland Park would separate the proposed zoo-related uses from existing residential areas to the north and south; this separation would help to prevent land use conflicts in accordance with Land Use and Transportation Element Policies I/C4.2, N2.1, N2.2, N2.3, N2.4, N2.5, and N5.2 and OSCAR Element Policy REC-2.4. The buildout of the amended Master Plan would also be required to comply with zoning (Oakland Planning Code Section 17.11.160) requirements for buffering (i.e., screening of storage areas, control of artificial lighting), which would help to reduce potential land use conflicts. As also discussed under **Criterion b** above, the proposed zoo-related uses would not create significant conflicts with ongoing use of the undeveloped portions of Knowland Park for recreational purposes (e.g., hiking, dog walking); conflicts between park uses would therefore be avoided, as provided by OSCAR Element Policies REC-2.2 and REC-2.3.

The buildout of the amended Master Plan would not interfere with OSCAR Element policies (e.g., OS-5.1, OS-5.3, OS-8.1) that call for trail improvements in Knowland Park. Opportunities for trail improvements would remain available in other undeveloped areas of the park.

**Implications of General Plan Consistency Under CEQA.** Conflicts with a General Plan do not inherently result in a significant effect on the environment within the context of CEQA. As stated in Section 15358(b) of the CEQA Guidelines, “[e]ffects analyzed under CEQA must be related to a physical change.”

Further, Appendix G of the CEQA Guidelines (Environmental Checklist Form) makes explicit the focus on *environmental* policies and plans, asking if the project would “conflict with any applicable land use plan, policy, or regulation . . . *adopted for the purpose of avoiding or mitigating an environmental effect*” (emphasis added). Even a response in the affirmative, however, does not necessarily indicate the project would have a significant effect, unless a physical change would occur. To the extent that physical impacts may result from such conflicts, such physical impacts are analyzed elsewhere in this document.

Regarding a project’s consistency with the General Plan in the context of CEQA, the Oakland General Plan states the following:

The General Plan contains many policies which may in some cases address different goals, policies and objectives and thus some policies may compete with each other. The Planning Commission and City Council, in deciding whether to approve a proposed project, must decide whether, on balance, the project is consistent (i.e., in general harmony) with the General Plan. The fact that a specific project does not meet all General Plan goals, policies

and objectives does not inherently result in a significant effect on the environment within the context of the California Environmental Quality Act (CEQA). (City Council Resolution No. 79312 C.M.S.; adopted June 2005)

**Conclusion.** The potential for the buildout of the amended Master Plan to result in a fundamental conflict with applicable land use plans, policies, and regulations is a less-than-significant impact. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of the impact in relation to this criterion. Compared to the approved Master Plan, the proposed Master Plan amendment would reduce the potential for conflict with the applicable General Plan designations and zoning by adjusting the location of the perimeter fence so that the fence line follows the boundary between the Open Space (Special Use) zone and the Open Space (Resource Conservation Area) zone.

Please refer to other sections of this SMND/Addendum for discussion of the consistency of the proposed Master Plan amendment with other applicable City of Oakland regulations, such as grading, creek protection, and protected tree ordinances.

**Impact:** Less-than-significant

**Mitigation:** None required

**d) Would the project fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan?**

The buildout of the amended Master Plan would not conflict with a habitat conservation plan or natural community conservation plan, as no such plans apply to the Master Plan area. Like the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would have no impact in relation to this criterion.

**Impact:** No impact

**Mitigation:** None required

**e) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?**

The buildout of the amended Master Plan would be unlikely to lead to substantial physical deterioration of Knowland Park. The Oakland Zoo would continue to be responsible for maintenance of the areas of the park both within and outside the developed zoo area. Based on past experience, it is reasonable to assume that the zoo's ongoing maintenance activities would

prevent substantial physical deterioration of the park.<sup>1</sup> While the proposed California Exhibit may increase attendance at the zoo, it is reasonable to conclude that an increase in zoo attendance would not lead to a substantial increase in use and physical deterioration of other areas of Knowland Park, for the following reasons: (1) the perimeter fence would limit access from the zoo site to the undeveloped areas of the park, and (2) existing patterns of use suggest that most zoo visitors do not venture into the undeveloped areas of the park (see **Subsection 3.8.4.2** above).

Even if some zoo visitors were to use the park, substantial physical deterioration of the park would not be expected because the park is not heavily used, is 490 acres, and connects to the 5,067-acre Anthony Chabot Regional Park to the east. Thus, there would be ample park acreage and capacity to accommodate additional use by some zoo visitors. The public access path and improvement of the emergency vehicle access road under the proposed Master Plan amendment would provide benefits for park users. The proposed improvements to the existing fire road as an emergency vehicle access road would allow all-weather use of the road, eliminating muddy conditions that presently exist after wet weather. Additionally, the zoo's maintenance activities (described in footnote 1 below) would ensure that the park would not substantially deteriorate.

Approximately 20 acres of the California Exhibit would remain in undeveloped open space (see **Figure 2-4 in Chapter 2, Project Description**). The natural habitat in this area would be protected from most human disturbance and thus would be provided with greater protection from physical deterioration than under current conditions.

The impact of the buildout of the amended Master Plan with regard to increased use and physical deterioration of Knowland Park would be less than significant. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of the impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

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<sup>1</sup> Ongoing zoo maintenance is as follows:

Litter is picked up throughout the day by staff. Trash cans are emptied and collected at the end of the day. Pathways, parking lot areas and roadways are monitored daily for cleanliness and hazardous conditions. Minor repairs are corrected by the Maintenance Department and major paving repairs are completed by paving contractors as needed. All pathways are cleaned twice a week by the Grounds Department. Landscaping is maintained by the Horticulture and Grounds Departments under the direction of a landscape architect. Areas are maintained regularly for weed control, dead plants and re-planting. Animal enclosure fencing is inspected by staff on a daily basis, and zoo perimeter fence is inspected regularly. All buildings are maintained daily for cleanliness and minor building repairs are made as needed. Storm drains are cleaned weekly and monitored throughout the rainy season. (Oakland Zoo 2010)

Ongoing Knowland Park maintenance is as follows:

Litter is picked up on a seasonal basis. Tree trimming and dangerous tree removal is undertaken on an as-needed basis. The zoo is currently in the process of a long-term removal of non-native invasive plant species throughout Knowland Park and will re-vegetate with California native plant species. Fire management is primarily the responsibility of the Oakland Fire Assessment District and consists of annual goat grazing along the park perimeter to adjacent residences from grass fires. (Oakland Zoo 2010)

**f) Would the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?**

The zoo-related land uses allowed by the approved Master Plan and the proposed Master Plan amendment are recreational facilities. The environmental effects of these facilities are evaluated throughout this document and have been found to be less than significant.

The impact of the buildout of the amended Master Plan in relation to this criterion would be less than significant. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of the impact in relation to this criterion. As discussed throughout this document, the proposed Master Plan amendment includes certain provisions that would decrease environmental impacts, compared to the approved Master Plan.

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.8.6 CUMULATIVE IMPACTS

The geographic scope for assessing the potential for cumulative land use, recreation and planning impacts is the immediately surrounding area, including Knowland Park, the existing zoo facilities, the immediately surrounding residential communities, and the other nearby recreational areas, including Anthony Chabot Regional Park and other parks. The Existing Conditions subsection above (**Subsection 3.8.4**) describes the past and present development in this area.

The buildout of the amended Master Plan is the only reasonably foreseeable future project in the immediate geographic area. The Knowland Park area outside of the Master Plan boundary is zoned Open Space (Resource Conservation Area) and no future development is expected at this time. The zoo has been a part of Knowland Park for more than 60 years. The immediately surrounding residential areas are largely built out and future improvements to existing houses or the potential construction of houses on any vacant parcels would not result in significant land use changes or significant new recreational demand, and would not be close enough to the Master Plan area to combine with the amended Master Plan to create a cumulative impact.

The two development projects anticipated elsewhere in southeast Oakland – the Leona Quarry and Oak Knoll projects – are located too far from the Master Plan area for the land use or planning impacts of these projects to combine with the amended Master Plan to create a cumulative impact. While these projects could attract some additional park users to Knowland Park, they are unlikely to combine with the amended Master Plan to cause significant cumulative physical deterioration of Knowland Park, given the limited access to Knowland Park, the relatively large amount of other



park acreage in the vicinity, and the fact that both the Leona Quarry and Oak Knoll projects would include provisions for parks, recreational improvements, and open space.

Consequently, there are no potential significant land use, recreation or planning-related cumulative impacts in the relevant geographic area. Additionally, neither the original Master Plan reviewed in the 1998 MND nor the amended Master Plan reviewed in this Subsequent Mitigated Negative Declaration/Addendum would result in any significant adverse land use, recreation or planning impacts. Thus, the buildout of the amended Master Plan would not result in or contribute to any significant cumulative land use, recreation or planning impacts.

### 3.8.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new land use, recreation or planning impacts or a substantial increase in severity of previously identified land use, recreation, or planning impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less-than-significant. No new mitigation measures are required.

### 3.8.8 PLANNING-RELATED NON-CEQA CONSIDERATIONS

The following topic related to land use, recreation, and planning is not a consideration under CEQA but is evaluated in order to provide more information to decision-makers and the public.

#### 3.8.8.1 Relationship of Project to Open Space

**Introduction.** Some members of the public have expressed concern about the relationship of the buildout of the amended Master Plan to open space within Knowland Park. Pursuant to CEQA, the potential physical environmental impacts of the project on existing open space in the proposed Master Plan amendment area are evaluated as CEQA topics throughout this document (see **Section 3.1, Aesthetics; Section 3.3, Biological Resources; Section 3.4, Geology and Soils; Section 3.6, Hazards and Hazardous Materials; Section 3.7, Hydrology and Water Quality; Section 3.8, Land Use, Recreation and Planning; and Section 3.10, Public Services and Utilities**). Under CEQA, social effects of a project shall not be considered environmental impacts. However, because existing open space in Knowland Park may contain intrinsic societal value, in addition to environmental value, for some members of the public, an analysis of the relationship between the buildout of the amended Master Plan and open space as a societal asset is included here to evaluate the extent and nature of the change that would result from the buildout of the amended Master Plan.

**Existing Setting.** The proposed perimeter fence would enclose approximately 57 acres of Knowland Park within the boundaries of the zoo. This land is located adjacent to and east of the existing zoo facilities and contains several trails and fire roads. The land is characterized by varying

terrain, including areas of steep terrain, and has both areas of dense vegetation and open, grassland areas. Some of this area is inaccessible due to the topography and dense vegetation. (For detailed descriptions of the proposed Master Plan amendment area, see the “Existing Conditions” subsection in the following sections: **Section 3.1, Aesthetics; Section 3.3, Biological Resources; Section 3.4, Geology and Soils; Section 3.7, Hydrology and Water Quality; and Section 3.8, Land Use, Recreation and Planning.**)

**Open Space Within the Project.** Of the approximately 57 acres that would be included within the zoo boundary under the buildout of the amended Master Plan, approximately 20 acres would remain as open space. (For a detailed description of the “Ecological Recovery Zone” see **Chapter 2, Project Description.**) The natural resources in this open space would be protected by the perimeter fence from human intrusion. These natural resources also would be subject to the Habitat Enhancement Plan (HEP) that would remove non-native vegetation and expand native species. (See **Section 3.3, Biological Resources** for a more detailed description of the HEP.) Although this area would be enclosed by the perimeter fence, its intrinsic value as open space would be maintained under the buildout of the amended Master Plan.

**Acres Reduction From Approved Master Plan.** The approved 1998 Master Plan included approximately 62 acres of Knowland Park within the zoo’s perimeter fence boundary. The proposed Master Plan amendment would reduce this area to approximately 57 acres. The reduction in the Master Plan buildout area and change in the perimeter fence location would have several open space benefits. The amount of open area that would remain in Knowland Park outside of the zoo boundary would increase by approximately five acres over the approved Master Plan. In the southeast area of the site, the change in the perimeter fence location would remove one knoll (see “Lower Knoll” on **Figure 3.1-1** in **Section 3.1, Aesthetics**) from within the zoo boundary and thereby would maintain public access to the knoll and the views available from this knoll. In the northwest area of the California Exhibit, the change in the perimeter fence would minimize incursion in the chaparral and would avoid removal of oak trees.

**Consistency With the City’s Land Use Designations and Prior Master Plan Approval.**

The General Plan designation for the existing zoo and the proposed Master Plan amendment area is Urban Open Space, which allows uses such as urban parks and active outdoor recreation spaces. In contrast, the General Plan designation for the rest of Knowland Park is Resource Conservation Area (see **Figure 3.8-1**). Under the Resource Conservation Area designation, development is limited to the conservation and management of natural resources, public open space, and natural hazards. The zoning for the existing zoo and the proposed Master Plan amendment area is Open Space (Special Use), which allows recreational uses, including specifically park, recreational, and civic uses consistent with a master plan adopted by the City Council. Other areas of Knowland Park are zoned Open Space (Resource Conservation Area), which allows low-intensity recreational activities. Thus, the City’s General Plan designation and zoning distinguish the land use intent of the proposed Master Plan amendment area from the remainder of Knowland Park. Within the

amended Master Plan buildout area of Knowland Park, both the General Plan and the zoning allow zoo activities as an active recreational park and open space use. The remainder of Knowland Park is reserved for the conservation of natural resources and low intensity recreational uses. This distinction between the land use controls for the proposed Master Plan amendment area and the remainder of Knowland Park acknowledges the City's intent of allowing more intensive use of the open space where zoo activities are proposed and less intensive use of the open space elsewhere in Knowland Park. The OSCAR Element of the General Plan further identifies the proposed Master Plan amendment area as the location of the proposed zoo expansion (see **Subsection 3.8.3.1**). (See **Subsection 3.8.5** for more discussion on the proposed Master Plan amendment's consistency with General Plan policies.)

The buildout of the amended Master Plan would be consistent with the previous City decision regarding the expansion of the zoo to accommodate the California Exhibit. In 1998, the Oakland City Council approved the zoo Master Plan, including the expansion of the zoo by approximately 62 acres in an undeveloped area of Knowland Park located to the east of the existing zoo. The amended Master Plan would be located in the same area, but would reduce the area of expansion by approximately five acres. Additionally, the amount of area that would be developed and the amount that would remain open space in the approved Master Plan would be approximately the same under the buildout of the amended Master Plan (see **Table 2-4 in Chapter 2, Project Description**).

**Public Recreational Use.** Unlike a private development project that would preclude public access to the area, the zoo is open to the public. The vast majority of the visitors to Knowland Park are zoo visitors. In 2010 approximately 629,300 people visited the zoo and, over the long term, the buildout of the amended Master Plan is estimated to generate approximately 700,000 zoo visitors annually. Thus, the zoo provides, and the California Exhibit would continue to provide, the opportunity for many people to visit the zoo in Knowland Park and experience the park's natural landscape and views while having a recreational and educational experience at the zoo. The buildout of the amended Master Plan would comply with the Americans with Disabilities Act requirements and would make this area of Knowland Park accessible to those who otherwise would be unable to traverse the terrain and elevation in order to experience the park. The zoo and the buildout of the amended Master Plan would provide significant numbers of Oakland and other Bay Area residents with the opportunity to access Knowland Park.

**Knowland Park and Other Open Space in the Area.** The remaining 335 acres of Knowland Park would continue to exist as open space and allow low-intensity recreational uses, such as hiking, under both the General Plan designation and the zoning for this area. Hiking trails and many view opportunities would be maintained throughout the park (see **Section 3.1, Aesthetics**). Additionally, the buildout of the amended Master Plan would include a new public access path providing access to the knolls in the southeast area of the park where the proposed perimeter fence would be pulled back from its originally approved location. The HEP would

preserve and enhance the natural resources and habitats in Upper Knowland Park by removing highly invasive non-native species and revegetating native habitats (see **Appendix G-2**). The surrounding area also contains other open space resources, most notably Chabot Regional Park, which is located east of Knowland Park across Skyline Boulevard and provides an additional 5,067 acres of parkland in the immediate area. (See **Section 3.8.4.3** for a complete description of the other parks in the vicinity.) As discussed previously in this section (see **Subsection 3.8.5**), since 1998 the City has added approximately 24 acres of new parkland. The City has also added an additional approximately 116 acres of Resource Conservation Area during the same period.

### 3.8.8.2 Conclusion

As previously stated, the social effect of the proposed Master Plan amendment on open space is not considered a topic under CEQA. Even if considered a CEQA topic, given the factors presented above, the area of open space in Knowland Park that would be converted to zoo uses as a result of the buildout of the amended Master Plan would be considered a less-than-significant impact. The proposed Master Plan amendment would reduce the amount of open space to be converted to zoo uses compared to the approved Master Plan, the use of open space in the amended Master Plan area for more intensive recreational uses is consistent with City General Plan policies and zoning regulations, and substantial open space would remain in Knowland Park and nearby parks. Therefore, the buildout of the amended Master Plan would not have a significant social impact on open space.

### 3.8.9 REFERENCES

- City of Oakland. 1996. *Open Space, Conservation, and Recreation (OSCAR) Element, An Element of the Oakland General Plan*. June 1996.
- City of Oakland. 1998. *City of Oakland General Plan Land Use and Transportation Element*. March 1998.
- City of Oakland. 2009. *ABSMC Summit Campus Seismic Upgrade and Master Plan Project Draft EIR*. Prepared by ESA for the City of Oakland. December 2009.
- City of Oakland. 2010a. *City of Oakland Planning Code*. Available online at <http://library.municode.com/index.aspx?clientId=16490&stateId=5&stateName=California>. Viewed April 6, 2010.
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- Oakland Zoo. 2010. E-mails from Dr. Joel Parrott, Oakland Zoo, to Patricia Jeffery, PLACEMAKERS, re. "Maintenance for CEQA." May 24 and June 1, 2010.

## 3.9 NOISE

This section evaluates potential noise impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant noise impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified noise impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant noise impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. This section also identifies the applicable provisions of the City's Standard Conditions of Approval and whether or not any new mitigation measures are required.

### 3.9.1 PRIOR MND ANALYSIS AND CONCLUSIONS

#### 3.9.1.1 1998 Prior MND Impact Findings

The noise analysis included in the 1998 MND concluded that the approved Master Plan could result in potentially significant noise impacts.

The 1998 MND concluded the approved Master Plan would have four primary effects on the zoo's existing noise environment during operation of the zoo: 1) projected increases in attendance levels would increase traffic noise at the zoo's main entrance; 2) a new source of noise, shuttle buses, would be introduced along the proposed shuttle road in the California 1820 exhibit area; 3) a noise decrease at the zoo's main entrance parking lot would result from the redirection of school-related bus and vehicular traffic from the main entrance to the zoo's secondary entrance adjacent to the proposed Center for Science and Environmental Education; and 4) the proposed two-way zoo entry (Zoo Drive) would result in decreased use of the existing zoo exit road (to 106<sup>th</sup> Avenue) and increased use of the zoo entry road. The 1998 MND concluded that these noise effects during operation of the zoo would be less-than-significant.

The 1998 MND found that, during project construction, noise generated by construction equipment and activities could result in potentially significant noise increases at the zoo's southern boundary. The recommended mitigation measure would reduce the impact to a less-than-significant level.

#### 3.9.1.2 1998 MND Mitigation Measures

The following mitigation measure, as recommended in the 1998 MND, was found to reduce the construction noise impact to a less-than-significant level:

- 18a) Project contractors shall be required to implement noise control techniques to minimize disturbance to adjacent or nearby sensitive noise receptors during project construction in the vicinity of the southern Park boundary:
1. The proposed solid wood or masonry fence along the southern Park boundary shall be constructed and completed prior to construction of the proposed improvements to the main entrance parking lot and overflow parking lot. (NOTE: *This mitigation measure is not applicable to the proposed Master Plan amendment because the previously proposed solid wood or masonry fence is no longer proposed. A landscaped buffer has already been installed along the main parking lot boundary rather than a solid wood fence at the request of the adjacent neighbors. **SCA-NOISE-1 through SCA-NOISE-3** regarding construction noise would apply, see **Subsection 3.9.5.2, Criterion c** below.*)
  2. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and/or acoustically-attenuating shields or shrouds, wherever feasible and necessary) in order to minimize construction noise impacts. Construction equipment shall not generate noise levels above 75-80 dBA at 50 feet, or as required by City ordinance, in order to provide acceptable interior noise levels at nearby or adjacent residential receptors. (NOTE: *This mitigation measure is replaced with **SCA-NOISE-2**; see **Subsection 3.9.5.2, Criteria c and d**, below which discuss temporary noise levels generated from construction equipment.*)
  3. Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically-powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used such as drilling rather than impact equipment whenever feasible. (NOTE: *This mitigation measure is replaced with **SCA-NOISE-2**; see **Subsection 3.9.5.2, Criterion c** below, which discusses temporary noise levels generated from construction equipment.*)
  4. During project construction, truck operations shall be prohibited during the nighttime hours (8 p.m. to 7 a.m.) and the operation of heavy equipment shall be limited to 7:30 a.m. to 7:30 p.m., Monday through Saturday, to minimize potential disturbance of adjacent and nearby residential receptors. (NOTE: *This mitigation measure is replaced with **SCA-NOISE-1**; see **Subsection 3.9.5.2, Criterion c** below, which discusses temporary noise levels during construction.*)
  5. Stationary noise sources shall be located as far from the sensitive receptors as possible. If they must be located near existing receptors, they should be adequately muffled to the extent feasible and enclosed within temporary sheds. (NOTE: *This mitigation measure is replaced with **SCA-NOISE-1 through SCA-NOISE-3**; see **Subsection 3.9.5.2, Criterion c** below, which discusses temporary noise levels during construction.*)

### 3.9.2 STANDARD CONDITIONS OF APPROVAL

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Conditions of Approval that relate to noise and that would apply to the proposed Master Plan amendment are listed below. If the City approves the Master Plan amendment, these Conditions of Approval would be adopted as requirements of the Master Plan amendment and would ensure no significant noise impacts would occur. As a result, the Conditions of Approval are not listed as mitigation measures.

#### **SCA-NOISE-1: Days/Hours of Construction Operation**

##### ***Ongoing throughout demolition, grading, and/or construction***

The project applicant shall require construction contractors to limit standard construction activities as follows:

- a) Construction activities are limited to between 7:00 AM and 7:00 PM Monday through Friday, except that pile driving and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 AM and 4:00 PM Monday through Friday.
- b) Any construction activity proposed to occur outside of the standard hours of 7:00 AM to 7:00 PM Monday through Friday for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened and such construction activities shall only be allowed with the prior written authorization of the Building Services Division.
- c) Construction activity shall not occur on Saturdays, with the following possible exceptions:
  - i. Prior to the building being enclosed, requests for Saturday construction for special activities (such as concrete pouring which may require more continuous amounts of time), shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened. Such construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division.
  - ii. After the building is enclosed, requests for Saturday construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division, and only then within the interior of the building with the doors and windows closed.
- d) No extreme noise generating activities (greater than 90 dBA) shall be allowed on Saturdays, with no exceptions.
- e) No construction activity shall take place on Sundays or Federal holidays.

- f) Construction activities include but are not limited to: truck idling, moving equipment (including trucks, elevators, etc) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.
- g) Applicant shall use temporary power poles instead of generators where feasible.

### **SCA-NOISE-2: Noise Control**

#### ***Ongoing throughout demolition, grading, and/or construction***

To reduce noise impacts due to construction, the project applicant shall require construction contractors to implement a site-specific noise reduction program, subject to the Planning and Zoning Division and the Building Services Division review and approval, which includes the following measures:

- a) Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible).
- b) Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.
- c) Stationary noise sources shall be located as far from adjacent sensitive noise receptors as possible and they shall be muffled and enclosed within temporary sheds, or incorporate insulation noise barriers, or use other measures as determined by the City to provide equivalent noise reduction.
- d) The noisiest phases of construction shall be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.

### **SCA-NOISE-3: Noise Complaint Procedures**

#### ***Ongoing throughout demolition, grading, and/or construction***

Prior to the issuance of each building permit, along with the submission of construction documents, the project applicant shall submit to the Building Services Division a list of measures to respond to and track complaints pertaining to construction noise. These measures shall include:

- a) A procedure and phone numbers for notifying the Building Services Division staff and Oakland Police Department; (during regular construction hours and off-hours);



- b) A sign posted on-site pertaining with permitted construction days and hours and complaint procedures and who to notify in the event of a problem. The sign shall also include a listing of both the City and construction contractor's telephone numbers (during regular construction hours and off-hours);
- c) The designation of an on-site construction complaint and enforcement manager for the project;
- d) Notification of neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of extreme noise generating activities about the type and estimated duration of the activity; and
- e) A preconstruction meeting shall be held with the job inspectors and the general contractor/ on-site project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.

#### **SCA-NOISE-4: Operational Noise-General**

##### *Ongoing*

Noise levels from the activity, property, or any mechanical equipment on site shall comply with the performance standards of Section 17.120 of the Oakland Planning Code and Section 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the Planning and Zoning Division and Building Services.

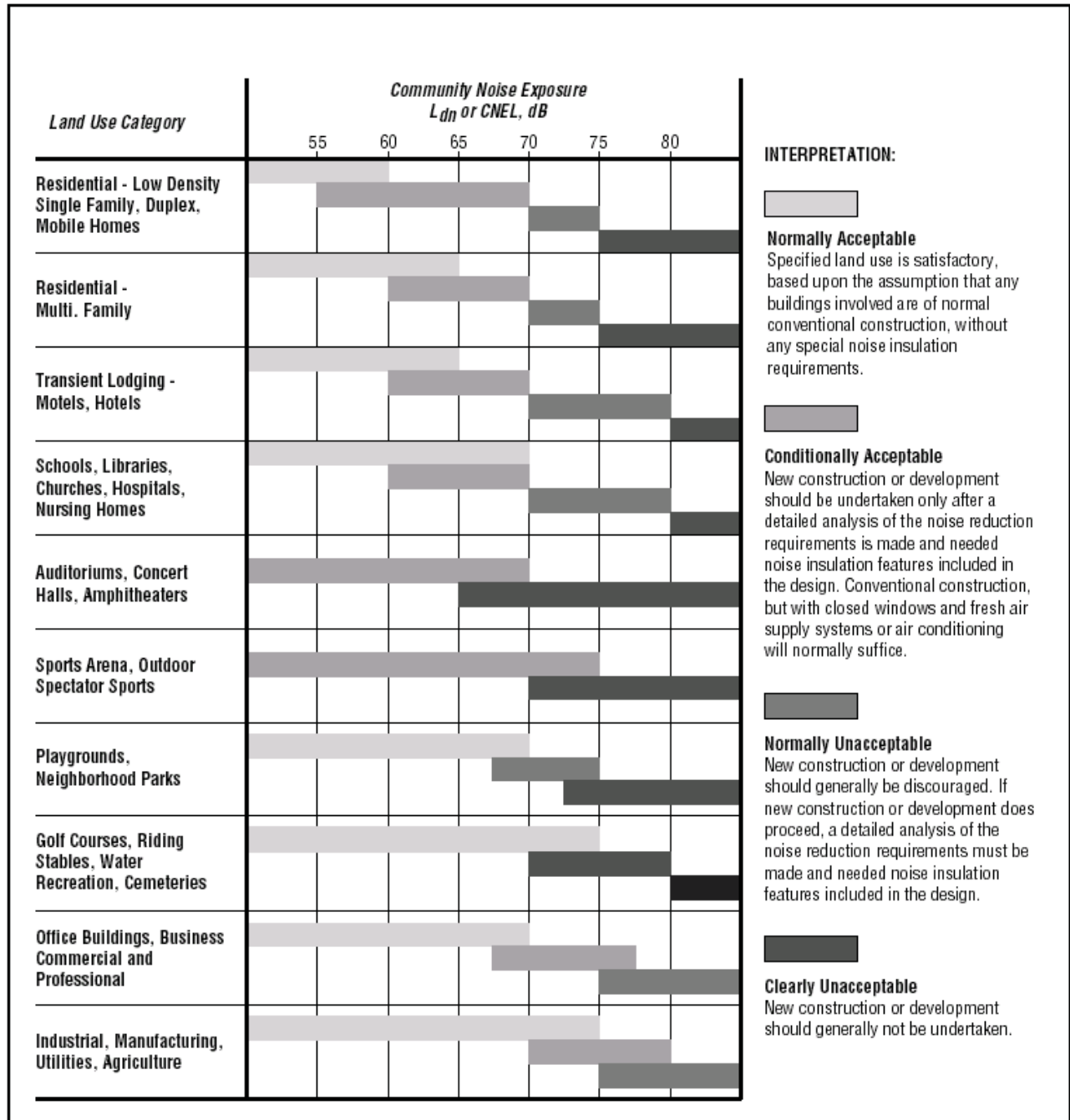
### 3.9.3 UPDATED REGULATORY SETTING

The following discussion reviews relevant noise provisions of the City of Oakland General Plan, Planning Code, and Municipal Code, along with Federal Transit Administration (FTA) groundborne vibration impact criteria.

#### **3.9.3.1 City of Oakland General Plan**

The Oakland General Plan Noise Element was adopted in 2005 and contains guidelines for determining the compatibility of various land uses with different outdoor noise environments (City of Oakland 2005). The Noise Element recognizes that some land uses are more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the type of activities typically involved. The City uses the State noise guidelines, which are presented in **Figure 3.9-1**, to determine the compatibility between various land uses and their noise environments.

Applicable noise policies of the Oakland General Plan are listed below and discussed in **Section 3.8, Land Use, Recreation and Planning**.



SOURCE: City of Oakland Noise Element, 2005



**Figure 3.9-1**  
Land Use Compatibility Guidelines

*Policy 1:* Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.

*Policy 2:* Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.

*Policy 3:* Reduce the community's exposure to noise by minimizing the noise levels that are received by Oakland residents and others in the City. (This policy addresses the reception of noise whereas Policy 2 addresses the generation of noise.)

### 3.9.3.2 City of Oakland Noise Ordinance

The City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) identifies standards for operational and construction noise.

**Operational Noise.** Oakland Planning Code Section 17.120.050 identifies standards for operational noise. These standards are presented in **Table 3.9-1**.

**TABLE 3.9-1: CITY OF OAKLAND OPERATIONAL NOISE STANDARDS AT RECEIVING PROPERTY LINE, DBA<sup>1</sup>**

Receiving Land Use	Cumulative Number of Minutes in a 1-Hour Period <sup>2</sup>	Maximum Allowable Noise Level (dBA)	
		Daytime 7:00 AM-10:00 PM	Nighttime 10:00 PM-7:00 AM
Residential and Civic <sup>3</sup>	20 (L <sub>33</sub> )	60	45
	10 (L <sub>16.7</sub> )	65	50
	5 (L <sub>8.3</sub> )	70	55
	1 (L <sub>1.7</sub> )	75	60
	0 (L <sub>max</sub> )	80	65
<b>Anytime</b>			
Commercial	20 (L <sub>33</sub> )	65	
	10 (L <sub>16.7</sub> )	70	
	5 (L <sub>8.3</sub> )	75	
	1 (L <sub>1.7</sub> )	80	
	0 (L <sub>max</sub> )	85	
Manufacturing, Mining, and Quarrying	20 (L <sub>33</sub> )	70	
	10 (L <sub>16.7</sub> )	75	
	5 (L <sub>8.3</sub> )	80	
	1 (L <sub>1.7</sub> )	85	
	0 (L <sub>max</sub> )	90	

<sup>1</sup> These standards are reduced 5 dBA for simple tone noise, noise consisting primarily of speech or music, or recurring impact noise. If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

<sup>2</sup> L<sub>x</sub> represents the noise level that is exceeded X percent of a given period. L<sub>max</sub> is the maximum instantaneous noise level.

<sup>3</sup> Legal residences, schools and childcare facilities, health care or nursing home, public open space, or similarly sensitive land uses.

Source: Oakland Planning Code Section 17.120.050

**Construction Noise.** Oakland Planning Code Section 17.120.050 identifies standards for construction noise. These standards are presented in **Table 3.9-2**. Section 17.120.050 further provides that, between the hours of 7:00 PM and 7:00 AM on weekdays and 8:00 PM to 9:00 AM on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard.

**TABLE 3.9-2: CITY OF OAKLAND CONSTRUCTION NOISE STANDARDS AT RECEIVING PROPERTY LINE, DBA<sup>1</sup>**

Receiving Land Use	Maximum Allowable Noise Level (dBA)	
	Weekdays 7:00 AM-7:00 PM	Weekends 9:00 AM-8:00 PM
<i>Less than 10 Days</i>		
Residential	80	65
Commercial, Industrial	85	70
<i>More than 10 Days</i>		
Residential	65	55
Commercial, Industrial	70	60

<sup>1</sup> If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

Source: Oakland Planning Code Section 17.120.050

### 3.9.3.3 City of Oakland Municipal Code Section 8.18.020

Oakland Municipal Code Section 8.18.020 specifies that the persistent maintenance or emission of any noise sound produced by humans, animals or mechanical equipment between the hours of 9:00 PM and 7:00 AM that disturbs the peace or comfort of any person shall constitute a nuisance. Section 8.18.020 further specifies that (a) all construction equipment powered by internal combustion engines shall be properly muffled and maintained; (b) unnecessary idling of internal combustion engines is prohibited; (c) all stationary noise-generating construction equipment such as tree grinders and air compressors are to be located as far as practical from existing residences; (d) quiet construction equipment, particularly air compressors, are to be selected whenever possible; and (e) use of pile drivers and jack hammers shall be prohibited on Sundays and holidays, except for emergencies and as approved in advance by the Building Official.

### 3.9.3.4 Federal Transit Administration Groundborne Vibration Impact Criteria

**Table 3.9-3** identifies standards for groundbourne vibration levels established by the Federal Transit Administration (FTA).

**TABLE 3.9-3: FEDERAL TRANSIT ADMINISTRATION GROUND BORNE VIBRATION IMPACT CRITERIA**

Land Use Category	Frequent Events <sup>1</sup>	Occasional Events <sup>2</sup>	Infrequent Events <sup>3</sup>
Category I: Buildings where vibration would interfere with interior operations	65 VdB <sup>4</sup>	45 VdB <sup>4</sup>	65 VdB <sup>4</sup>
Category II: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category III: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

<sup>1</sup> More than 70 vibration events of the same source per day.

<sup>2</sup> Between 30 and 70 vibration events of the same source per day.

<sup>3</sup> Less than 30 vibration events of the same source per day.

<sup>4</sup> This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research should always require detailed evaluation to define the acceptable vibration levels. Ensuring low vibration levels in a building requires special design of HVAC systems and stiffened floors.

Source: City of Oakland; Federal Transit Administration

### 3.9.4 EXISTING CONDITIONS

The primary noise sources in the vicinity of the Master Plan area include automobile, bus, and truck traffic noise from Interstate 580 (I-580) as well as surrounding community roadways and the existing zoo operations. While the Oakland International Airport is located approximately 3.15 miles from the Master Plan area, a review of the Oakland International Airport noise contours determined that, due to the distance, intervening land features, and topography, airport-related noise in the Master Plan area is negligible (Oakland International Airport 2009). There are no other primary noise sources in the vicinity of the Master Plan area.

To document the current community ambient noise conditions in the proposed Master Plan amendment area, three environmental noise monitors were placed along the southern edge of the property to record simultaneously the daily background noise levels prevalent in and around the zoo. The three 24-hour noise monitors were programmed to record continuously throughout a typical business day on Thursday, April 9, 2009. **Table 3.9-4** presents the results of the 24-hour noise monitoring and **Figure 3.9-2** shows the location of the noise monitors.

**TABLE 3.9-4: MEASURED AMBIENT NOISE LEVELS OVER A 24-HOUR PERIOD**

Position	Date	Location	24-Hour L <sub>EQ</sub> (dBA)
1	4-9-2009	Proposed Veterinary Medical Hospital	54.2
2	4-9-2009	Service Road	56.5
3	4-9-2009	Proposed California Exhibit Southeastern Fence Line	54.9

Source: ARCADIS 2009



As shown in **Table 3.9-4**, the three continuous 24-hour noise measurements ( $L_{EQ}$ , A-weighted) range from the highest noise level of 56.5 dBA  $L_{EQ}$  at Receptor 2 to the quietest noise level of 54.2 dBA  $L_{EQ}$  at Receptor 1. During the noise measurements, start and end times were recorded and background noise sources in the area, such as motor vehicle traffic traveling on I-580 and parking lot noise from activities associated with the zoo operations, were noted. Other field data gathered included measurements or estimates of distances, angles-of-view, slopes, and site elevations; this information was subsequently verified using available maps and records. The noise measurements ran from midnight to midnight, integrating and logging data every 30 minutes. The noise level meters were field-calibrated prior to and following the noise measurements to ensure accuracy. All noise measurements were made using a sound level meter that conforms to the American National Standards Institute (ANSI SI.4-1983 – R2001) specifications for sound level meters. All instruments are maintained with the National Bureau of Standards traceable calibrations.

The predominant land uses surrounding the zoo are single-family residential development and Knowland Park. Both the residential and park land uses are considered noise-sensitive receptors. Most of the nearby residential development is not adversely affected by existing noise from the Oakland Zoo, as the development is set back from the zoo site and traffic on I-580 creates ambient noise.

### 3.9.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

#### 3.9.5.1 Methodology

**Noise Exposure and Community Noise.** An individual's noise exposure is valued based on a measurement of the noise that the individual experiences over a specified time interval. A noise level is a measurement of noise that occurs during a specified period of time. A continuous source of noise is very rare for long periods of time and is typically not a characteristic of community noise. Community noise refers to outdoor noise in the vicinity of a community and most commonly originates from transportation vehicles or stationary mechanical equipment. A community noise environment varies continuously over time with respect to the contributing sources. Within a community, ambient noise levels gradually change throughout a typical day and the changes can be correlated to the increase and decrease of transportation noise or to the daytime/nighttime operation of stationary mechanical equipment. The variation in community noise throughout a day is also due to the addition of short-duration single-event noise sources, such as aircraft and sirens.

In order to characterize and evaluate cumulative future (2015 and 2035) traffic noise impacts, the metrics for evaluating the community noise environment are based on measurements of the noise exposure over a period of time. These metrics are time-varying and are defined as statistical noise descriptors. The most common metrics for evaluating community noise are as follows:

**Leq:** The equivalent sound level, or the time-integrated continuous sound level, that represents the same sound energy as the varying sound levels, logarithmically averaged over a specified monitoring period.

**Lmax:** The instantaneous greatest noise level measured on a sound level meter during a designated time interval.

**Lmin:** The instantaneous lowest noise level measured on a sound level meter during a designated time interval.

**Lx:** The base sound level that is exceeded x percent during a specified time.

**DNL:** The Day-Night Average Sound Level (abbreviated as DNL or  $L_{DN}$ ) that represents a 24-hour A-weighted sound level average conducted from midnight to midnight, where sound levels during the nighttime hours of 10:00 PM to 7:00 AM have an added 10-dB weighting, but no added weighting on the evening hours.

**CNEL:** The Community Noise Equivalent Level that represents a 24-hour A-weighted sound level average conducted from midnight to midnight, where sound levels during the evening hours of 7:00 PM to 10:00 PM have an added 5-dB weighting, and nighttime hours of 10:00 PM to 7:00 AM have an added 10-dB weighting.

**Effects of Noise on People.** Noise is generally defined as unwanted or objectionable sound. The effects of noise on humans can be described in three categories:

- Subjective Effects – annoyance or nuisance
- Interference – speech intelligibility, sleep disturbance, and learning interference
- Physiological Effects – hearing loss

Environmental noise impacts on a community typically take the form of subjective and interference effects. Humans working within areas that contain large mechanical equipment such as industrial plants more commonly experience physiological effects from noise. There is no standard set forth to measure the subjective effects of noise or the reactions of annoyance. The human threshold of annoyance has a wide variation from individual to individual, and tolerance of noise is based on individual past experiences with noise.

An assessment of the potential for a project to result in adverse noise effects requires an evaluation of several factors, including the site's general setting, the nature of the existing ambient noise sources or activities occurring in that setting, proximity of the receptor to the existing ambient noise source or activity, time of day, and the presence of various sound-attenuating factors, such as vegetation, ground absorption, topographic features, buildings, and atmospheric conditions.

Noise standards and sound measurement equipment have been designed to account for the sensitivity of human hearing to different audible wave forms, or frequencies. This is accomplished by applying "A-weighted" correction factors. This correction factor is widely



applied in the industry and is known to de-emphasize the very low and very high frequencies of sound in a manner similar to the response of the human ear. The primary assumption is that the A-weighted decibel (dBA) is a good correlation to a human's subjective reaction to noise.

Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The dBA scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA. The relationship between the increases to A-weighted noise levels are as follows:

- A noise level change of three dBA is barely perceptible to average human hearing.
- A five-dBA change in noise level, however, is clearly noticeable.
- A 10-dBA change in noise level is perceived as a doubling of noise loudness.
- A 20-dBA change is considered a dramatic change in loudness.

**Table 3.9-5** lists the typical instantaneous noise levels of common activities in dBA.

**TABLE 3.9-5: TYPICAL NOISE LEVELS**

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 1,000 Feet	100	
Gas Lawn Mower at 3 Feet	90	
Diesel Truck at 50 Feet, at 50 Miles per Hour (mph)	80	Food Blender at 3 Feet Garbage Disposal at 3 Feet
Noisy Urban Area, Daytime Gas Lawn Mower at 100 Feet	70	Vacuum Cleaner at 10 Feet
Commercial Area Heavy Traffic at 300 Feet	60	Normal Speech at 3 Feet
Quiet Urban Daytime	50	Large Business Office, Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: Caltrans Technical Noise Supplement, October 1998

**Noise Receptors.** To assess potential noise impacts on adjacent residences and park users, 15 receptor locations were identified for the purpose of modeling future noise emissions from the buildout of the amended Master Plan (Veterinary Medical Hospital and California Exhibit). **Figure 3.9-3** shows the receptor locations. The receptor locations were selected to represent the residences and fire roads nearest the California Exhibit boundary. Seven receptor locations (Receptors 5 – 11) were selected along the Knowland Park southern property line adjoining single-family residences; four receptor locations (Receptors 12 – 15) were selected along the existing fire road within Knowland Park; one receptor location (Receptor 4) was selected within the zoo’s existing parking lot; two receptor locations (Receptors 2 and 3) were selected near the two southwesterly knolls of Knowland Park (Lower Knoll A and Upper Knoll B), and one receptor (Receptor 1) is located at the site of the proposed Veterinary Medical Hospital. (Receptors 1 – 3 are also the locations of the noise monitoring equipment used to record ambient noise – see **Figure 3.9-2**.) Modeling of the proposed Master Plan amendment area and surrounding environment was accomplished using CadnaA Ver. 4.0.<sup>1</sup>

### 3.9.5.2 CEQA Thresholds/Criteria of Significance

The project would have a significant impact on the environment if it would:

- a) Expose persons to or generate noise levels in excess of standards established in the Oakland General Plan or applicable standards of other agencies (e.g., OSHA).
- b) Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding operational noise.
- c) Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding construction noise, except if an acoustical analysis is performed. During the hours of 7 PM to 7 AM on weekdays and 8 PM to 9 AM on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard.
- d) Violate the City of Oakland Noise Ordinance (Oakland Municipal Code Section 8.18.020) regarding nuisance of persistent construction-related noise.
- e) Create a vibration not associated with motor vehicles, trains, or temporary construction or demolition work which is perceptible without instruments by the average person at or beyond any lot line containing the vibration-causing activity, except vibration-causing activities located in the M-40 zone or in the M-30 zone more than 400 feet from any legally occupied residential property (Oakland Planning Code Section 17.120.060).

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<sup>1</sup> The CadnaA Ver. 4.0 is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA (Computer Aided Noise Abatement) assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project information such as traffic volumes, mechanical emission noise source data, acoustical barriers, project structures, and topography to create a detailed CAD model and uses the most up-to-date mathematical calculation standards to predict individual and/or combined outdoor noise impacts at defined noise-sensitive project boundary areas and surrounding residential communities.



SOURCE: Aliquot and PJA; ARCADIS



**Figure 3.9-3**  
Nearest Residential and Park Receptor Locations

- f) Expose persons to or generate rail-related groundborne vibration in excess of standards established by the Federal Transit Administration (FTA).
- g) Generate interior Ldn or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (and may be extended by local legislative action to include single family dwellings) per California Noise Insulation Standards (CCR Part 2, Title 24).
- h) Result in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project. If the cumulative increase in noise results in a 5 dBA permanent increase in ambient noise levels in the project vicinity above existing levels without the project (i.e., cumulative conditions including the proposed project compared to existing conditions), the project's contribution to the cumulative increase would be cumulatively considerable, and significant if it results in a 3 dBA permanent increase attributable to the project (i.e., cumulative conditions including the proposed project compared to cumulative conditions without the proposed project).<sup>2</sup>
- i) Conflict with land use compatibility guidelines for all specified land uses for determination of acceptability of noise after incorporation of all applicable Standard Conditions of Approval.
- j) Be located within an airport land use plan and expose people residing or working in the project area to excessive noise levels.
- k) Be located within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels.

These criteria are discussed below.

**a) Would the project expose persons to or generate noise levels in excess of standards established in the Oakland General Plan or applicable standards of other agencies (e.g., OSHA)?**

The buildout of the amended Master Plan would not expose persons to or generate noise levels in excess of standards established in the Noise Element of the Oakland General Plan.

Operational noise resulting from the buildout of the amended Master Plan would not result in conflicts with the land use/noise compatibility guidelines established by the Noise Element. See further discussion of operational noise under **Criterion b** and **Criterion i** below.

The amended Master Plan would not expose people (i.e., zoo patrons) to noise exceeding the land use/noise compatibility guidelines. See further discussion of operational noise under **Criterion b** and **Criterion i** below.

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<sup>2</sup> Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference, as discussed in this section under "Effects of Noise on People"; therefore, 3 dBA is considered an appropriate additional screening criterion to determine if project related noise increases are cumulatively considerable.

Since anticipated operational noise would not create any conflicts with the land use/noise compatibility guidelines, the proposed Master Plan amendment would not conflict with Noise Element Policies 1, 2, or 3.

The buildout of the amended Master Plan would not create any new significant impacts or increase the severity of impacts compared to the approved Master Plan.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) Would the project violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding operational noise?**

The proposed Master Plan amendment would not violate Noise Ordinance provisions regarding operational noise.

The combined daily operations resulting from the buildout of the amended Master Plan, including the Veterinary Medical Hospital, gondola people-moving system, California Exhibit, and service road, were evaluated to determine daily operational noise impacts. Fifteen noise measurements were taken on and adjacent to the proposed Master Plan amendment area.

**Figure 3.9-3** shows the locations of the noise measurement receptors. **Table 3.9-6** shows the anticipated daytime and nighttime noise levels at these locations. See **Appendix J-1** for operational noise emissions.

As shown in **Table 3.9-6**, operational noise from the buildout of the amended Master Plan in both daytime and nighttime conditions would be below the Noise Ordinance limits of 60 dBA during the daytime period and 45 dBA during the nighttime period for residential and civic “receiving land uses.” Ongoing operations associated with the buildout of the amended Master Plan would not generate interior Ldn or CNEL greater than 45 dBA at nearby land uses. Operational noise from the buildout of the amended Master Plan would therefore represent a less-than-significant impact, and no mitigation is necessary.

The buildout of the amended Master Plan would not create any new significant noise impacts or increase the severity of noise impacts identified in the 1998 MND.

**Impact:** Less-than-significant

**Mitigation:** None required

**TABLE 3.9-6: OPERATIONAL NOISE FROM PROPOSED MASTER PLAN AMENDMENT**

Receptor	Location	Daytime Operational Noise Level (dBA)	Nighttime Operational Noise Level (dBA)
1	Veterinary Medical Hospital (Noise Monitor)	56.3	25.5
2	Service Road (Noise Monitor)	39.7	22.2
3	California Exhibit (Noise Monitor)	36.4	17.2
4	Zoo Parking Zoo	48.2	27.4
5	Southern Property Line (Residential)	41.2	33.8
6	Southern Property Line (Residential)	52.1	29.6
7	Southern Property Line (Residential)	36.0	15.5
8	Southern Property Line (Residential)	37.2	20.2
9	Southern Property Line (Residential)	40.6	19.9
10	Southern Property Line (Residential)	47.9	23.6
11	Southern Property Line (Residential)	46.6	30.6
12	Knowland Park (proposed public access path)	59.8	21.8
13	Knowland Park	56.0	36.6
14	Knowland Park	52.3	38.5
15	Knowland Park	38.1	26.0

Source: ARCADIS

**c) Would the project violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding construction noise, except if an acoustical analysis is performed?**

Construction noise generated by the buildout of the amended Master Plan would not exceed the City’s Noise Ordinance standards and therefore would not have a potentially significant impact because **SCA-NOISE-1 through SCA-NOISE-3** would reduce the temporary construction noise impact to a less-than-significant level based on a site specific acoustical analysis was performed.

**Analysis of Construction Noise.** As described in **Chapter 2, Project Description**, construction of the amended Master Plan would occur in five phases. The construction noise impact analysis identifies potential noise impacts for each of the construction phases. The noise emission calculations are based on the type of equipment that could be used during each of the five phases of construction, including trucks, bobcat, scraper, bulldozer, compactor, front-end loader, paver, concrete pump, crane, excavator, boom lift, fork lift, scraper, backhoe, and air compressor. See **Appendix J-2**, which includes noise emission data for construction equipment.

All sound pressure levels within the equipment noise emission database are standardized at a distance of 50 feet from the noise source. The construction equipment operation utilization percentage (the duration of time the equipment operates during a specified one-hour period) is based on typical construction practices as defined by the Federal Highway Administration and ARCADIS's professional experience. The noise calculations of each construction phase provide for a realistic prediction of the noise impact range to be expected from the typically intermittent operation of construction machinery during a one-hour period.

**Table 3.9-7** presents the temporary noise levels associated with the five proposed construction phases at the 15 noise monitoring locations. As shown in **Table 3.9-7**, during Phase 1, Receptors 4 and 6 (which are residential) would have noise levels exceeding the Noise Ordinance's daytime noise limit of 65 dBA for residential "receiving land uses" for construction projects lasting more than ten days. It is noted that Receptor 1 is the noise monitor location of the Veterinary Medical Hospital and is located well within the zoo property and does not represent a residential or park boundary. Therefore, the 65 dBA threshold does not apply. As shown in **Table 3.9-7** noise impacts to Knowland Park would not exceed the City of Oakland noise threshold limits of 70 dBA for all defined construction phases.

Construction activities during Phase 2 would include the use of a helicopter to transport the gondola support structures from a staging area located at the future location of the California Exhibit to the site of the gondola line. Because helicopter operations would occur for only a single day, noise emissions associated with helicopter operations are called out separately. The Noise Ordinance identifies a noise limit of 80 dBA for residential "receiving land uses" for construction projects lasting fewer than ten days. As shown in **Table 3.9-7**, helicopter noise would be below 80 dBA at all of the receptor locations and therefore would comply with the Noise Ordinance.

**SCA-NOISE-1 through SCA-NOISE-3** would apply during construction and would reduce the potential noise impacts. To implement **SCA-NOISE-2**, the project applicant would have a qualified acoustical consultant prepare a noise reduction implementation plan for City review and approval. The goal of the plan would be to reduce noise impacts during Phase 1 at Receptor 4 and Receptor 6 to below City standards. The project applicant would be required to implement the approved plan.

The approved noise reduction implementation plan may include the following:

***Phase 1 Veterinary Medical Hospital.*** During construction activities, a 15-foot-high temporary sound barrier of 230 feet in length shall be placed between the proposed Veterinary Medical Hospital site and the southern and eastern residences. The sound barrier shall be placed at the edge of the parking lot closest to the Veterinary Medical Hospital location as shown in **Figure 3.9-4**. The sound barrier shall require a ten-foot return on each end and be oriented 45 degrees into the construction activities. Due to edge diffraction, the construction activities shall not approach the end of the wall returns by 50 feet. **Table 3.9-8** identifies the temporary sound barrier wall height and the duration of the wall placement.

**TABLE 3.9-7: TEMPORARY CONSTRUCTION NOISE FROM PROPOSED MASTER PLAN AMENDMENT**

Receptor	Location	Phase 1 Noise Level (dBA)	Phase 1 Noise Level with SCA (dBA)	Phase 2 Noise Level (dBA)	Phase 3 Noise Level (dBA)	Phase 4 Noise Level (dBA)	Phase 5 Noise Level (dBA)	Helicopter Noise Level (dBA) <sup>1</sup>
1 <sup>2</sup>	Veterinary Medical Hospital Noise Monitor	81.7	81.7	65.6	65.5	65.5	58.7	74.8
2	Service Road Noise Monitor	62.2	62.2	44.9	44.6	44.1	42.0	70.7
3	California Exhibit Noise Monitor	52.5	52.5	42.2	44.7	37.7	40.6	69.9
4	Zoo Parking Lot	<b>71.8</b> <sup>3</sup>	63.9	64.9	64.9	64.7	53.3	75.7
5	Southern Property Line (Residential)	63.4	63.2	56.1	55.7	55.6	42.6	71.5
6	Southern Property Line (Residential)	<b>72.4</b> <sup>3</sup>	62.5	54.4	54.2	54.2	53.1	71.1
7	Southern Property Line (Residential)	63.5	56.9	39.3	39.7	37.3	37.9	59.7
8	Southern Property Line (Residential)	54.7	54.7	43.5	47.2	39.3	40.4	71.8
9	Southern Property Line (Residential)	48.0	48.0	50.4	52.2	46.5	46.8	71.8
10	Southern Property Line (Residential)	31.5	31.5	57.1	56.1	52.1	56.4	69.6
11	Southern Property Line (Residential)	38.1	38.0	54.5	55.3	51.1	52.6	68.0
12	Knowland Park (proposed public access path)	29.5	29.5	66.7	63.0	60.8	68.0	75.8
13	Knowland Park (fire road)	28.5	28.5	63.7	63.6	64.7	59.3	73.7
14	Knowland Park (fire road)	29.3	29.3	61.0	60.3	60.0	55.9	70.6
15	Knowland Park (fire road)	24.5	24.5	47.5	47.9	44.0	43.4	64.8

<sup>1</sup> The Noise Ordinance identifies a noise limit of 80 dBA for residential receiving land uses for construction projects lasting fewer than ten days.

<sup>2</sup> Receptor 1 is the noise monitor location of the Veterinary Medical Hospital and is located well within the zoo property and does not represent a residential or park boundary.

<sup>3</sup> Bold numbers indicate exceedance of the 65 dBA threshold for residential receiving land uses.

<sup>4</sup> The City of Oakland's temporary construction noise threshold limits contained in Oakland Planning Code Section 17.120.050 are defined in two broad land use categories: residential and commercial/industrial. There are no clearly defined limits for a public recreational park, such as Knowland Park. The residential land use limits are designed to mitigate not only exterior noise, but also put a stronger emphasis on meeting an acceptable interior noise level within an enclosed residential structure. The park does not contain any livable building structures and is strictly considered an outdoor use environment. Therefore, the residential noise threshold limits are very conservative regarding noise impacts to a public park and do not properly represent Knowland Park's land use. Furthermore, the State of California's published Land Use Noise Compatibility Matrix, which Oakland uses as well, defines noise impacts of 70 dBA Ldn to be normally acceptable for neighborhood public parks and 75 dBA Ldn for golf courses and other active recreation areas. Thus, it is reasonable that the maximum one-hour average Leq dBA can be considered the appropriate temporary construction noise impact threshold limit for Knowland Park, which is equivalent to the commercial/industrial noise thresholds limits in OPC Section 17.120.050. As such, no noise reduction measures are required to reduce noise impacts to users of Knowland Park.

Source: ARCADIS





SOURCE: ARCADIS

◆◆◆ **Figure 3.9-4**  
 Construction Phase 1 –  
 Veterinary Medical Hospital Sound Barrier Locationsw

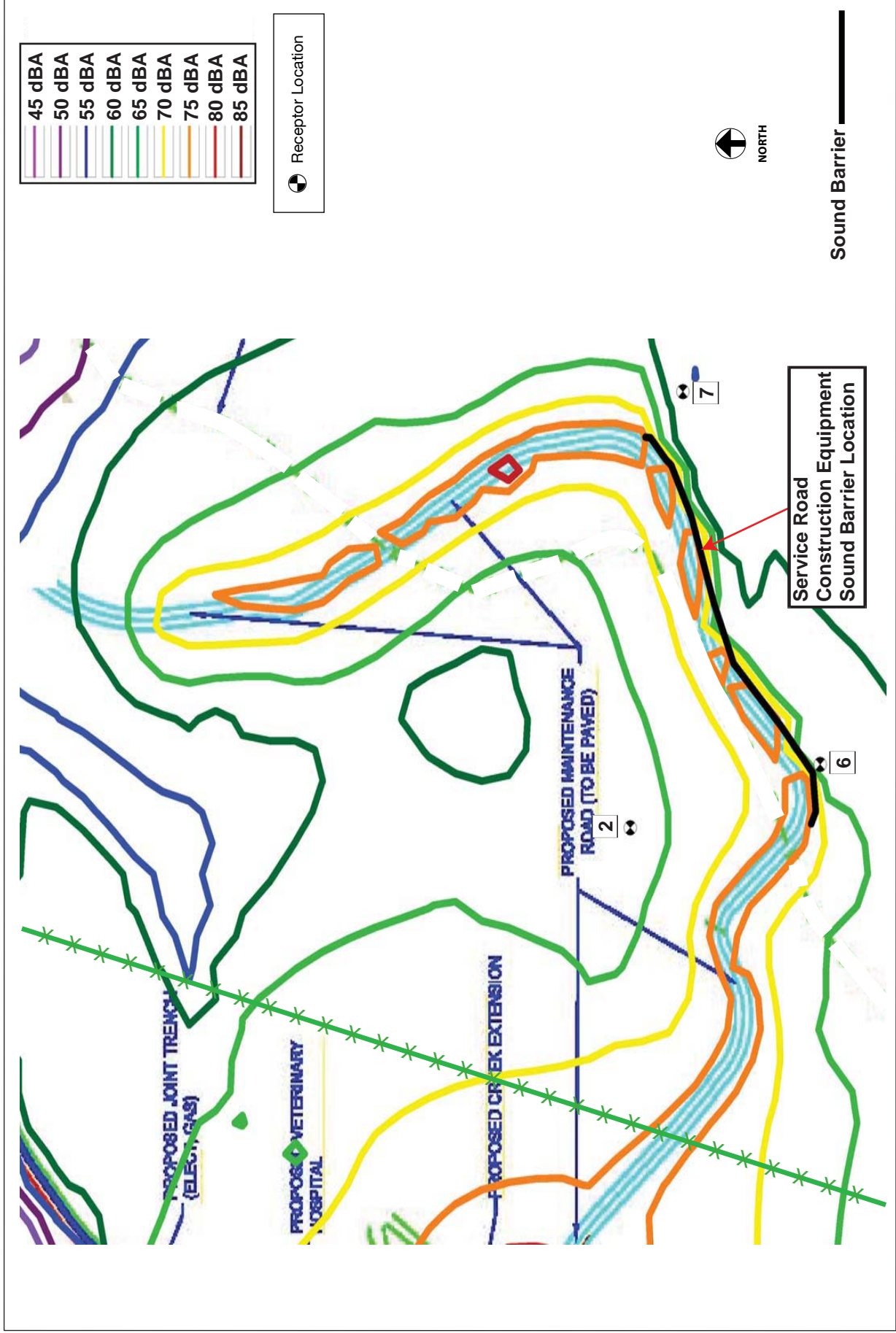
**TABLE 3.9-8: TEMPORARY SOUND BARRIER DESCRIPTION**

Construction Phase	Sound Barrier Length (feet)	Sound Barrier Height (feet)	Sound Barrier Location	Duration Sound Barrier in Place (Hours)
<i>Phase 1 - Veterinary Medical Hospital</i>				
Grading	230	15	Placed between the proposed Veterinary Medical Hospital site and the southern and eastern residences. The sound barrier shall be placed at the edge of the parking lot closest to the Veterinary Medical Hospital location.	120
Concrete Pour	Not Required	Not Required	Not Required	Not Required
Finishing Paving	230	15	Placed between the proposed Veterinary Medical Hospital site and the southern and eastern residences. The sound barrier shall be placed at the edge of the parking lot closest to the Veterinary Medical Hospital location	24
<i>Phase 1 - Service Road</i>				
Excavation/ Grading	475	12	Along edge of service road segment adjacent to the southern residences.	80
Paving	475	12	Along edge of service road segment adjacent to the southern residences.	56
Concrete	475	12	Along edge of service road segment adjacent to the southern residences.	20

Source: ARCADIS

**Phase 1 Service Road.** A 12-foot-high temporary sound barrier segment of 475 feet in length shall be placed along the edge of the service road segment where the road bends and is oriented nearest the southern residences as shown in **Figure 3.9-5** while roadway construction occurs. The sound barrier shall require a ten-foot return on each end and be oriented 45 degrees into the construction activities. Due to edge diffraction, the construction activities shall not approach the end of the wall returns by 50 feet. **Table 3.9-8** identifies the temporary sound barrier wall height and the duration of the wall placement.

The temporary sound barrier shall be constructed of a sound blanket system hung on scaffolding to achieve the required height. This system is very effective in the reduction of construction noise and allows the ability to move or adjust the wall location. An alternative sound barrier design would consist of plywood installed atop a portable concrete K-Rail system. This alternative solution is effective in the reduction of noise and also allows the ability to move or adjust the wall location.



SOURCE: ARCADIS



**Figure 3.9-5**  
 Construction Phase 1 –  
 Service Road Sound Barrier Location

An alternative approach to the sound barrier would be to equip all of the heavy construction equipment used in the construction of the Veterinary Medical Hospital and the service road with acoustical silencers installed directly onto the construction equipment's exhaust system. This alternative solution would reduce the temporary construction noise impacts to below the City of Oakland's noise threshold limits.

**Summary.** Buildout of the amended Master Plan would generate substantial construction noise. The impact would be similar to the noise impact identified in the 1998 MND. However, the 1998 MND noise impacts did not address the specific effects of various construction phases, such as those now proposed by the Master Plan amendment. Also, while the 1998 MND addressed nearby residences as noise-sensitive receptors, it did not identify park users as a sensitive receptor. As shown in **Table 3.9-7**, park users would not be exposed to noise levels exceeding the Noise Ordinance threshold limit of 70 dBA. With implementation of **SCA-NOISE-2**, a noise reduction plan containing temporary sound barriers or equipment silencers would be implemented during construction Phase 1, which would reduce temporary construction noise levels below 65 dBA for nearby residences (see **Table 3.9-7**). See **Appendix J-3** for examples of sound barriers. Implementation of **SCA-NOISE-1 through SCA-NOISE-3** would reduce the construction noise impacts to less-than-significant levels. No mitigation is required.

**Impact:** Less-than-significant

**Mitigation:** None required

**d) Would the project violate the City of Oakland Noise Ordinance (Oakland Municipal Code Section 8.18.020) regarding nuisance of persistent construction-related noise?**

The buildout of the amended Master Plan does not include construction activities that would violate the provisions of Municipal Code Section 8.18.020 (e.g., by proposing construction between 9:00 PM and 7:00 AM or use of construction equipment that does not comply with Section 8.18.020 provisions – see **Subsection 3.9.3.3** above). The proposed Master Plan amendment would be required to comply with Municipal Code Section 8.18.020. The proposed Master Plan amendment would therefore have a less-than-significant impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

- e) **Would the project create a vibration not associated with motor vehicles, trains, or temporary construction or demolition work which is perceptible without instruments by the average person at or beyond any lot line containing the vibration-causing activity, except vibration-causing activities located in the M-40 zone or in the M-30 zone more than 400 feet from any legally occupied residential property?**

The buildout of the amended Master Plan would not include any activity or equipment that would create a vibration perceptible to nearby residences.

**Impact:** No impact

**Mitigation:** None required

- f) **Would the project expose persons to or generate rail-related groundborne vibration in excess of standards established by the Federal Transit Administration (FTA)?**

The buildout of the amended Master Plan would not include any rail-related facility that would result in groundborne vibration nor are there any rail-related facilities within the vicinity of the Master Plan area that would cause groundborne vibration exceeding FTA standards. Occupants of the buildout of the amended Master Plan would not be exposed to rail-related groundborne vibration.

**Impact:** No impact

**Mitigation:** None required

- g) **Would the project expose persons to interior Ldn or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (and may be extended by local legislative action to include single family dwellings) per California Noise Insulation Standards (CCR Part 2, Title 24)?**

There are no residential spaces proposed for construction. Therefore, this criterion does not apply to the proposed Master Plan amendment.

**Impact:** No impact

**Mitigation:** None required

- h) **Would the project result in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project? If the cumulative increase in noise results in a 5 dBA permanent increase in ambient noise levels in the project vicinity above existing levels without the project (i.e., cumulative conditions including the proposed project compared to existing conditions), the project's contribution to the cumulative increase would be cumulatively considerable, and significant if it results in a 3 dBA permanent increase attributable to the project (i.e.,**

**cumulative conditions including the proposed project compared to cumulative conditions without the proposed project).<sup>3</sup>**

**Table 3.9-4** shows the ambient noise levels at the locations of the proposed Veterinary Medical Hospital, the service road and the southern boundary of the California Exhibit. The existing ambient noise levels range from 54.2 dBA to 56.5 dBA. The noise generated by the proposed Master Plan amendment facilities, including the Veterinary Medical Hospital, service road, gondola people-moving system and California Exhibit would not result in a permanent five dBA increase in existing ambient noise levels. **Table 3.9-10** presents noise levels anticipated at the three noise monitor locations when noise from the proposed facilities is added to ambient noise levels. It is noted that Receptor 1 is located within the zoo property and does not represent a residential or park boundary. **Appendix J-1** includes operational noise data.

The buildout of the amended Master Plan would result in an increase in traffic (see **Section 3.11, Transportation and Circulation**) that would result in a corresponding increase in traffic noise. The buildout of the amended Master Plan, however, would not result in a five dBA permanent increase in ambient noise levels in the vicinity. The increase in traffic noise would be below three decibels, which is identified as “barely perceptible to average human hearing” in the Noise Element. Traffic noise from the buildout of the amended Master Plan would be imperceptible off-site and would not contribute to an increase in ambient noise levels. As indicated in **Table 3.9-10**, the resulting increase in noise would be below five dBA. Traffic noise was analyzed for years 2008 (baseline year traffic conditions), 2015 (interim year traffic conditions) and 2035 (cumulative year traffic conditions). **Table 3.9-9** shows the baseline noise levels (2008), projected 2015 noise levels, and projected 2035 noise levels with and without the buildout of the amended Master Plan. As shown in **Table 3.9-9**, the increase in traffic volume noise levels in 2015 and 2035 with the buildout of the amended Master Plan would not exceed five dBA when compared to the existing (2008) baseline. Furthermore, the buildout of the amended Master Plan would not result in a traffic noise increase of three decibels at any location in 2015 or 2035 when compared to the future (2015 and 2035) baseline. As shown in **Table 3.9-9**, the buildout of the amended Master Plan would cause a traffic noise increase of approximately 0.2 dBA in 2015 on Zoo Drive between the main entrance gate and the parking lot, an increase of approximately 0.1 dBA in 2035 on Zoo Drive between the main entrance gate and the parking lot, and an increase of approximately 0.1 dBA in 2035 on Mountain Boulevard between Golf Links Road and Calafia Avenue. The traffic noise increases resulting from the buildout of the amended Master Plan would have no perceptible effect on the noise environment.

**Impact:** Less-than-significant

**Mitigation:** None required

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<sup>3</sup> Outside of the laboratory, a 3-dBA change is considered a just perceivable difference, as discussed in this section under “Effects of Noise on People”; therefore, 3 dBA is considered an appropriate additional screening criterion to determine if project related noise increases are cumulatively considerable.

**TABLE 3.9-9: ROADWAY TRAFFIC VOLUME NOISE LEVELS**

Roadway Segment	Existing (2008) (CNEL dBA)	Existing Plus Buildout of Amended Master Plan (CNEL dBA)	2015		2035	
			Baseline Without Buildout of Amended Master Plan (CNEL dBA)	With Buildout of Amended Master Plan (CNEL dBA)	Baseline Without Buildout of Amended Master Plan (CNEL dBA)	With Buildout of Amended Master Plan (CNEL dBA)
<i>Zoo Drive</i>						
Golf Links Rd. – Entrance Gate	68.9	68.9	69.2	69.2	69.8	69.8
Entrance Gate – Parking Lot	62.6	62.8	62.7	62.9	63.2	63.3
<i>Golf Links Road</i>						
I-580 – Mountain Blvd.	76.6	76.6	76.9	76.9	77.5	77.5
Mountain Blvd. – Anza Ave.	67.1	67.1	67.3	67.3	67.8	67.8
<i>Mountain Boulevard</i>						
Golf Links Rd. – Calafia Ave.	74.7	74.8	75.1	75.1	75.7	75.8
<i>106th Street</i>						
I-580 – Malcolm Ave.	72.6	72.6	73.0	73.0	73.7	73.7
<i>Malcolm Avenue</i>						
106th St. – Mark St.	62.9	63.0	63.2	63.2	63.9	63.9

Source: ARCADIS

**TABLE 3.9-10: EXISTING AMBIENT NOISE CONDITIONS COMPARED TO FUTURE CONDITIONS WITH FACILITY NOISE FROM PROPOSED MASTER PLAN AMENDMENT**

Receptor	Location	Existing Ambient Noise Levels (dBA)	Combined Ambient Noise and Proposed Master Plan Amendment Operational Noise (dBA)	Difference (dB)
1 <sup>1</sup>	Proposed Veterinary Medical Hospital (Noise Monitor)	54.2	58.4	4.2
2	Service Road (Noise Monitor)	56.5	56.6	0.1
3	Proposed California Exhibit (Noise Monitor)	54.9	55.0	0.1

<sup>1</sup> Receptor 1 is the noise monitor location of the Veterinary Medical Hospital and is located well within the zoo property and does not represent a residential or park boundary.

Source: ARCADIS

**i) Would the project conflict with land use compatibility guidelines for all specified land uses for determination of acceptability of noise after incorporation of all applicable Standard Conditions of Approval?**

The existing ambient noise environment at the zoo boundaries is under 60 dBA. There is not a specific land use category identified for zoos in the Noise Element of the General Plan (see **Figure 3.9-3**). The closest land use categories are “Playgrounds, Neighborhood Parks” and “Golf Courses, Riding Stables, Water Recreation, Cemeteries” The community noise exposure level for “Playgrounds, Neighborhood Parks would be “normally acceptable” up to 70 dBA; and for “Golf Courses, Riding Stables, Water Recreation, Cemeteries would be “normally acceptable” up to 75 dBA. As the current ambient noise level is under 60 dBA, the buildout of the amended Master Plan would be located in an area within acceptable noise exposure levels.

**Impact:** Less-than-significant

**Mitigation:** None required

**j) Would the project be located within an airport land use plan and expose people residing or working in the project area to excessive noise levels?**

The Oakland Zoo and the rest of Knowland Park are not located within the boundaries of the Oakland International Airport Comprehensive Land Use Plan, and therefore the buildout of the amended Master Plan would not expose persons and exhibit animals to excessive noise levels (Oakland International Airport 2009).

**Impact:** No impact

**Mitigation:** None required

**k) Would the project be located within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?**

There are no private airstrips located within two miles of the Oakland Zoo and the rest of Knowland Park. Therefore, there would be no impact under this criterion.

**Impact:** No impact

**Mitigation:** None required

### 3.9.6 CUMULATIVE IMPACTS

The geographic scope for assessing the potential for cumulative noise impacts is focused on the immediate surrounding area, including the existing zoo facilities, the rest of Knowland Park, and the adjacent residential communities. The Existing Conditions subsection above (**Subsection 3.9.4**) describes the past and present development in this area.



The buildout of the amended Master Plan is the only reasonably foreseeable future project in this geographic area. The Knowland Park area outside of the Master Plan boundary is zoned Open Space (Resource Conservation Area) and no future development is expected at this time. The zoo and its related support facilities have been a part of Knowland Park for more than 60 years. The immediately surrounding residential areas are largely built out and future improvements to existing homes or the potential construction of homes on any vacant parcels would be minor and would not be expected to result in a significant increase in the ambient noise level in the vicinity. The two development projects anticipated elsewhere in southeast Oakland – the Leona Quarry and Oak Knoll projects – are located too far from the Master Plan amendment area for the noise impacts of these projects to contribute to an increase in ambient noise levels. Additionally, neither the approved Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant adverse operational noise impacts. On-site operational noise impacts would not result in a permanent five-dBA increase in ambient noise levels in the vicinity. Off-site traffic noise increases resulting from the buildout of the amended Master Plan in both 2015 and 2035 would have no perceptible effect on the noise environment. Thus, the proposed Master Plan amendment would not result in or contribute to any significant cumulative noise impacts.

### 3.9.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new noise impacts or a substantial increase in the severity of previously identified noise impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less than significant. Previously imposed mitigation measures from the 1998 MND have been identified and, where appropriate, have been clarified, refined, revised, or deleted. This section also identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.

### 3.9.8 REFERENCES

- City of Oakland. 2005. *City of Oakland General Plan Noise Element*. June.
- City of Oakland. 1998. Initial Study and Environmental Review Checklist, Oakland Zoo in Knowland Park Master Plan.
- Beranek, Leo L. 1988. *Noise and Vibration Control*, Revised Edition. INCE.
- Harris, Cyril M. 1998. *Handbook of Acoustical Measurements and Noise Control*, 3rd Edition. Acoustical Society of America.
- Oakland International Airport. 2009. "Oakland International Airport, Fourth Quarter 2008 Noise Contours. March 3. [www.oaklandairport.com/noise/pdfs/2008\\_Annual\\_Noise\\_Contour\\_Map.pdf](http://www.oaklandairport.com/noise/pdfs/2008_Annual_Noise_Contour_Map.pdf)

Occupational Safety & Health Administration. 2007. 29 Code of Federal Regulations, Subpart H, Section 1910.95, Occupational Noise Exposure.

Raichel, Daniel R. 2000. *The Science and Applications of Acoustics*.

U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March.

U.S. Department of Transportation Federal Highway Administration. 2009. Section 9.0 *Construction Equipment Noise Levels and Ranges*.

### 3.10 PUBLIC SERVICES AND UTILITIES

This section evaluates potential public services and utilities impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant public services or utilities impacts not identified in the 1998 MND or a substantial increase in the severity of the previously identified impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new significant public services and utilities impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised, or deleted. This section also identifies the applicable provisions of the City's Conditions of Approval and whether or not any new mitigation measures are required.

#### 3.10.1 PRIOR MND ANALYSIS AND CONCLUSIONS

##### 3.10.1.1 1998 Prior MND Impact Findings

**Fire Protection.** The 1998 MND concluded that the Master Plan would have a less-than-significant impact on fire protection service. The 1998 MND noted that, according to the Oakland Fire Marshal, Master Plan provisions for road access would provide adequate access for fire protection purposes.

**Police.** The 1998 MND concluded that the Master Plan would have a less-than-significant impact on police service. The 1998 MND noted that the Oakland Zoo maintains a 24-hour security force, and that estimated increases in attendance were not expected to result in significant impacts on police service.

**Water Supply.** The 1998 MND concluded that the Master Plan would have a less-than-significant impact on water service. The 1998 MND indicated that the proposed expansion of facilities and animal exhibits would result in an increase in water consumption but would not require extension of public utility lines. Construction of new utility lines would be limited to on-site improvements.

**Wastewater.** The 1998 MND concluded that the Master Plan would have a less-than-significant impact on wastewater service. The 1998 MND indicated that the proposed expansion of facilities and animal exhibits would result in an increase in wastewater generation but would not require extension of public utility lines. Construction of new utility lines would be limited to on-site improvements.

**Storm Drainage.** The 1998 MND concluded that conversion of pervious surfaces to impervious surfaces under the Master Plan would have a potentially significant impact on storm

drainage unless mitigation was incorporated into the Master Plan. (See further discussion in **Section 3.7, Hydrology and Water Quality.**)

**Solid Waste.** The 1998 MND concluded that the Master Plan would have a less-than-significant impact on solid waste service. The 1998 MND indicated that implementation of the Master Plan would not result in a significant increase in solid waste, and that the increased amount of animal waste would be handled by a new on-site composting system.

**Electricity and Natural Gas.** The 1998 MND concluded that the Master Plan would have no impact on energy resources, since the scale of the proposed development and types of proposed uses were consistent with PG&E's expectations for existing and future energy demand.

### **3.10.1.2 1998 MND Mitigation Measures**

Since the 1998 MND concluded that the Master Plan would not have significant impacts on fire protection, police, water supply, wastewater, solid waste, or electricity or natural gas services, no mitigation measures were identified. For discussion of mitigation measures for storm drainage impacts, see **Section 3.7, Hydrology and Water Quality.**

### **3.10.2 STANDARD CONDITIONS OF APPROVAL**

The City of Oakland's Standard Conditions of Approval that address public services and utilities and would apply to the proposed Master Plan amendment are listed below. If the City approves the Master Plan amendment, these Conditions of Approval would be adopted as requirements of the Master Plan amendment and would ensure less-than-significant impacts on public services and utilities. As a result, the Standard Conditions of Approval are not listed as mitigation measures.

(For Standard Conditions of Approval related to storm drain facilities, see **Section 3.7, Hydrology and Water Quality.**)

### **SCA-SERVICES-1: Waste Reduction and Recycling**

The project applicant will submit a Construction & Demolition Waste Reduction and Recycling Plan (WRRP) and an Operational Diversion Plan (ODP) for review and approval by the Public Works Agency.

#### ***Prior to issuance of demolition, grading, or building permit***

Chapter 15.34 of the Oakland Municipal Code outlines requirements for reducing waste and optimizing construction and demolition (C&D) recycling. Affected projects include all new construction, renovations/alterations/modifications with construction values of \$50,000 or more (except R-3), and all demolition (including soft demo). The WRRP must specify the

methods by which the development will divert C&D debris waste generated by the proposed project from landfill disposal in accordance with current City requirements. Current standards, FAQs, and forms are available at [www.oaklandpw.com/Page39.aspx](http://www.oaklandpw.com/Page39.aspx) or in the Green Building Resource Center. After approval of the plan, the project applicant shall implement the plan.

### ***Ongoing***

The ODP will identify how the project complies with the Recycling Space Allocation Ordinance, (Chapter 17.118 of the Oakland Municipal Code), including capacity calculations, and specify the methods by which the development will meet the current diversion of solid waste generated by operation of the proposed project from landfill disposal in accordance with current City requirements. The proposed program shall be implemented and maintained for the duration of the proposed activity or facility. Changes to the plan may be re-submitted to the Environmental Services Division of the Public Works Agency for review and approval. Any incentive programs shall remain fully operational as long as residents and businesses exist at the project site.

### **SCA-SERVICES-2: Fire Safety Phasing Plan**

#### ***Prior to issuance of a demolition, grading, and/or construction and concurrent with any p-job submittal permit***

The project applicant shall submit a separate fire safety phasing plan to the Planning and Zoning Division and Fire Services Division for their review and approval. The fire safety plan shall include all of the fire safety features incorporated into the project and the schedule for implementation of the features. Fire Services Division may require changes to the plan or may reject the plan if it does not adequately address fire hazards associated with the project as a whole or the individual phase.

### **SCA-SERVICES-3: Fire Safety**

#### ***Prior to and ongoing throughout demolition, grading, and/or construction***

The project applicant and construction contractor will ensure that during project construction, all construction vehicles and equipment will be fitted with spark arrestors to minimize accidental ignition of dry construction debris and surrounding dry vegetation.

### **SCA-SERVICES-4: Stormwater and Sewer**

#### ***Prior to completing the final design for the project's sewer service***

Confirmation of the capacity of the City's surrounding stormwater and sanitary sewer system and state of repair shall be completed by a qualified civil engineer with funding from the project applicant. The project applicant shall be responsible for the necessary stormwater and sanitary sewer infrastructure improvements to accommodate the proposed project. In addition, the applicant shall be required to pay additional fees to improve sanitary sewer infrastructure if

required by the Sewer and Stormwater Division. Improvements to the existing sanitary sewer collection system shall specifically include, but are not limited to, mechanisms to control or minimize increases in infiltration/inflow to offset sanitary sewer increases associated with the proposed project. To the maximum extent practicable, the applicant will be required to implement Best Management Practices to reduce the peak stormwater runoff from the project site. Additionally, the project applicant shall be responsible for payment of the required installation or hook-up fees to the affected service providers.

### **SCA-BIO-15: Vegetation Management Plan**

(Please refer to **Section 3.3, Biological Resources**.)

#### 3.10.3 UPDATED REGULATORY SETTING

The following discussion reviews provisions of the Oakland General Plan and other regulations that are relevant to public services and utilities for the proposed Master Plan amendment. (For regulatory provisions related to storm drain facilities, see **Section 3.7, Hydrology and Water Quality**.)

##### **3.10.3.1 City of Oakland General Plan**

**Land Use and Transportation Element.** The Land Use and Transportation Element of the Oakland General Plan was adopted in March 1998, before the 1998 MND was adopted. The Land Use and Transportation Element contains the following objective and policies relevant to public services and utilities for the proposed Master Plan amendment (City of Oakland 1998):

*Objective N12: Provide adequate infrastructure to meet the needs of Oakland's growing community.*

The General Plan recommends that consideration be given to the adequacy of infrastructure when contemplating additional development, particularly in the hill areas of Oakland. Infrastructure capacity and availability are critical determinants of future development throughout the City and will be a major factor affecting proposed construction or future annexation requests.

*Policy N12.1: Developing Public Service Facilities.* The development of public facilities and staffing of safety-related services, such as fire stations, should be sequenced and timed to provide a balance between land use and population growth, and public services at all times.

*Policy N12.4: Undergrounding Utility Lines.* Electrical, telephone, and related distribution lines should be undergrounded in commercial and residential areas, except where special local conditions such as limited visibility of the poles and wires make this unneeded. They should also be underground in appropriate institutional, industrial, and other areas, and generally along freeways, scenic routes, and heavily traveled streets. Programs should lead systematically toward the eventual undergrounding of existing lines in such places. Where significant utility extensions are taking place in these areas, such as in new subdivisions, utilities should be installed underground from the start.

See further discussion in **Section 3.8, Land Use, Recreation and Planning.**

**Open Space, Conservation and Recreation (OSCAR) Element.** The Open Space, Conservation and Recreation (OSCAR) Element of the Oakland General Plan was adopted in June 1996, before the 1998 MND was adopted. The OSCAR Element contains the following key objectives and policies relevant to public services and utilities for the proposed Master Plan amendment (City of Oakland 1996):

*Objective CO-4: Water Supply.* To maintain a water supply sufficient to meet local needs while minimizing the need to develop new water supply facilities.

*Policy CO-4.1: Water Conservation.* Emphasize water conservation and recycling strategies in efforts to meet future demand.

*Policy CO-4.2: Drought-Tolerant Landscaping.* Require use of drought-tolerant plants to the greatest extent possible and encourage the use of irrigation systems which minimize water consumption.

*Policy CO-4.3: Use of Reclaimed Water.* Promote the use of reclaimed wastewater for irrigating landscape medians, cemeteries, parks, golf courses, and other areas requiring large volumes of non-potable water.

*Objective CO-10: Vegetation Management.* To manage vegetation so that the risk of catastrophic wildfire is minimized.

*Policy CO-10.1: Flammable Vegetation Control.* Subject to the availability of City resources and at the discretion of the City Council and applicable City departments, control flammable vegetation on public and private open space lands in the Oakland Hills to reduce wildfire hazards.

*Policy CO-10.2: Fire Prevention Measures.* As determined necessary by the City, require individual property owners and developers in high hazard areas to reduce fire hazards on their properties through a range of preventative measures. Landscaping and site planning in these high hazard areas should minimize future wildfire hazards.

*Objective CO-13: Energy Resources.* To manage Oakland's energy resources as efficiently as possible, reduce consumption of non-renewable resources, and develop energy resources which reduce dependency on fossil fuels.

*Policy CO-13.1: Reliable Energy Network.* Promote a reliable local energy network which meets future needs and long-term economic development objectives at the lowest practical cost.

*Policy CO-13.2: Energy Efficiency.* Support public information campaigns, energy audits, the use of energy-saving appliances and vehicles, and other efforts which help Oakland residents, businesses, and City operations become more energy efficient.

*Policy CO-13.3: Construction Methods and Materials.* Encourage the use of energy-efficient construction and building materials. Encourage site plans for new development which maximize energy efficiency.

*Objective REC-5: Park Safety.* To improve personal safety and reduce crime in Oakland's parks.

*Policy REC-5.1: Increased Range of Activities.* Promote an increased range of activities within Oakland's parks as a means of introducing new users to the parks and improving safety through numbers.

*Policy REC-5.2: Safety-Oriented Design.* Use a wide range of physical design solutions to improve safety at Oakland's parks, including lighting, signage, landscape design, fencing, vandal-resistant building materials, and emergency response features.

*Action REC-5.2.2: Design Review by OFD and Ranger Unit.* On an on-going basis, involve the Ranger Unit and the Oakland Fire Department in the review of major planned park improvements and provide them with opportunities to suggest modifications which could improve public safety.

*Policy REC-5.3:* Improve law enforcement in Oakland's parks through a combination of new rangers, reserve officers, neighborhood watch groups, coordination with East Bay Regional Park District rangers, and better communication between enforcement officers and neighborhood residents.

See further discussion in **Section 3.8, Land Use, Recreation and Planning.**

**Safety Element.** The Safety Element of the Oakland General Plan was adopted in November 2004, after the 1998 MND was adopted. The Safety Element contains the following key policies and actions relevant to public services and utilities for the proposed Master Plan amendment (City of Oakland 2004):

*Policy PS-1:* Maintain and enhance the city's capacity to prepare for, mitigate, respond to and recover from disasters and emergencies.

*Policy FI-1:* Maintain and enhance the city's capacity for emergency response, fire prevention and fire-fighting.

*Action FI-1.1:* Periodically assess the need for new or relocated fire stations and other facilities, changes in staffing levels, and additional or updated supplies, equipment, technologies and in-service training classes.

*Action FI-1.2:* Strive to meet a goal of responding to fires and other emergencies within seven minutes of notification 90 percent of the time.

*Policy FI-2:* Continue, enhance or implement programs that seek to reduce the risk of structural fires.

*Action FI-2.3:* Continue to review development proposals to ensure that they incorporate required and appropriate fire-mitigation measures, including adequate provisions for occupant evacuation and access by fire-fighting personnel and equipment.

*Policy FI-3:* Prioritize the reduction of the wildfire hazard, with an emphasis on prevention.



*Action FI-3.1:* Implement and administer the 2004 wildfire-prevention assessment district for the Oakland Hills, and carry out the programs funded by the district, including fire-safety inspections of private properties, vegetation management practices, roving firefighter patrols on high fire-hazard days, and public education efforts.

See further discussion in **Section 3.8, Land Use, Recreation and Planning.**

### **3.10.3.2 City of Oakland 2004 Wildfire Prevention Assessment District**

The Oakland Zoo and Knowland Park are located within the City of Oakland's 2004 Wildfire Prevention Assessment District, which did not exist at the time the 1998 MND was prepared and adopted. The following "compliance standards" apply to development within the Wildfire Prevention Assessment District (City of Oakland 2010a):

1. Maintain a 30-foot defensible space around all buildings/structures.
  - The grass needs to be cut 6 inches or less.
  - The tree branches need to be limbed up 6 feet from the ground
  - Shrubs need to be maintained
  - Climbing vines must be removed from trees and structures
2. Additional defensible space outward to 100 feet from all buildings and surrounding, neighboring structures may be required depending on the property slope, fuel load and/or fuel type.
  - Fuel load - amount of vegetation.
  - Fuel type - type of vegetation.
  - Property slope - steepness of property.
3. Maintain a 10-foot minimum clearance next to the roadside; more may be required.
  - The roadside clearance may be extended more than 10 feet.
4. Remove all portions of trees within 10 feet of chimney and/or stovepipe outlets.
  - Property owners are responsible for maintaining trees year round.
  - Trees need to be cut 10 feet away from the chimney in any direction.
5. Maintain trees adjacent to or overhanging a structure so that they are free of dead/dying wood.
  - Cut the trees back and remove any dead or dying wood.
6. Maintain the roof of any structure so that it is free of leaves, needles, or other dead/dying wood.
  - Remove any leaves, needles, branches, or debris from the roof and/or gutters.
7. Install a spark arrester on chimney and/or stovepipe outlets.

- The spark arrester must be constructed of heavy wire mesh with openings not to exceed ½ inch.
8. Provide street address numbers that are clearly visible from the roadside, minimum height: 2 inches.
    - The address numbers should be posted on the house.
    - If the house sits back from the street, post the address at the beginning of the driveway and on the house
    - The address numbers should be in a contrasting color for visibility.
  9. Remove all tree limbs within 6 feet of the ground.
    - Remove lower hanging tree branches from the ground up to 6 feet.
  10. Remove dead/dying vegetation from property.
    - Remove any and all dead/dying vegetation from the property.

### 3.10.3.3 Water Conservation and Recycled Water Requirements

**Recycled Water.** In January 2002, the City of Oakland adopted a recycled water ordinance that requires new developments within the city to use recycled water provided by EBMUD for common area irrigation, if recycled water is available to the development area. This requires installation of a separate non-potable water distribution system on-site.

In addition, EBMUD's Nonpotable Water Policy No. 73 (1996) mandates that all customers use recycled water for non-domestic purposes when such water is of adequate quality and quantity, available at reasonable cost, not detrimental to public health and not injurious to plant life, fish, and wildlife.

**Water Conservation.** Section 31 of EBMUD's Water Service Regulations requires that new or expanded water service not be provided unless all applicable water-efficiency measures described in the regulation are installed at a project sponsor's expense. EBMUD encourages use of water conservation practices such as (1) improving irrigation efficiency through good design and maintenance; (2) reducing runoff, over-spray, and over-watering through hardware upgrades and smart water management; and (3) reducing landscape water requirements through appropriate plant selection.

### 3.10.3.4 Senate Bill (SB) 610

Senate Bill (SB) 610, codified as Sections 10910-10915 of the California Public Resources Code, requires local water providers to conduct a water supply assessment for projects proposing over 500 housing units, 250,000 square feet of commercial office space (or more than 1,000 employees), a shopping center or business establishment with over 500,000 square feet (or more than 1,000 employees), or equivalent usage. Local water suppliers must also prepare or have already prepared

an Urban Water Management Plan (UWMP) to guide planning and development in the water supplier's service area, and specifically pursue efficient use of water resources. Issuance of a water supply assessment determination by the local water supplier for a proposed project verifies that the supplier has previously considered a proposed project in its UWMP and has adequate capacity to serve a project in addition to its existing service commitments, or alternatively, measures that would be required to adequately serve the proposed project. The buildout of the amended Master Plan does not meet or exceed the project thresholds established by SB 610, and therefore a water supply assessment for the proposed Master Plan amendment is not required.

### **3.10.3.5 California Integrated Waste Management Act (Assembly Bill 939)**

The California Integrated Waste Management Act of 1989, or Assembly Bill (AB) 939, established the Integrated Waste Management Board, required the implementation of integrated waste management plans and also mandated that local jurisdictions divert at least 50 percent of all solid waste generated (based on 1990 levels), beginning January 1, 2000, and divert at least 75 percent by 2010. As required by AB 939, the City of Oakland has prepared a Source Reduction and Recycling Element (SRRE) which requires proposed development projects to undergo, as part of the required environmental review, an assessment of project impacts on the City's ability to maintain the mandated 50 percent waste diversion rates. Projects that would have an adverse effect on the City's waste diversion goals are required to include waste diversion mitigation measures to assist in reducing these impacts to less-than-significant levels.

### **3.10.3.6 Alameda County Waste Reduction and Recycling Initiative (Measure D)**

In addition to AB 939, the 1990 Voter Initiative Measure D (Alameda County Waste Reduction and Recycling Initiative) mandates all cities in Alameda County to divert 75 percent of their solid waste from landfills by the year 2010.

### **3.10.3.7 City of Oakland Construction and Demolition Debris Waste Reduction and Recycling Requirements**

The City of Oakland's construction and demolition (C&D) debris waste reduction and recycling requirements (Ordinance No. 12253; Municipal Code Chapter 15.34) are intended to further the goals of AB 939 and Alameda County's Measure D. As part of the application for a building permit, a project applicant is required to prepare and submit a Construction and Demolition Debris Waste Reduction and Recycling Plan (WRRP) to divert at least 50 percent of all construction and demolition debris generated by project development from landfill disposal.

### **3.10.3.8 Title 24 Energy Conservation Requirements**

Buildings constructed after June 30, 1977 must comply with standards identified in Title 24 of the California Code of Regulations. Title 24, established by the California Energy Commission (CEC) in 1978, requires the inclusion of state-of-the-art energy conservation features in building

design and construction, including the incorporation of specific energy-conserving design features, use of non-depletable energy resources, or a demonstration that buildings would comply with a designated energy budget.

### **3.10.3.9 City of Oakland Sustainability Programs**

The City of Oakland's sustainability programs are administered under the umbrella of the Oakland Sustainability Community Development Initiative, which was created in 1998 under Ordinance 74678 CMS. These programs range from the encouragement of green building practices to the replacement of heavy-duty diesel trucks. Oakland has funded a Phase I feasibility study and a Phase II Implementation Plan to become a community choice aggregator, which would allow the City to purchase electricity on behalf of its energy users. Potential benefits of becoming an aggregator include increased use of renewable energy sources to meet Oakland's energy needs and a reduction in electricity costs. In addition, another program promotes the use of renewable energy, with a particular emphasis on increasing the use of solar power. Aggressive renewable energy goals have been established for the City, including requiring 50 percent of the City's entire electricity use to come from renewable sources by 2017 and 100 percent by 2030.

### **3.10.3.10 Draft City of Oakland Energy and Climate Action Plan**

The Draft City of Oakland Energy and Climate Action Plan outlines 150 specific actions (to be implemented over a 10-year period) that will enable the City to achieve a 36-percent reduction in greenhouse gas emissions. Based on the plan, much of the reduction would result from the implementation of renewable energy and energy efficiency measures, including measures to reduce electricity consumption by 32 percent and natural gas consumption by 15 percent. These measures include adopting a green building ordinance for private development, using property-based financing for alternative energy systems, and advancing the use of transit. The plan has not yet been adopted by the City.

## **3.10.4 EXISTING CONDITIONS**

### **3.10.4.1 Fire Protection**

The Oakland Fire Department provides fire protection and emergency medical services to the Oakland Zoo and vicinity.

**Facilities and Staffing.** The Fire Department operates 25 fire stations, including one at Oakland International Airport. The Fire Department maintains 24 engine companies with approximately four personnel per engine, four truck companies with four personnel per truck, and three truck companies with five personnel per truck.

Total Fire Department staffing consists of approximately 500 uniformed personnel. The actual number of assigned personnel per station depends on the needs of that station. All personnel are trained as paramedics or emergency medical technicians.

The Fire Department is organized into four divisions and three battalions that provide requested fire and emergency medical services. The battalions are organized by geographic area: Battalion 2 serves West Oakland and North Oakland; Battalion 3 serves the area from Seminary Boulevard, east to the City of San Leandro; and Battalion 4 serves central Oakland. (There is no Battalion 1.) Each battalion consists of 7 to 10 fire stations.

The nearest fire station to the Oakland Zoo, Station 26, is located at 2611 98<sup>th</sup> Avenue, less than 0.5 mile west of the zoo. A second station, Station 28, is located at 4614 Grass Valley Road about two miles southeast of the zoo. Determining which fire station will respond to an emergency call depends on a number of factors, including the type of emergency and the station's capacity to respond at that moment.

**Service Demand.** The Oakland Fire Department Dispatch Center (FDDC) is located in downtown Oakland and is responsible for fire and medical emergency coordination and response. The FDDC receives approximately 60,000 calls for response annually, of which 80 percent are medical emergencies.

The Fire Department's response time goal is seven minutes or less, 90 percent of the time (City of Oakland 2009). The Fire Department's average citywide response time is five minutes.

**Existing Emergency Vehicle Access at Oakland Zoo.** In addition to the main entrance to the Oakland Zoo, several unimproved roads provide emergency vehicle access to the hill area above the zoo (including the proposed Master Plan amendment area). These roads consist of (1) an unimproved fire road that extends from the existing upper parking lots into the hill area, and (2) an unimproved road extending from the end of Snowdown Avenue at the southern boundary of Knowland Park. The Snowdown Avenue access is currently blocked by a keyed rail gate at the end of the pavement. Several other dirt roads provide access to the area east of the proposed California Exhibit area.

**Oakland Zoo Protocol for Oakland Fire Department Emergency Response.** The Oakland Zoo protocol is to request Oakland Fire Department response for emergencies involving animal escape, natural disaster, fire, hazardous material spill, dangerous person, the need for advanced life support, or threat of bodily injury. Firefighters and paramedics are asked to enter through the main gate (at Golf Links Road), where a security officer is always posted. The security officer is instructed to direct firefighters and paramedics to the public safety/security management station, where the event is monitored. Oakland Zoo security staff coordinate with the Oakland Police and Fire Departments during such events.

### 3.10.4.2 Police

The Oakland Police Department provides police services throughout the city, including the Oakland Zoo and vicinity.

**Facilities and Staffing.** The Police Department is headquartered at 455 7th Street in downtown Oakland, approximately 11 miles northwest of Knowland Park. The Police Department has approximately 774 sworn police officers and a civilian staff of about 340. The Police Department is currently understaffed (Melara 2010a).

The Police Department has divided the city into three command areas and 35 community policing beats. Each neighborhood services coordinator handles multiple patrol beats. Neighborhood service coordinators are civilian employees who serve as a liaison between the community and the Police Department, and work with residents, businesses, schools, and other institutions to set priorities and develop strategies to improve public safety and reduce crime.

Patrol beats have one officer assigned 24 hours a day. Officers generally work ten-hour shifts four times each week. At any one time, citywide, there are 35 officers, a watch commander, and up to six supervising sergeants on duty, all of whom are sworn personnel. The Traffic Operations Unit generally staffs about 18 officers throughout the day, with additional staff available for special events and periods of special staffing needs.

The Oakland Zoo is located within patrol Beat 35Y, which is staffed by one officer and supported by a squad of four to seven officers within the surrounding district. The boundaries of Beat 35Y are Interstate 580 and Mountain Boulevard to the west, Keller Avenue to the north, Skyline Boulevard to the east, and the City of San Leandro to the south.

Due to budget cuts, the Park Ranger Unit that once patrolled Knowland Park no longer exists. The discontinuation of this unit is a change that has occurred since the 1998 MND was prepared.

**Service Demand.** All emergency (911) and non-emergency calls for police services are received through the Police Department's communications center located at 1701 Edgewater Drive. Calls for fire and medical services are routed to the Oakland Fire Department for dispatching. Priorities for responding to police calls are set by a computer-aided dispatch system that may be overridden by dispatchers. Police officers are dispatched from the police communications center by radio and/or laptop computers mounted in police vehicles.

The Police Department receives a relatively small number of calls from the Oakland Zoo each year (Melara 2010b). The Police Department has not experienced any difficulties with emergency access to the zoo site (Melara 2010b).

**Oakland Zoo On-Site Security.** To supplement police services provided by the City of Oakland, the Oakland Zoo provides private on-site security services at the zoo 24 hours a day, seven days a week. A total of seven security personnel are employed. The zoo maintains a written emergency protocol plan for the security of visitors and animals at the zoo. Security personnel are trained to provide emergency aid and assist in evacuating visitors in the event of an emergency.

Oakland Police Department response is requested in the event of animal escape, natural disaster, fire, hazardous material spill, or dangerous persons. In accordance with the zoo's emergency protocol, the responding officer is informed of the event and the gate that the police should secure. In the event of animal escape, the zoo's Animal Escape Recovery Team, which consists of trained personnel, coordinates efforts to ensure the safety of zoo visitors and to recover escaped animals.

### 3.10.4.3 Water Supply

The East Bay Municipal Utility District (EBMUD), a publicly owned utility, supplies water to parts of Alameda and Contra Costa counties, including the City of Oakland. EBMUD supplies water to approximately 1.3 million people within its estimated 331-square-mile service area. The City of Oakland comprises slightly less than one-third of EBMUD's customers.

**Water Supply System.** The EBMUD water supply system consists of a network of reservoirs, aqueducts, treatment plants, and distribution facilities. This network extends from the principal water source, the Mokelumne River Basin in the Sierra Nevada mountain range, to water treatment plants or to reservoirs<sup>1</sup> within EBMUD's service area, and ultimately to residences and businesses in the East Bay. On average, 90 percent of the water delivered by EBMUD comes from the Mokelumne River watershed, with the remaining ten percent originating as runoff within the service area. EBMUD has water rights and facilities to divert up to a maximum of 325 million gallons of water per day (mgd), subject to the availability of Mokelumne River runoff and prior water rights of other users.

**Water Demand.** In fiscal year 2009, average daily water consumption among EBMUD customers was about 181 million gallons per day (mgd) (Rehnstrom 2010). By 2030, EBMUD estimates that water demand will increase to approximately 281 mgd in its service area, although with successful implementation of water recycling and conservation programs, this demand could be reduced to about 232 mgd.

In normal and above-normal water years, EBMUD has sufficient water rights to meet demand. In multiple dry water years, the current water supply is not sufficient to meet demand.

<sup>1</sup> EBMUD's East Bay service area includes five reservoirs: Briones, Chabot, Lafayette, San Pablo, and Upper San Leandro.

In October 2009, EBMUD adopted an updated long-term Water Supply Management Program 2040 (WSMP 2040), which serves as a planning guide for the reliable provision of quality water to the EBMUD service area through 2040. The WSMP 2040 calls for (1) water conservation efforts that would save 39 mgd, (2) aggressive recycling efforts that would extend the water supply by 11 mgd, (3) limited (15-percent) water rationing during droughts, and (4) development of 43 mgd in additional water supplies through a combination of water transfers, groundwater storage, and regional supply projects.

**Water Supply Projects.** To meet projected water needs and address deficient supply during severe droughts, EBMUD is working to identify supplemental water supplies and recycled water programs, and to continue implementation of water conservation measures.

In September 1995, EBMUD authorized a Water Supply Action Plan to identify supplemental water supplies during multiple-year droughts by pursuing several water supply components concurrently. As a result, on December 8, 2000, the U.S. Bureau of Reclamation, EBMUD, the City of Sacramento, and the Sacramento County Water Agency mutually agreed to develop a joint water supply from the Sacramento River. Components of this project include a diversion one mile north of the City of Freeport, pumping facilities, treatment facilities, and transmission pipes. Construction began in 2007 and is substantially completed. The Freeport Project will provide EBMUD with up to 100 mgd of water during dry years only, estimated to be three out of every 10 years, as a supplemental water source to complement existing conservation programs.

In addition, the WSMP 2040 anticipates that a major regional water project will be needed around 2025 and identifies two alternatives: (1) upcountry surface and groundwater storage, consisting of enlarging Pardee Reservoir, raising Lower Bear Reservoir, and using San Joaquin County groundwater in partnership with Amador, Calaveras, and/or San Joaquin County agencies; and (2) a regional desalination project in partnership with the San Francisco Public Utilities Commission, Contra Costa Water District, and Santa Clara Valley Water District.

**Recycled Water.** The goals of using recycled water are to supplement the existing potable water supply and assist in meeting future water demands. Water for recycling is drawn from water reservoirs containing untreated water, and from wastewater treatment plants. EBMUD currently supplies almost 6.5 mgd of recycled water and other non-potable water for irrigation, industrial processes, and equipment wash-down. EBMUD's goal is delivery of 14 mgd of recycled water by 2020, for a total of 5.1 billion gallons annually. The Oakland Zoo is not located within the service area boundary of EBMUD's East Bayshore Recycled Water Project, which serves other parts of Oakland.



**Water Distribution Facilities in Oakland Zoo Vicinity.** EBMUD’s Upper San Leandro Pressure Zone (service elevation between 100 and 275 feet) and Piedmont Pressure Zone (service elevation between 325 and 500 feet) serve the Oakland Zoo.

Four two-inch water meters provide domestic water service to the zoo. These water meters are located at the Hellman Street site boundary, at the Hood Street site boundary, in the zebra exhibit, and off Golf Links Road near the zoo entrance. The water meter in the zebra exhibit is connected to a 16-inch EBMUD water transmission line that traverses the zoo’s upper parking lot. The water meters at Hellman Street and Hood Street are connected to EBMUD six-inch water mains in those streets. The water meter off Golf Links Road is connected to EBMUD’s six-inch main in Calafia Avenue.

Emergency water is provided via an existing 8-inch private line that connects to EBMUD’s 16-inch water main. Distribution reservoirs in the Piedmont Pressure Zone are the source of this emergency water.

**Existing Water Use at Oakland Zoo.** The Oakland Zoo generates an average demand of approximately 76,000 gallons of water per day. This estimate is based on average demand from January 2005 through January 2010.

#### 3.10.4.4 Wastewater

The City of Oakland owns, operates, and maintains a local sanitary sewer collection system that covers approximately 48 square miles and includes approximately 1,000 miles of pipe and seven pump stations. The City’s collection system connects with EBMUD interceptor lines leading to the EBMUD wastewater treatment plant. EBMUD provides sanitary sewer treatment services to approximately 650,000 people within an 88-square-mile area of Alameda and Contra Costa counties, including the City of Oakland. The City of Oakland and about eight other communities<sup>2</sup> comprise the EBMUD Special District No. 1 sanitary sewer treatment service area.

**Wastewater Collection.** The City of Oakland’s wastewater collection system is divided into basins and subbasins. Each numbered subbasin encompasses a specific physical area, and its sewer flows are assigned to a single discharge point from the City’s collection system into EBMUD’s interceptor lines. City sewer pipes range from 6 to 72 inches in diameter, with most lines pre-dating 1938 and with some parts of the system over 100 years old. Most of the system is gravity-fed. Some areas of Oakland, such as former military bases, cemeteries, large parks, and some hillside areas, are not part of the sewer service system. Over 90 percent of the sewer customers are residential users.

<sup>2</sup> EBMUD’s main wastewater treatment plant treats municipal wastewater from the cities of Alameda, Albany, Berkeley, Emeryville, Oakland, Piedmont, El Cerrito, Kensington, and part of Richmond.

**Wastewater Treatment.** EBMUD's main wastewater treatment plant is located southwest of the Interstate 580/Interstate 80 (I-580/I-80) interchange in Oakland, south of the San Francisco/Oakland Bay Bridge. Wastewater is collected by 29 miles of interceptor lines that move wastewater from about 1,400 miles of sewers owned and operated by the jurisdictions served. EBMUD provides secondary treatment for a maximum flow of 168 mgd, and primary treatment can be provided for up to 320 mgd. Storage basins provide plant capacity for a short-term hydraulic peak of 415 mgd. The average annual flow is currently 75 mgd. Currently, there are no planned improvements to the wastewater treatment plant that would affect treatment capacity.

**Inflow/Infiltration Correction Program.** A continuing issue with respect to sanitary sewer collection has been inflow and infiltration of stormwater into the EBMUD and Oakland sewer lines, resulting in high flow levels and overflow of untreated wastewater during wet weather events. Most of the stormwater enters sewer systems by infiltration (i.e., the stormwater passes through the soil and into deteriorated sewer pipes). Inflow originates from stormwater inlets and manholes that connect to the sanitary sewer system rather than the stormwater system.

In 1986, with EBMUD as the lead agency, the Wet Weather Program was initiated to improve treatment capacity for wet weather flows and reduce the amount of inflow and infiltration throughout the EBMUD collection system. The cities of Alameda, Albany, Berkeley, Emeryville, Kensington, Oakland, Piedmont, and portions of El Cerrito and Richmond participate in EBMUD's Wet Weather Program. The program has resulted in four new wet weather treatment facilities, two storage basins, 7.5 miles of new interceptors, and expansion of the main wastewater treatment plant. These facilities accommodate an increase in peak wet weather treatment capacity from 290 mgd to 775 mgd. The City's long-range sewer improvements are anticipated to reduce peak regional flows from 1.1 billion gallons per day to 775 mgd.

**EBMUD Efforts.** In January 2009, the Regional Water Quality Control Board (RWQCB) issued an order prohibiting further discharges from EBMUD's wet weather facilities. In addition, on July 22, 2009, a Stipulated Order for Preliminary Relief issued by the Environmental Protection Agency (EPA), the State Water Resources Control Board (SWRCB), and the RWQCB became effective, requiring EBMUD to begin work that will identify problem infiltration/inflow areas, begin to reduce infiltration/inflow through private sewer lateral improvements, and lay the groundwork for future efforts to eliminate discharges from the wet weather facilities. EBMUD is conducting extensive flow monitoring and hydraulic modeling to determine the level of flow reductions that will be needed in order to comply with the new "zero-discharge" requirement at the wet weather facilities.

Currently, there is insufficient information to forecast how these changes will affect allowable wet weather flows in the individual collection system subbasins contributing to the EBMUD wastewater system. It is reasonable to assume that a new regional wet weather flow allocation process may occur in the East Bay, but the schedule for implementation of any new flow

allocations has not yet been determined. In the meantime, EBMUD is recommending that individual developments (1) replace or rehabilitate any existing sanitary sewer collection systems, including sewer lateral lines, to reduce infiltration/inflow; and (2) ensure that any new wastewater collection systems, including sewer lateral lines, are constructed to prevent infiltration/inflow to the maximum extent feasible.

**City of Oakland Efforts.** The City of Oakland's infiltration/inflow correction program consists of a 25-year capital improvement program that calls for the rehabilitation of the existing system in cost-effective areas and adding additional pipe capacity where needed. This program anticipated 20-percent additional development (i.e., a 20-percent growth rate) for most parts of Oakland. With the completion of this 25-year program (rehabilitation of cost-effective sub-basins and construction of additional relief sewers), the City's wastewater collection system will have sufficient capacity to accommodate the growth anticipated at the time of the initial program study and the resulting increase in wastewater flows.

The City requires that all new development or redevelopment projects undergo an impact analysis to ensure that the existing system has enough hydraulic capacity to accommodate the proposed development. The City's impact analysis ensures that the overall development is within the projected growth.

The City's collection system comprises local collection mains and a network of trunk systems. The City's system capacity improvements have targeted the trunk network only and assume that the remainder of the system (the local mains) has sufficient capacity. The entire system is divided into drainage basins and subbasins. Each subbasin has a projected allocation for base flow increase based on an anticipated growth rate during the period of the inflow and infiltration collection maintenance and rehabilitation program. Growth (base flow increase) within each subbasin must not exceed projections. If exceeded, the impact of the additional growth on the entire City collection system must be analyzed, and trunk system and additional system improvements may be required. If redirection of allocation from other subbasins is needed to accommodate a development project, further review and approval from the City would be required in order to determine locations and the amount of potential reallocation. If growth does not exceed projections within each subbasin, then impact analysis may be limited to the study of local mains serving the development site. The Oakland Zoo is located in Subbasin 85-222.

**Wastewater Generation and Collection Facilities at Oakland Zoo.** The Oakland Zoo currently generates approximately 38,000 gallons per day (or approximately 14 million gallons per year) of wastewater. Sewage is conveyed through on-site lines in the zoo grounds to City of Oakland sewer lines in streets contiguous to the site.

#### 3.10.4.5 Storm Drainage

In Oakland, stormwater runoff is collected from the southwesterly flows from the Oakland/Berkeley hills to the developed flatlands, where it then flows primarily through underground storm drains and culverts to the San Francisco Bay, via the Oakland Estuary (directly or by way of Lake Merritt) or through the City of Emeryville.

The Alameda County Flood Control and Water Conservation District constructs, operates, and maintains major trunk lines and flood control facilities in Oakland, and the Oakland Public Works Agency is responsible for construction and maintenance of the local storm drainage system within Oakland's public areas and roads.

The City has prepared a comprehensive storm drainage master plan to identify existing deficiencies in the system and develop recommendations for rehabilitating the system in order to reduce localized flooding. Storm drain complaints are scattered throughout the city and are mostly related to commercial business uses. Based on these complaints, even without televised footage of actual pipes, the City has taken the position that the storm drain system is aged and would not be able to handle increased runoff flows. The City requires development projects to evaluate the on-site and off-site condition and capacity of the existing stormwater collection system and implement necessary improvements that are identified to accommodate the project. Specifically, the City requires developments to detain stormwater to the extent feasible.

The Oakland Zoo site primarily drains to Arroyo Viejo Creek, which roughly parallels Golf Links Road. Existing storm drain pipelines convey drainage through two general subbasins to the creek. The proposed Master Plan amendment area mainly drains to natural swales that lead to Arroyo Viejo Creek.

For more discussion of site drainage, see **Section 3.7, Hydrology and Water Quality**.

#### 3.10.4.6 Solid Waste

**Waste Management and Disposal.** Non-hazardous waste in the City of Oakland is collected by Waste Management of Alameda County (WMAC), which provides curbside pickup for residential, commercial, and industrial non-hazardous waste and transports the waste to WMAC's Davis Street Transfer Station in San Leandro.

The Alameda County Waste Management Authority (ACWMA) estimates that, in 2006, Oakland disposed of approximately 388,307 tons of solid waste, or about 1,064 tons per day.

Transfer trucks haul waste to the Altamont Landfill and Resource Facility, located approximately 35 miles east of Oakland near the City of Livermore. The Altamont Landfill has a permitted maximum daily disposal of 11,500 tons per day, approximately 24 percent of which was

attributable to the City of Oakland in 2007. The total estimated permitted capacity of the Altamont Landfill is 62 million cubic yards. Approximately 26 percent of the landfill's permitted capacity has been used. The landfill's currently anticipated closure date is January 1, 2029.

Demolition and construction debris generated in Oakland is generally hauled by contractors and local construction companies to recycling facilities in the East Bay or to the Vasco Road Landfill near the City of Livermore. The total estimated permitted capacity of the Vasco Road Landfill is almost 33 million cubic yards. Approximately 70 percent of the landfill's permitted capacity has been used. The landfill's currently anticipated closure date is August 31, 2019.

**Citywide Waste Generation and Diversion.** As required by enactment of the California Integrated Waste Management Act (AB 939) in 1989 (discussed in **Subsection 3.10.3.5** above), the City of Oakland has prepared a Source Reduction and Recycling Element (SRRE), a report that describes (1) the chief characteristics of the city's waste, (2) existing waste diversion programs and rates of waste diversion, and (3) the new or expanded programs the City intends to implement to achieve the mandated rates of diversion.<sup>3</sup> The city's waste diversion rate has increased from approximately 11 percent in 1990 to an estimated 59 percent in 2006. The City's waste diversion programs and requirements are discussed in **Subsection 3.10.3.7** above.

**Solid Waste Handling and Management at Oakland Zoo.** Solid waste generated at the Oakland Zoo consists of cardboard, paper, cans, limited plastics, landscaping clippings, animal manure, and discarded food, along with a small amount of other miscellaneous items.

The zoo maintains a program for solid waste handling and management that includes sorting, recycling, and composting. The contents of garbage cans are sorted, separating recyclables from compostable waste. Animal manure is composted along with discarded food and landscaping clippings. Composted material is used in landscaped areas as a soil amendment in the natural clay soils; most of the organic matter, including manure, is used on-site. Eating utensils provided to visitors are biodegradable and are also composted.

In addition, the zoo's solid waste management program includes recycling of off-site landscape clippings and yard waste. The diet of elephants at the zoo is supplemented with unwanted clippings from neighbors' yards, which are collected and taken to the zoo. Pumpkins discarded after Halloween are retrieved for elephant food, and discarded holiday trees are brought or delivered to the zoo for food; after leaves and twigs are browsed, remaining tree limbs are set out for pickup by WMAC. The elephants thus recycle community waste that would otherwise go to landfills.

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<sup>3</sup> Waste diversion is defined as the total waste that a jurisdiction generates less the amount that is disposed at a landfill or transformation facility. Waste diversion occurs through reduction, reuse, recycling, and composting programs.

Solid waste picked up for landfill disposal at the Oakland Zoo amounts to approximately 4,000 cubic yards per year.

#### **3.10.4.7 Electricity and Natural Gas**

Electricity and gas service in the City of Oakland is provided primarily by Pacific Gas and Electric Company (PG&E), which owns the gas and electrical utility supply lines. Some users purchase energy services directly from alternate power providers. Throughout most of Oakland, electrical power is delivered via overhead distribution and transmission lines, and natural gas is distributed through underground piping. PG&E expands its services on an as-needed basis and requires the user to fund the extension of service.

The Oakland Zoo is currently served by a PG&E power pole located off the lower parking lot near the existing administrative building. The power pole provides three-phase, 12-kilovolt primary voltage.

The Oakland Zoo is served by a 2-inch PG&E gas distribution line that extends from Stella Street south of the site and traverses the lower parking lot.

#### **3.10.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT**

The project would have a significant impact on the environment if it would:

- a) Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for the following public services: fire protection, police protection, schools, or other public facilities;
- b) Exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board;
- c) Require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
- d) Exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
- e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

- f) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
- g) Violate applicable federal, state, and local statutes and regulations related to solid waste;
- h) Violate applicable federal, state and local statutes and regulations relating to energy standards; or
- i) Result in a determination by the energy provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

These criteria are discussed below.

- a) **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for the following public services: fire protection, police protection, schools, or other public facilities?**

**Fire Protection Services.** The proposed Master Plan amendment would not result in increased demand for fire protection services beyond that identified in the 1998 MND and would not create a need for new Oakland Fire Department facilities.

With the buildout of the amended Master Plan, the zoo would experience an annual increase in attendance of approximately 150,000 visitors in the first year of operation (2015-2016) of the California Exhibit, with an estimated total of 750,000 annual visitors; then, over time, the zoo would experience a gradual decrease in annual attendance leading to an estimated stabilized attendance of 700,000 visitors in 2035 (Hausrath Economics Group 2010; see **Appendix D**). In addition, the buildout of the amended Master Plan would increase the number of employees by approximately 30 persons and would include new structures in an area that is susceptible to wildfires. Therefore, the buildout of the amended Master Plan could incrementally increase the need for fire-fighting services and emergency response. However, this incremental increase in demand would be less-than-significant due to (1) the comprehensive emergency access that would be provided as part of the Master Plan amendment, and (2) implementation of **SCA-SERVICES-2**, **SCA-SERVICES-3**, and **SCA-BIO-15**, which would require the Oakland Zoo to manage vegetation and undertake construction activities in such a way that fire risk would be reduced. In addition, on-site security personnel are trained to provide emergency aid and assist in evacuations and would further reduce demand for Fire Department personnel.

**Emergency Access.** The proposed Master Plan amendment would include improvements to existing emergency roads that would allow for access by emergency vehicles (which would allow the Fire Department to efficiently serve the site). Based on input from the Oakland Fire Department, the emergency access roads that would be developed as part of the buildout of the amended Master Plan would comply with current Fire Department requirements. The Oakland Fire Department considers these improvements generally acceptable; the department would further review final plans for adequacy when the Oakland Zoo submits a building permit application (Griffin 2010). The proposed improvements are as follows:

- *Primary Emergency Vehicle Access Road off Snowdown Avenue.* The proposed Master Plan amendment includes provision of a primary emergency vehicle access road extending from the end of Snowdown Avenue to the proposed California Exhibit. The road would follow the existing dirt road off Snowdown Avenue that is currently used by the Oakland Fire Department. The road would be widened to approximately 20 feet, with turnouts located approximately every 300 feet along the road's approximately 1,450-foot length. The road would be surfaced in gravel. The proposed improvements to the road were not included in the approved Master Plan. Therefore, the proposed Master Plan amendment would improve emergency access compared to the approved Master Plan.
- *Secondary Emergency Vehicle Access Road from Upper Parking Lots.* A service road would be extended from the existing upper parking lots at the zoo, providing access to the proposed Veterinary Medical Hospital and continuing on an existing service road to the California Exhibit. This road would also serve as a secondary emergency vehicle access road. The road would be approximately 14 feet wide with an approximately three-foot ditch on the hill side of the road and an approximately two-foot dirt shoulder. The road would be paved.

In addition to these emergency access roads, an approximately 20-foot-wide road would extend through the proposed California Exhibit, passing by the California Interpretive Center and leading to the secondary emergency vehicle access road. The road would widen to a minimum of approximately 30 feet in front of the California Interpretive Center. Therefore, the proposed Master Plan amendment area would be well-served by emergency access routes, and no new emergency access facilities (beyond those already proposed) would be required.

**Risk Reduction Measures.** The proposed Master Plan amendment would be subject to **SCA-BIO-15**, **SCA-SERVICES-2**, and **SCA-SERVICES-3**, which require the preparation and implementation of a Vegetation Management Plan and Fire Safety Phasing Plan, and the use of a mechanism to minimize accidental ignition during the construction period. In addition, the Oakland Wildfire Prevention District provides fire reduction activities in the area that include inspection of properties to ensure defensible space around structures is adequate; the reduction of roadside fuel; the use of goats to reduce hazardous fuel; public outreach and education; and patrols on days when fire risk is high. These measures, combined with the Standard Conditions of Approval required by the City, would ensure that the impact of the buildout of the amended



Master Plan on Fire Department services would be less-than-significant and that no new Fire Department facilities would be required to serve the amended Master Plan.

**Police Services.** The proposed Master Plan amendment would not result in increased demand for police services beyond that identified in the 1998 MND and would not create a need for new Oakland Police Department facilities (Melara 2010b).

With the buildout of the amended Master Plan, the zoo would experience an annual increase in attendance of approximately 150,000 visitors in the first year of operation (2015-2016) of the California Exhibit, with an estimated total of 750,000 annual visitors; then, over time, the zoo would experience a gradual decrease in annual attendance leading to an estimated stabilized attendance of 700,000 visitors in 2035 (Hausrath Economics Group 2010; see **Appendix D**). In addition, the buildout of the amended Master Plan would increase the number of employees by approximately 30 persons. A small percentage of these visitors and employees could require police services if crimes or other emergency incidents occur at the Oakland Zoo. However, the buildout of the amended Master Plan would consist of new uses that are not expected to be significant generators of crime, or otherwise require substantial increases in service by the Oakland Police Department (unlike, for instance, a large retail facility).

The less-than-significant impact of the proposed Master Plan amendment on police services would be further reduced through the continued provision of a private security force at the Oakland Zoo. This private security force (currently consisting of seven security personnel and operating 24 hours a day, seven days a week) would be able to provide a first response to minor criminal activities of the type that could occur at the Oakland Zoo, thus reducing the need for immediate involvement by the Oakland Police Department. In addition, the proposed perimeter fence would be designed to reduce the potential for animal escape, further reducing the need for police involvement associated with the need for animal capture. Therefore, no new Police Department facilities would be required to serve the amended Master Plan.

The Police Department has indicated that the access roads included in the proposed Master Plan amendment would be acceptable, and the buildout of the amended Master Plan would not interfere with emergency response or evacuation plans. As a routine matter, the City would require construction contractors to work with the department's Special Events Unit to coordinate additional police presence during construction, as necessary (Melara 2010a).

**Other Public Facilities.** The impacts of the proposed Master Plan amendment on other public facilities are addressed below and in **Section 3.7, Hydrology and Water Quality**, and **Section 3.8, Land Use, Recreation and Planning**. Since the buildout of the amended Master Plan would not include housing and would not create a residential population, it would not result in impacts on public schools.

**Summary.** The buildout of the amended Master Plan would not create a need for new or expanded fire protection or police facilities, and therefore its impact would be less than significant. Compared to the approved Master Plan evaluated in the 1998 MND, the proposed Master Plan amendment would not create a new significant impact or increase the severity of impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) Would the project exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board?**

The buildout of the amended Master Plan would not exceed the wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board (RWQCB), as City of Oakland sewage collection facilities and the East Bay Municipal Utility District (EBMUD) wastewater treatment plant would have adequate capacity to serve the amended Master Plan after implementation of **SCA-SERVICES-4** which requires upgrades to the sanitary sewer system, if deemed necessary. EBMUD anticipates that the wastewater treatment plant and interceptor system would have adequate dry weather capacity to treat wastewater flows from the amended Master Plan (Rehnstrom 2010).

**Estimated Wastewater Generation.** The proposed Veterinary Medical Hospital and California Exhibit would generate an estimated 1.5 million gallons of wastewater per year and an estimated peak wet weather infiltration and inflow of 6.6 million gallons per year for a total estimated wastewater generation of 8.1 million gallons per year (Aliquot 2010). With construction of the proposed on-site wastewater collection system described below (and required infrastructure upgrades), the City of Oakland sanitary sewer system and EBMUD wastewater treatment plant could handle this additional flow.

**Requirements Ensuring Adequate Wastewater Treatment Capacity.** The Oakland Zoo is located in Subbasin 85-222 of the City's sanitary sewer system. With implementation of **SCA-SERVICES-4** (Stormwater and Sewer), which would require the Oakland Zoo to fund any necessary sewer infrastructure improvements, including mechanisms to control increases in infiltration/inflow, increases in wastewater generated by the buildout of the amended Master Plan could be accommodated. This condition also includes the payment of sewer mitigation fees required by the City's Public Works Agency. EBMUD would also assess a wastewater capacity fee that would reflect the cost of providing wastewater treatment capacity to the buildout of the amended Master Plan (Rehnstrom 2010). Therefore, improvements necessary to ensure the subbasin would have adequate capacity to accommodate wastewater generated by the buildout of the amended Master Plan would be required and funded as part of **SCA-SERVICES-4** and fees collected by the City and EBMUD.

Although EBMUD's main wastewater treatment plant (MWWTP) has adequate dry weather capacity to treat wastewater generated by development projects within EBMUD's service area (annual average flow into the MWWTP is 75 mgd and the plant provides secondary treatment for up to 168 mgd and primary treatment for up to 320 mgd), inadequate capacity exists during wet weather events. As discussed in **Subsection 3.10.4.4** above, the issue of inadequate wet weather capacity has been particularly critical since 2009, when the RWQCB issued an order prohibiting further discharges from EBMUD's wet weather facilities. Previously, these facilities treated wastewater during wet weather events that the MWWTP was unable to treat. EBMUD is currently conducting extensive flow modeling and hydraulic monitoring to determine the level of flow reduction that will be needed to comply with the RWQCB order. In the meantime, EBMUD is instructing lead agencies in the process of reviewing development projects to require such projects to implement the following improvements: (1) replace or rehabilitate existing sanitary sewer collection systems, including lateral sewer lines, to reduce infiltration and inflow; and (2) ensure that any new wastewater collection systems, including lateral sewer lines, are constructed to prevent infiltration and inflow to the maximum extent feasible. This approach is outlined in the Sewer System Management Plan, which was adopted by EBMUD on April 14, 2009. These requirements, which are expected to be imposed uniformly on projects in the EBMUD service area, are expected to reduce the impact of development projects on wastewater discharges and wastewater facilities to a less-than-significant level. Therefore, the amended Master Plan would not result in an exceedance of San Francisco Bay RWQCB water quality standards.

**Proposed Wastewater Collection System.** The amended Master Plan would be connected to the City of Oakland's sanitary sewer, and sewage would be treated at the EBMUD wastewater treatment plant.

The proposed Veterinary Medical Hospital and California Exhibit would be served by a proposed eight-inch private sanitary sewer main that would extend from the existing 8-inch main at the end of Stella Street through the parking lot to the proposed Veterinary Medical Hospital. From there, the eight-inch main would extend northeast up to the California Interpretive Center. Due to topography in the California Exhibit area, some of the animal holding buildings would be served by a force main. This force main would convey wastewater from several night houses to the eight-inch gravity main at the California Interpretive Center. From there, wastewater would flow by gravity past the Veterinary Medical Hospital and on to the existing main at the end of Stella Street. These collector facilities would be adequately sized and would not be expected to result in releases of untreated wastewater under normal operating conditions.

The overnight camping area would have composting toilets and would not be connected to the City's sewer system. To reduce sewage generation, low-flow fixtures would be installed in the Veterinary Medical Hospital, the California Interpretive Center, and other buildings in the California Exhibit.

Animal enclosures and night houses would be washed down daily into the sanitary sewer system. Zoo personnel would use limited water to wash down areas; solids would be hauled to composting stations (Aliquot 2010).

**Summary.** The buildout of the amended Master Plan would not exceed the wastewater treatment requirements of the San Francisco Bay RWQCB, and therefore its impact would be less than significant. Compared to the approved Master Plan evaluated in the 1998 MND, the proposed Master Plan amendment would not create a new significant impact or increase the severity of impacts in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

**c) Would the project require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects?**

As discussed in more detail in **Section 3.7, Hydrology and Water Quality**, the proposed Master Plan amendment would allow for construction of on-site storm drain facilities that would be designed to regulate drainage flow. The facilities would include a detention basin located east of the proposed Veterinary Medical Hospital and storm drain pipelines extending from the detention basin up the service road to the California Exhibit. Drainage from the California Exhibit would be piped to small detention areas and released into swales with energy dissipaters at pipe ends. The proposed drainage system is designed to comply with City of Oakland standards and specifications, as well as water quality provisions of the Clean Water Act and the Alameda Countywide Clean Water Program.

The proposed new detention basin, storm drain pipelines, and swales provided for by the Master Plan amendment would not result in significant environmental impacts. The development of this infrastructure would result in minor ground disturbance and temporary construction-period impacts on water quality (e.g., increased sedimentation), but these impacts would be reduced to less-than-significant levels with implementation of **SCA-SERVICES-4**, which requires Best Management Practices to be implemented at construction sites to reduce adverse effects on water quality. These Best Management Practices would likely include the installation of materials and features such as hay bales and erosion-control fabrics that are designed to reduce the release of sedimentation into stormwater runoff. (See further discussion in **Section 3.7, Hydrology and Water Quality**.)

The environmental impacts of the proposed on-site storm drain facilities are further evaluated in **Section 3.7, Hydrology and Water Quality**, as part of the overall review of the proposed Master Plan amendment. The buildout of the amended Master Plan would not result in significant new

impacts due to construction of the proposed new on-site storm drain facilities. (See further discussion in **Section 3.7, Hydrology and Water Quality.**)

**Impact:** Less-than-significant

**Mitigation:** None required

**d) Would the project exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects?**

The buildout of the amended Master Plan would not exceed water supplies available from existing entitlements and resources, or require or result in construction of new or expanded water facilities that could cause significant effects. Existing EBMUD water entitlements and resources would be adequate to serve the amended Master Plan, and no new or expanded water supply facilities would be needed. New water facilities would be limited to the on-site water system proposed as part of the Master Plan amendment. The proposed Master Plan amendment would not result in significant impacts on water supplies or significant impacts due to construction of water facilities.

**Estimated Water Demand.** The buildout of the amended Master Plan would generate an estimated increase in water demand of seven million gallons of domestic water per year. This would include approximately 1.5 million gallons per year for the increase in visitors and staff, and approximately 5.5 million gallons per year for irrigation, night house washing and pathway cleaning (Rosean Del Bello 2011). EBMUD is the proposed source of all water needed to serve the domestic, irrigation, and cleaning needs.

EBMUD anticipates sufficient supply to serve this demand and would serve the demand using existing water supply and treatment facilities (Rehnstrom 2010). EBMUD's water demand projections, as published in the 2005 Urban Water Management Plan, accounted for water demands associated with the 1998 Oakland Zoo Master Plan. EBMUD has issued a "will-serve" letter for the proposed Master Plan amendment, indicating that "ample potable water service is available for both domestic use and fire protection to the subject property from existing facilities which are serviced and maintained by East Bay Municipal Utility District" (EBMUD 2010c). No additional water facilities beyond the on-site water system described below would be needed to serve the amended Master Plan.

The buildout of the amended Master Plan is expected to be fully operational in 2015. The system-wide demand for water in EBMUD's service area is evaluated and planned for in the EBMUD 2005 Urban Water Management Plan. According to the 2005 Urban Water Management Plan, EBMUD projects that water demand will be approximately 226 mgd in 2015 (an increase from the

current demand of approximately 181 mgd), taking into account the implementation of planned water recycling and conservation programs.

While the demand for water in 2015 could be accommodated by EBMUD's water rights during normal and above-normal water years, these water rights would not be adequate to satisfy demand during dry years. In 2015, it is expected that in the third year of a three-year drought approximately four mgd of supplemental water supply would be required to meet demand in the EBMUD service area. To address this shortfall, in October 2009 EBMUD adopted an updated long-term Water Supply Management Program 2040, which would provide for additional water conservation efforts, aggressive water recycling efforts, water rationing, and the development of additional water supplies such that demand in the service area could be satisfied during dry years. In addition, development projects within the EBMUD service area would be required to comply with City ordinances and policies regarding water supply, as well as water conservation measures, and wherever feasible, participate in water recycling programs established by EBMUD to address the effects of a severe drought. Therefore, it is expected that EBMUD would be able to meet the demand for water generated by the buildout of the amended Master Plan without the construction of new water supply facilities or the expansion of existing facilities.

In accordance with the City's recycled water ordinance, the Oakland Zoo would coordinate with EBMUD to confirm the feasibility of supplying recycling water to the Master Plan area. The Oakland Zoo would also be required to comply with EBMUD water efficiency measures. (See **Subsection 3.10.3.3** above.)

**Proposed Water System.** Water service would be extended to the proposed Master Plan amendment area from the existing 16-inch EBMUD water main in the upper parking lot above the existing Administration Building. This water main would serve the proposed Veterinary Medical Hospital and California Exhibit, providing both domestic and emergency water. The proposed on-site water system consists of the following:

- *A new two-inch domestic water meter* that would connect to the existing 16-inch EBMUD main in the existing upper parking lot (below the proposed Veterinary Medical Hospital). The new water meter would replace an existing two-inch meter at Hellman Street, which would be removed. Water service would be from Zone B3A, which serves elevations 325 to 500 feet. Domestic water from the new service location would serve the Veterinary Medical Hospital directly and be pumped to the California Exhibit, which lies above Zone B3A.
- *A pressurized pumping system* to be located in a proposed pump house just north of the proposed Veterinary Medical Hospital. The pumping system would distribute water to the California Exhibit. The pump house would be approximately 30 feet by 20 feet by 15 feet in dimension and would contain pumps for domestic water service (including landscaping) and emergency water service.
- *A new eight-inch emergency water line* that would connect to the existing 16-inch EBMUD main at the same location as the new domestic water meter. This line would provide emergency

water for the proposed Veterinary Medical Hospital and would extend northeast to serve the California Exhibit.

The environmental impacts of the proposed on-site water facilities are evaluated throughout this document as part of the overall review of the proposed Master Plan amendment. The proposed Master Plan amendment would not result in significant impacts due to construction of the proposed new on-site water facilities.

**Need for Water Supply Assessment.** As discussed in **Subsection 3.10.3.4** above, Senate Bill (SB) 610 requires local water providers to conduct a water supply assessment for projects proposing more than 500 housing units, 250,000 square feet of commercial office space (or more than 1,000 employees), a shopping center or business establishment with more than 500,000 square feet (or more than 1,000 employees), or equivalent usage.

A typical housing unit generates a demand for approximately 1 acre-foot of water per year. The estimated domestic water demand for the buildout of the amended Master Plan – approximately 21.5 acre-feet per year – would therefore equal the demand generated by approximately 22 housing units. Since the water demand would be considerably less than that generated by 500 housing units, no water supply assessment is required under SB 610. EBMUD has confirmed this conclusion (Rehnstrom 2010).

**Summary.** The buildout of the amended Master Plan would not exceed available water supplies or create a need for new or expanded water facilities, and therefore its impact would be less-than-significant. Compared to the approved Master Plan evaluated in the 1998 MND, the proposed Master Plan amendment would not create a new significant impact or increase the severity of impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

**e) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects?**

As discussed under **Criterion b** above, the City of Oakland sanitary sewer system and EBMUD wastewater treatment plant could handle additional flow generated by the buildout of the amended Master Plan. The Oakland Zoo is located in Subbasin 85-222. The buildout of the amended Master Plan would exceed the growth assumptions for the subbasin and therefore could result in overflows that would not be adequately treated (and thus would exceed the

capacity of the sanitary sewer collection and treatment system). However, the buildout of the amended Master Plan would be subject to **SCA-SERVICES-4**, which would require the Oakland Zoo to construct any necessary sewer infrastructure improvements, including mechanisms to control increases in infiltration/inflow. This condition also includes the payment of sewer mitigation fees required by the City's Public Works Agency. EBMUD would also assess a wastewater capacity fee that would reflect the cost of providing wastewater treatment capacity to the amended Master Plan (Rehnstrom 2010). Therefore, improvements necessary to ensure the subbasin has adequate capacity to accommodate wastewater generated by the amended Master Plan would be required and funded as part of **SCA-SERVICES-4** and fees collected by the City and EBMUD.

Although EBMUD's main wastewater treatment plant (MWWTP) has adequate dry weather capacity to treat wastewater generated by development projects within EBMUD's service area (annual average flow into the MWWTP is 75 mgd and the plant provides secondary treatment for up to 168 mgd and primary treatment for up to 320 mgd), inadequate capacity exists during wet weather events. As discussed in **Subsection 3.10.4.4** above, the issue of inadequate wet weather capacity has been particularly critical since 2009, when the RWQCB issued an order prohibiting further discharges from EBMUD's wet weather facilities. Previously, these facilities treated wastewater during wet weather events that the MWWTP was unable to treat. EBMUD is currently conducting extensive flow modeling and hydraulic monitoring to determine the level of flow reduction that will be needed to comply with the RWQCB order. In the meantime, EBMUD is instructing lead agencies in the process of reviewing development projects to require such projects to implement the following improvements: (1) replace or rehabilitate existing sanitary sewer collection systems, including lateral sewer lines, to reduce infiltration and inflow and (2) ensure that any new wastewater collection systems, including lateral sewer lines, are constructed to prevent infiltration and inflow to the maximum extent feasible. Such improvements are required as part of the City's **SCA-SERVICES-4**. EBMUD's approach is outlined in the Sewer System Management Plan, which was adopted by EBMUD on April 14, 2009. These requirements, which are expected to be imposed uniformly on projects in the EBMUD service area, are expected to reduce the impact of development projects on wastewater discharges and wastewater facilities to a less-than-significant level. Therefore, the proposed Master Plan amendment would not exceed the capacity of wastewater collection and treatment facilities, or otherwise require the construction or expansion of wastewater treatment facilities.

**Summary.** Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required



**f) Would the project be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects?**

The amended Master Plan would be served by landfills with sufficient permitted capacities to accommodate the solid waste disposal needs of the proposed development and would not require or result in construction of new or expanded landfill facilities. The buildout of the amended Master Plan therefore would not result in significant impacts due to the need for new or expanded landfills.

**Construction Waste.** The buildout of the amended Master Plan would generate construction waste and debris. Construction-generated waste would be removed from the site and disposed of primarily at the Vasco Road Landfill, which is estimated to have sufficient capacity through approximately 2019 (CIWMB 2010b).

The proposed Master Plan amendment would be subject to **SCA-SERVICES-1**, which requires the project applicant to submit a Construction and Demolition Waste Reduction and Recycling Plan (WRRP) for review and approval by the Public Works Agency. The WRRP must specify the methods by which construction and demolition waste generated by the proposed project would be diverted from landfill disposal in accordance with City requirements. Compliance with the WRRP would require at least 50 percent of all construction and demolition debris generated by the buildout of the amended Master Plan to be diverted from landfills. Therefore, the buildout of the amended Master Plan would not contribute a substantial amount of waste to the Vasco Road Landfill and could be accommodated by the landfill.

**Waste from Ongoing Operations.** The buildout of the amended Master Plan would generate a net increase of 29.3 tons of waste per year that would require disposal at landfills. This waste would include garbage generated by new zoo attendees and employees (ENVIRON 2010, Table 2.13, GHG report; see **Appendix H**).

The Altamont Landfill has a permitted maximum daily disposal of 11,500 tons per day, approximately 24 percent of which was attributable to the City of Oakland in 2007 (CIWMB 2010a; City of Oakland 2009). The waste generated by the buildout of the amended Master Plan (approximately 29.3 tons per year, or approximately 0.8 ton per day) would represent far less than one percent of the maximum disposal permitted at this facility. The landfill has adequate permitted capacity to accommodate the increase in solid waste disposal from the buildout of the amended Master Plan.

In addition, the implementation of **SCA-SERVICES-1** (Waste Reduction and Recycling) would further reduce the less-than-significant effects of the Master Plan amendment on landfill capacity. **SCA-SERVICES-1** requires the preparation of an Operational Diversion Plan to

identify how the project would comply with the City's Recycling Space Allocation Ordinance (Oakland Municipal Code Chapter 17.118) and specify the methods by which the project would meet the required diversion of solid waste generated by project operation. Implementation of the Operational Diversion Plan would be expected to reduce operational-period waste generation associated with the proposed Master Plan amendment by at least 75 percent, or 22 tons, in compliance with AB 939.

The zoo's existing solid waste reduction strategies that would continue to be implemented as part of the Master Plan amendment include (1) the sorting of materials such that recyclable or compostable materials are diverted from the landfill; (2) the composting of animal manure, food waste, and landscaping clippings, and the use of compost for on-site landscaping activities; and (3) the collection of yard waste and vegetable matter from off-site residences, and the use of these materials to feed elephants. These strategies would further reduce the less-than-significant impact of the buildout of the amended Master Plan on landfill capacity.

**Summary.** The buildout of the amended Master Plan would not require or result in construction of landfill facilities or expansion of existing facilities, and therefore its impact would be less than significant. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

**g) Would the project isolate applicable federal, state, and local statutes and regulations related to solid waste?**

Because the buildout of the amended Master Plan would be subject to the Oakland Zoo's ongoing waste diversion activities, in addition to City construction- and operation-period waste-diversion requirements, the proposed Master Plan amendment would not impede the City of Oakland's ability to meet the waste diversion requirements of AB 939 (the California Integrated Waste Management Act) (see **Subsection 3.10.3.5** above) or the Alameda County Waste Reduction and Recycling Initiative (see **Subsection 3.10.3.6** above), or cause the City to violate other applicable federal, state, and local statutes and regulations related to solid waste. The Oakland Zoo's existing solid waste handling and management program, which includes sorting, recycling, and composting, would be employed at the proposed California Exhibit and other components of the amended Master Plan. As already noted, the buildout of the amended Master Plan would be subject to **SCA-SERVICES-1**, which requires the project applicant to submit a Construction and Demolition Waste Reduction and Recycling Plan (WRRP) for review and approval by the Public Works Agency. The WRRP must specify the methods by which construction and demolition waste generated by the proposed project would be diverted from

landfill disposal in accordance with City requirements and would be expected to divert at least 50 percent of construction-period waste from landfills. Additionally, as described above, **SCA-SERVICES-1** requires an Operational Diversion Plan.

**Summary.** The impact of the buildout of the amended Master Plan on applicable regulations related to solid waste would be less-than-significant. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

**h) Would the project violate applicable federal, state and local statutes and regulations relating to energy standards?**

The proposed Master Plan amendment would not violate statutes or regulations relating to energy standards. The buildout of the amended Master Plan would be required to comply with the standards of Title 24 of the California Code of Regulations (see **Subsection 3.10.3.8** above). In addition, the proposed Master Plan amendment includes the following provisions for reducing electrical and natural gas demand: (1) use of energy-saving construction materials and techniques, (2) design of the proposed Veterinary Medical Hospital to meet LEED (Leadership in Energy and Environmental Design) standards, and (3) provision of “green roofs” on several of the proposed animal night houses.

The design of the Veterinary Medical Hospital in accordance with LEED standards and the use of green roofs on the proposed animal night houses would promote the green design initiatives outlined in the City of Oakland Draft Energy and Climate Action Plan and would help to achieve the City’s goals to reduce electricity consumption in the City by 32 percent and reduce natural gas consumption by 15 percent.

**Summary.** The impact of the buildout of the amended Master Plan on applicable energy standards would be less-than-significant. (See **Section 3.5, Global Climate Change**, for a detailed discussion of energy consumption resulting from the proposed Master Plan amendment.) Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

- i) **Would the project result in a determination by the energy provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects?**

PG&E has issued a "will-serve" letter indicating that gas and electric service is available to serve the amended Master Plan (Dowell 2010). At this stage, the only new or expanded energy facilities that have been identified as necessary to serve the amended Master Plan are on-site electrical and gas service connections proposed by the Master Plan amendment. These connections would not result in significant new impacts.

**Estimated Electrical and Gas Service Demands.** The proposed Veterinary Medical Hospital and California Exhibit would create a demand for approximately 756,919 kilowatt hours of electricity per year and approximately 2,755,531 kilo British Thermal Units (kBtu) of natural gas per year. (See **Section 3.5, Global Climate Change**, for additional discussion of energy use.) As described above, the proposed Master Plan amendment would incorporate green design strategies, including the use of LEED strategies to reduce energy demand, and the use of green roofs for the animal enclosures.

**Proposed Electrical and Gas Service Connections.** Under the proposed Master Plan amendment, electrical service would be provided through a connection to the existing electrical pole in the lower parking lot of the zoo. Primary three-phase electrical service would be tapped from this pole. Electrical lines would be underground in a proposed joint trench, connecting to transformers serving the proposed Veterinary Medical Hospital and nearby facilities (e.g., the water pump house) and then extending to the proposed California Exhibit, where transformers would be installed to serve the gondola people-moving system, the California Interpretive Center, and other exhibit areas.

Gas service would be provided through the existing two-inch gas distribution line from Stella Street. A gas line would be installed in the proposed joint trench, extending to the proposed Veterinary Medical Hospital and California Exhibit.

At this stage, the only new energy facilities that have been identified as necessary to serve the buildout of the amended Master Plan are the on-site electrical and gas service connections proposed by the Master Plan amendment. PG&E would evaluate the need for any additional improvements at the time that it reviews final design plans.

**Summary.** PG&E has indicated that gas and electric service is available to serve the amended Master Plan (Dowell 2010). At this stage, the only new or expanded energy facilities that have been identified as necessary to serve the buildout of the amended Master Plan are the on-site electrical and gas service connections proposed by the Master Plan amendment. The

environmental impacts of these on-site facilities are evaluated as part of the overall analysis of the proposed Master Plan amendment throughout this SMND/Addendum. The impact of the buildout of the amended Master Plan would be less-than-significant. Compared to the approved Master Plan evaluated in the 1998 MND, the buildout of the amended Master Plan would not create a new significant impact or increase the severity of impact in relation to this criterion.

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.10.6 CUMULATIVE IMPACTS

The geographic scope for assessing the potential for cumulative public services and utilities impacts consists of the service areas of the agencies providing services and utilities to the Master Plan area. The following discussion evaluates the potential for cumulative impacts.

#### 3.10.6.1 Fire Protection

For fire protection service, the geographic scope for assessing cumulative impacts is the area within the Oakland city limits, which is served by the Oakland Fire Department, and in particular the Oakland Wildfire Prevention Assessment District, which was established to reduce the risk of wildfire in the Oakland Hills (and within which the Master Plan area is located). The buildout of the amended Master Plan, in conjunction with other past, present, and reasonably foreseeable future projects, could result in a cumulative increase in demand for fire protection service. The buildout of the amended Master Plan would increase attendance at the zoo, increase employment by approximately 30 persons, and result in the development of new structures in an area that is prone to wildfires. However, as discussed in the above project-specific analysis, service demand from the buildout of the amended Master Plan would not result in a significant impact on Oakland Fire Department services or create the need for new or expanded facilities.

The buildout of the amended Master Plan would include emergency roads that would allow for adequate access of emergency vehicles. A 20-foot-wide road that would extend through the proposed California Exhibit would also allow for enhanced emergency access to the site. The proposed Master Plan amendment would be subject to **SCA-SERVICES-2**, **SCA-SERVICES-3**, and **SCA-BIO-15**, which require the preparation and implementation of a Vegetation Management Plan and Fire Safety Phasing Plan, and the use of a mechanism to minimize accidental ignition during the construction period. These measures would reduce the contribution of the buildout of the amended Master Plan to cumulative impacts on Fire Department services to a less-than-significant level. Other projects in the City have been and would also be subject to similar measures.

Additionally, management activities within the Oakland Wildfire Prevention Assessment District are intended to reduce the risk of fire associated with past, present, and future development in the Oakland Hills. Fire reduction activities that are undertaken in the area include inspection of properties to ensure defensible space around structures is adequate; the reduction of roadside fuel; the use of goats to reduce hazardous fuel; public outreach and education; and patrols on days when fire risk is high. The fire reduction program instituted in the District includes follow-up inspections and the monitoring of fuel reduction activities, and lasts all year. These measures would not eliminate the risk of fire in the Oakland Wildfire Prevention Assessment District but would reduce the demands on Fire Department services and reduce the need for new facilities.

Based on Fire Department budget projections, no new facilities are planned in the foreseeable future. The Fire Department expects to meet the demand from cumulative development through existing facilities.

Overall, the effect of the buildout of the amended Master Plan on fire protection service, in combination with other past, present, and foreseeable projects, would be less than significant. Neither the original Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant impacts on fire protection service. Thus, the buildout of the amended Master Plan would not result in or contribute to any significant cumulative fire protection service impacts.

#### **3.10.6.2 Police**

For police service, the geographic scope for assessing cumulative impacts is the area within the Oakland city limits, which is served by the Oakland Police Department. The buildout of the amended Master Plan, in conjunction with other past, present, and reasonably foreseeable future projects, could result in a cumulative increase in demand for police service. However, as discussed in the above project-specific analysis, demand from the buildout of the amended Master Plan would not result in a significant impact on Oakland Police Department services or create the need for new or expanded facilities.

The buildout of the amended Master Plan would increase attendance at the Oakland Zoo and add 30 new employees. A small percentage of these visitors and employees could require police services if crimes or other emergency situation occur at the Oakland Zoo. However, the buildout of the amended Maser Plan would consist of new uses that are not expected to be significant generators of crime, or otherwise require substantial increases in service by the Oakland Police Department. The less-than-significant impact of the buildout of the amended Master Plan on police services would be further reduced through the continued provision of a private security force at the Oakland Zoo. This private security force – which operates 24 hours a day, seven days a week – would be able to provide a first response to minor criminal activities of the type that

could occur at the Oakland Zoo, thus reducing the need for immediate involvement by the Oakland Police Department.

Cumulative development in the city would generally be expected to increase demand for police services, although some new development in the city (e.g., that involving the development of infill parcels in urban areas) could have beneficial effects on police services if it increases informal surveillance of areas prone to criminal activities. In August 2010, the Oakland Police Department released a working draft of its Strategic Plan, which outlines ways in which the Police Department plans to provide service to the city's residential and employee population, in the context of a high workload and budget constraints. The Strategic Plan identifies several ways to increase the efficiency of the Police Department, including through the expansion of partnerships with other law enforcement agencies; the use of more sophisticated intelligence-gathering mechanisms; development of innovative ways to reduce violent crime, based on academic and other research; the effective implementation of community policing; and upgrading critical Police Department facilities, such as the crime lab. The Strategic Plan would thus extend the benefits of the Police Department's limited resources and enable the Police Department to more effectively serve cumulative development without the immediate need to develop more Police Department facilities (City of Oakland Police Department 2010). Thus, cumulative development is not expected to result in the need for the construction of new facilities in the foreseeable future. The impact of cumulative development on the Oakland Police Department would also be reduced through continued review of specific development projects by the Police Department to ensure that projects are designed to reduce the potential for criminal activity.

In the context of standard development review practices, citywide plans to increase the efficiency of the Police Department, the nature of the proposed uses at the Oakland Zoo, and the private security provided at the zoo, the buildout of the amended Master Plan would not result in or contribute considerably to any significant cumulative impacts on existing Oakland Police Department facilities or the need for new facilities. Neither the original Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant impacts on police service. Thus, the buildout of the amended Master Plan would not result in or contribute to any significant cumulative police service impacts.

### **3.10.6.3 Water**

For water service, the geographic scope for assessing cumulative impacts is the EBMUD service area. The buildout of the amended Master Plan, in conjunction with other past, present, and reasonably foreseeable future projects, could result in a cumulative increase in demand for water service. However, as discussed in the above project-specific analysis, demand from the buildout of the amended Master Plan would not exceed available water supplies or require construction of new or expanded water facilities.

The buildout of the amended Master Plan would increase demand for domestic water by an estimated seven million gallons per year. This estimate includes the use of low-flow plumbing fixtures and evapotranspiration-based irrigation controllers. EBMUD has indicated that sufficient water supplies exist to accommodate this demand for water. The landscaping that would be planted as part of the proposed Master Plan amendment would include native trees, shrubs, and grasses that generally require low volumes of water after an initial transplant period.

The cumulative demand for water in EBMUD's service area is evaluated and planned for in the EBMUD 2005 Urban Water Management Plan. According to the 2005 Urban Water Management Plan, EBMUD estimates that water demand will increase to approximately 232 mgd by 2030 (from the current demand of 181 mgd), taking into account the implementation of planned water recycling and conservation programs. While the demand for water in 2030 could be accommodated by EBMUD's water rights during normal and above-normal water years, these water rights would not be adequate to satisfy demand during dry years. To address this shortfall, in October 2009, EBMUD adopted an updated long-term Water Supply Management Program 2040, which would provide for additional water conservation efforts, aggressive water recycling efforts, water rationing, and the development of additional water supplies such that demand in the service area could be satisfied during dry years. In addition, all cumulative projects would be required to comply with City ordinances and policies regarding water supply, as well as water conservation measures, and wherever feasible, participate in water recycling programs established by EBMUD to address effects of severe drought. Therefore, the cumulative impact of past, present, and reasonably foreseeable projects, including the buildout of the amended Master Plan, on water supply would be less than significant. Additionally, the water conservation features of the Master Plan amendment (low-flow plumbing, landscape plans, and irrigation system features) would reduce its contribution to any impact to a less-than-significant level.

Neither the original Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant impacts on water service. Moreover, the buildout of the amended Master Plan amendment would not result in or contribute to any significant cumulative water service impacts.

#### **3.10.6.4 Wastewater**

For wastewater service, the geographic scope for assessing cumulative impacts is the City of Oakland (for wastewater collection) and the EBMUD service area (for wastewater treatment). The buildout of the amended Master Plan, in conjunction with past, present, and reasonably foreseeable future projects, could result in a cumulative increase in wastewater generation, resulting in increased demand on wastewater collection and treatment facilities. However, it is not anticipated that the wastewater demands of the buildout of the amended Master Plan combined with past, present, and reasonably foreseeable future projects in Oakland would



exceed City or EBMUD capacity. All cumulative projects, including the buildout of the amended Master Plan, would be required to comply with the City's programs and ordinances designed to ensure adequate function and capacity of the sanitary sewer system.

The proposed Veterinary Medical Hospital and California Exhibit would generate an estimated 8.1 million gallons of wastewater per year. However, the proposed Master Plan amendment would be subject to **SCA-SERVICES-4**, which would require the Oakland Zoo to fund any necessary sewer infrastructure improvements, including mechanisms to control increases in infiltration/inflow. This condition also includes the payment of sewer mitigation fees required by the City's Public Works Agency. EBMUD would also assess a wastewater capacity fee that would reflect the cost of providing wastewater treatment capacity to the buildout of the amended Master Plan (Rehnstrom 2010). Therefore, improvements necessary to ensure the subbasin has adequate capacity to accommodate wastewater generated by the buildout of the amended Master Plan would be required and funded as part of **SCA-SERVICES-4** and fees collected by the City and EBMUD. Consequently, the proposed Master Plan amendment would not result in an exceedance of City or EBMUD wastewater handling capacity and would not result in a significant cumulative contribution to potential impacts on the capacity of the subbasin.

Other cumulative projects have been and would be subject to **SCA-SERVICES-4** and applicable wastewater fees. Therefore, cumulative development would not result in a significant cumulative impact on the capacity of the subbasin. Other subbasins in the EBMUD service area may also be at or near capacity, and cumulative projects could result in overflows. However, such projects have been and would be subject to similar measures requiring upgrades to sewer infrastructure and thus would not result in significant cumulative impacts. The buildout of the amended Master Plan would not affect or contribute to any potential impacts in other subbasins.

Although EBMUD's main wastewater treatment plant (MWWTP) has adequate dry weather capacity to treat wastewater generated by cumulative projects (annual average flow into the MWWTP is 75 mgd and the plant provides secondary treatment for up to 168 mgd and primary treatment for up to 320 mgd), inadequate capacity exists during wet weather events. This cumulative problem has been particularly critical since 2009, when the RWQCB issued an order prohibiting further discharges from EBMUD's wet weather facilities. Previously, these facilities treated wastewater during wet weather events that the MWWTP was unable to treat. EBMUD is currently conducting extensive flow modeling and hydraulic monitoring to determine the level of flow reduction that will be needed to comply with the RWQCB order. In the meantime, EBMUD is instructing lead agencies in the process of reviewing development projects to require such projects to implement the following improvements: (1) replace or rehabilitate existing sanitary sewer collection systems, including lateral sewer lines, to reduce infiltration and inflow; and (2) ensure that any new wastewater collection systems, including lateral sewer lines, are constructed to prevent infiltration and inflow to the maximum extent feasible. This approach is outlined in the Sewer System Management Plan, which was adopted by EBMUD on April 14,

2009. These requirements, which are expected to be imposed uniformly on projects in the EBMUD service area, are expected to reduce the cumulative impacts on wastewater discharges and wastewater facilities to a less-than-significant level. As described above, because similar infrastructure improvements would be required as part of the buildout of the amended Master Plan, the Master Plan amendment would not make a significant contribution to cumulative impacts on wastewater discharges or the overall wastewater system.

Overall, the effect of the buildout of the amended Master Plan on the need for new or expanded wastewater facilities, in combination with other past, present, and reasonably foreseeable projects, would be less than significant. Neither the original Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant impacts on wastewater service. Thus, buildout of the amended Master Plan would not result in or contribute to any significant cumulative wastewater service impacts.

#### **3.10.6.5 Storm Drainage**

In summary, **SCA-HYDRO-3** would require a post-construction stormwater management plan that will control stormwater generated from impervious surfaces developed as part of the buildout of the amended Master Plan. Stormwater would be retained on-site through the protection of open space within the proposed Master Plan amendment area and the development of small detention areas and swales. Therefore, the buildout of the amended Master Plan would not make a significant cumulative contribution to the need for new stormwater infrastructure. In addition, similar stormwater protection measures have been and would be required as part of other cumulative development projects. Therefore, the overall cumulative impact on stormwater drainage facilities would be less than significant and no new major stormwater facilities (or expanded facilities) are anticipated. Please **Section 3.7 Hydrology and Water Quality, Subsection 3.7.6**, for a discussion of cumulative hydrology and water quality impacts.

#### **3.10.6.6 Solid Waste**

For solid waste disposal service, the geographic scope for assessing cumulative impacts consists of the service areas of the Altamont Landfill and Vasco Road Landfill. The buildout of the amended Master Plan, in conjunction with past, present, and reasonably foreseeable future projects, could result in a cumulative increase in solid waste and debris generated by project construction and operations (e.g., through waste generated by new Oakland Zoo attendees and employees). However, comprehensive implementation of State and local waste reduction and diversion requirements and programs has and would continue to reduce the potential for exceeding existing capacities of the two landfills, which still have adequate capacity.

The buildout of the amended Master Plan would generate construction waste and debris. Construction-generated waste would be removed from the site and disposed of primarily at the

Vasco Road Landfill, which is estimated to have sufficient capacity through approximately 2019 (CIWMB 2010b). The proposed Master Plan amendment would be subject to **SCA-SERVICES-1**, which requires the project applicant to submit a Construction and Demolition Waste Reduction and Recycling Plan (WRRP) for review and approval by the Public Works Agency. The WRRP must specify the methods by which construction and demolition waste generated by the proposed project would be diverted from landfill disposal in accordance with City requirements. Compliance with the WRRP would require at least 50 percent of all construction and demolition debris generated by the buildout of the amended Master Plan to be diverted from landfills. Similar requirements have been and would be imposed on other cumulative development projects. Therefore, the buildout of the amended Master Plan would not result in a significant cumulative contribution to reduction in the capacity of the Vasco Road Landfill.

Waste from ongoing operations would be disposed of at the Altamont Landfill. The landfill has a permitted maximum daily disposal of 11,500 tons per day, approximately 24 percent of which was attributable to the City of Oakland in 2007 (CIWMB 2010a; City of Oakland 2009). The waste generated by the buildout of the amended Master Plan (approximately 29.3 tons per year, or approximately 0.8 ton per day) would represent far less than one percent of the maximum disposal permitted at this facility. The landfill has adequate permitted capacity to accommodate the increase in solid waste disposal from the buildout of the amended Master Plan and other cumulative development until 2029.

In addition, the implementation of Standard Conditions of Approval related to solid waste reduction and the continuation of waste reduction practices at the Oakland Zoo would further reduce the less-than-significant contribution of the Master Plan amendment to cumulative landfill capacity impacts. The proposed Master Plan amendment would be subject to **SCA-SERVICES-1**, which requires the preparation of an Operational Diversion Plan to identify how the project would comply with the City's Recycling Space Allocation Ordinance (Oakland Municipal Code Chapter 17.118) and specify the methods by which the project would meet the required diversion of solid waste generated by project operation. Implementation the Operational Diversion Plan would be expected to reduce operational-period waste generation associated with the proposed Master Plan amendment by at least 75 percent, in compliance with AB 939. Other cumulative development projects would be required to implement similar waste reduction measures, reducing the overall cumulative effect on landfill capacity.

The zoo's existing solid waste reduction strategies that would continue to be implemented as part of the Master Plan amendment include (1) the sorting of materials such that recyclable or compostable materials are diverted from the landfill; (2) the composting of animal manure, food waste, and landscaping clippings, and the use of compost for on-site landscaping activities; and (3) the collection of yard waste and vegetable matter from off-site residences, and the use of these materials to feed elephants. These strategies would further reduce the less-than-significant contribution of the proposed Master Plan amendment to cumulative landfill capacity impacts.

As a result, the effect of the buildout of the amended Master Plan on landfill capacity, in combination with other cumulative projects, would be less than significant. In addition, neither the original Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant impacts on solid waste disposal service. Thus, the buildout of the amended Master Plan would not result in or contribute to any significant cumulative solid waste disposal service impacts.

### **3.10.6.7 Electricity and Natural Gas**

For electrical and natural gas service, the geographic scope for assessing cumulative impacts is PG&E's northern and central California service area. Despite annual statewide increases in energy consumption, the net increased energy demand from the buildout of the amended Master Plan, combined with other past, present, and reasonably foreseeable future projects, would not result in a significant cumulative impact. Urbanized portions of City of Oakland are already served by gas and electricity infrastructure, and the net increased energy demand from reasonably foreseeable projects, relative to the regional service area, would be minimal and would not require expanded or new energy facilities as a direct result of project development (City of Oakland 2009).

In addition, PG&E, which provides energy to the Oakland Zoo and elsewhere in the East Bay, produces much of its energy from renewable sources and has plans in place to increase reliance on renewable energy sources. Of the energy provided to PG&E customers in 2009, almost 15 percent came from renewable resources. In 2009, 20.5 percent of energy provided to PG&E customers came from nuclear generation; 13 percent came from large hydroelectric facilities; and 14.4 percent came from renewable resources such as wind, geothermal, biomass, and small hydroelectric sources. In addition, PG&E has plans to increase the use of renewable power. For instance, PG&E purchases power from customers that install small-scale renewable generators (e.g., wind turbines or photovoltaic cells) up to 1.5 megawatts in size (PG&E 2010).

Because many agencies in California, like the City of Oakland, have adopted policies seeking increased use of renewable resources (and have established minimum standards for the provision of energy generated by renewable resources), it is expected that PG&E will continue to meet future demand for energy via a gradually increasing reliance on renewable resources, including small-scale sources such as photovoltaic panels and wind turbines, in addition to larger-scale facilities, such as wind farms. Therefore, although the buildout of the amended Master Plan and cumulative projects would be expected to increase the demand for energy-producing facilities, this increase in demand would likely be met through the development of renewable resources that would have fewer environmental effects than the development of new conventional gas- or coal-fired power plants.

In addition, the buildout of the amended Master Plan and all cumulative projects have been and would be required to comply with all standards of Title 24 of the California Code of Regulations. Therefore, the effect of the buildout of the amended Master Plan on energy services, in combination with other past, present, and foreseeable projects, would be less than significant. The contribution of the proposed Master Plan amendment to cumulative energy-related impacts would be further reduced through the incorporation of green design strategies, including the use of LEED strategies to reduce energy demand, and the use of green roofs on the animal enclosures. The Oakland Zoo is also located in close proximity to a dense urban center. Therefore, the amended Master Plan would also realize transportation-related energy savings compared to a similar project in a location at a distance from a major urban area.

In addition, neither the original Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant impacts on energy services. Thus, the buildout of the amended Master Plan would not result in or contribute to any significant cumulative energy service impacts.

### 3.10.7 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new public services or utilities impacts or a substantial increase in the severity of previously identified public services and utilities impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less than significant. This section identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.

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## 3.11 TRANSPORTATION AND CIRCULATION

This section evaluates potential transportation and circulation impacts of the buildout of the amended Master Plan. The analysis specifically considers whether the buildout of the amended Master Plan would result in new significant transportation and circulation impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. This section also discusses any pertinent new information or changes in circumstances that could result in new transportation and circulation significant impacts not identified in the 1998 MND or a substantial increase in the severity of previously identified impacts. Previously imposed mitigation measures from the 1998 MND are identified and, where appropriate, are clarified, refined, revised or deleted. This section also identifies the applicable provisions of the City's Conditions of Approval and whether or not any new mitigation measures are required.

### 3.11.1 PRIOR MND ANALYSIS AND CONCLUSIONS

#### 3.11.1.1 Prior 1998 MND Impact Findings

The transportation and circulation analysis included in the 1998 MND concluded that the approved Master Plan would result in a less-than-significant increase in vehicle traffic. The analysis addressed Master Plan-related vehicle trip generation, local traffic operations, proposed access and circulation improvements, and related safety issues. Master Plan-generated traffic was estimated based on the projected increase in zoo attendance, taking into consideration the new exhibits proposed in the Master Plan.

The 1998 MND concluded that future Master Plan-generated traffic during the PM peak hour would not have a measurable impact on off-site vehicle operations for the following reasons:

1. The zoo generally closes one hour prior to the weekday PM peak hour;
2. Proposed internal circulation changes would improve the distribution of exiting vehicles so that vehicles parked at the main parking lots would exit via the 106th Avenue / Malcolm Avenue / Zoo Drive intersection, and vehicles parked at the arboretum parking lot would exit via the Zoo Drive / Mountain Boulevard / Golf Links Road intersection; and
3. Local roadway improvements including the installation of traffic signals at the Golf Links Road / I-580 Ramps would improve traffic conditions near the site.

The 1998 MND also concluded that the proposed widening of Zoo Drive to allow for two-way traffic would improve internal circulation, as vehicles parked at the arboretum parking lot would no longer be required to drive up Zoo Drive and exit on Malcolm Avenue, thus reducing the number of vehicles exiting on Malcolm Avenue. Residents living within the vicinity of the 106th Avenue / Malcolm Avenue / Zoo Drive intersection voiced concerns about potential unsafe traffic conditions caused by excessive vehicle speeds on Malcolm Avenue. Changes were

proposed that would potentially reduce the amount of vehicles exiting the zoo onto Malcolm Avenue. The 1998 MND concluded that the problem of excessive vehicle speeds on Malcolm Avenue was an enforcement issue that could best be addressed by the City of Oakland.

The MND stated that pedestrian and bicycle activity was low and consisted primarily of visitors walking from their cars in the main parking lot to the zoo entrance. The repaving of the bicycle and pedestrian lane would improve conditions for all bicyclists and pedestrians destined for the zoo.

### **3.11.1.2 1998 MND Mitigation Measures**

The following mitigation measures were adopted:

- 26a) Construction traffic shall only use existing improved public roads. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment and is supplemented with SCA-TRANS-1 which addresses construction traffic and parking.)*
- 27a) To prevent heavy traffic from exiting the Zoo in one direction, traffic will be directed between Golf Links Road and 106<sup>th</sup> Avenue in order to balance the traffic flow. At no time will the Golf Links exit be closed to heavy traffic. *(NOTE: This mitigation measure is applicable to the proposed Master Plan amendment and is currently being implemented.)*

Subsequent to Master Plan approval, local roadway improvements including the installation of traffic signals at the Golf Links Road / I-580 Ramps have improved traffic conditions near the zoo entrance and the zoo completed circulation improvements that allow vehicles parked at the arboretum parking lot to safely exit via the Zoo Drive / Mountain Boulevard / Golf Links Road intersection. Additionally, signage has been installed at the upper parking lots to direct vehicles to exit the zoo from Zoo Drive onto Malcolm Avenue and 106th Avenue rather than exiting onto Golf Links Road.

### **3.11.2 STANDARD CONDITIONS OF APPROVAL**

Since City of Oakland approval of the Master Plan and adoption of the 1998 MND, the City has prepared Standard Conditions of Approval that apply to new development projects. The Standard Condition of Approval that relates to transportation and circulation and that would apply to the proposed Master Plan amendment is listed below. If the City approves the Master Plan amendment, this Condition of Approval would be adopted as a requirement of the Master Plan amendment and would ensure no significant impacts related to transportation and circulation would occur. As a result, the Condition of Approval is not listed as a mitigation measure.

## SCA-TRANS-1 Construction Traffic and Parking

### *Prior to the issuance of a demolition, grading or building permit*

The project applicant and construction contractor shall meet with appropriate City of Oakland agencies to determine traffic management strategies to reduce, to the maximum extent feasible, traffic congestion and the effects of parking demand by construction workers during construction of this project and other nearby projects that could be simultaneously under construction. The project applicant shall develop a construction management plan for review and approval by the Planning and Zoning Division, the Building Services Division, and the Transportation Services Division. The plan shall include at least the following items and requirements:

- a) A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes.
- b) Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur.
- c) Location of construction staging areas for materials, equipment, and vehicles at an approved location.
- d) A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. Planning and Zoning shall be informed who the Manager is prior to the issuance of the first permit issued by Building Services.
- e) Provision for accommodation of pedestrian flow.
- f) Provision for parking management and spaces for all construction workers to ensure that construction workers do not park in on street spaces.
- g) Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the applicant's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the City Building Inspector and/or photo documentation, at the applicant's expense, before the issuance of a Certificate of Occupancy.
- h) Any heavy equipment brought to the construction site shall be transported by truck, where feasible.
- i) No materials or equipment shall be stored on the traveled roadway at any time.

- j) Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion.
- k) All equipment shall be equipped with mufflers.
- l) Prior to the end of each work day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors.

### **SCA-TRANS-2 Parking and Transportation Demand Management**

#### ***Prior to issuance of a final inspection of the building permit***

The applicant shall submit for review and approval by the Planning and Zoning Division a Transportation Demand Management (TDM) plan containing strategies to reduce on-site parking demand and single occupancy vehicle travel. The applicant shall implement the approved TDM plan. The TDM shall include strategies to increase bicycle, pedestrian, transit, and carpools/vanpool use. All four modes of travel shall be considered. Strategies to consider include the following:

- a) Inclusion of additional bicycle parking, shower, and locker facilities that exceed the requirement
- b) Construction of bike lanes per the Bicycle Master Plan; Priority Bikeway Projects
- c) Signage and striping onsite to encourage bike safety
- d) Installation of safety elements per the Pedestrian Master Plan (such as cross walk striping, curb ramps, count down signals, bulb outs, etc.) to encourage convenient crossing at arterials
- e) Installation of amenities such as lighting, street trees, trash receptacles per the Pedestrian Master Plan and any applicable streetscape plan.
- f) Direct transit sales or subsidized transit passes
- g) Guaranteed ride home program
- h) Pre-tax commuter benefits (checks)
- i) On-site car-sharing program (such as City Car Share, Zip Car, etc.)
- j) On-site carpooling program
- k) Distribution of information concerning alternative transportation options
- l) Parking spaces sold/leased separately
- m) Parking management strategies; including attendant/valet parking and shared parking spaces

### 3.11.3 UPDATED REGULATORY SETTING

#### 3.11.3.1 Alameda County Congestion Management Agency Model

The Alameda County Congestion Management Agency (ACCMA) has recently updated its Countywide Transportation Demand model. The updated ACCMA Countywide Transportation Demand model traffic uses Association of Bay Area Governments (ABAG) Projections 2007 land use projections and reflects anticipated growth associated with future development in the area. The transportation evaluation presented in this section derives its cumulative forecasts (Year 2015 Baseline and Cumulative Year 2035 Baseline conditions) from the updated model.

#### 3.11.3.2 City of Oakland General Plan

Key applicable transportation- and circulation-related policies of the Oakland General Plan are discussed in **Subsection 3.11.5** below. These policies, along with other applicable transportation- and circulation-related policies, are also discussed in **Section 3.8, Land Use, Recreation and Planning**.

### 3.11.4 EXISTING CONDITIONS

The main access road to the Oakland Zoo is Zoo Drive, which extends generally in a north-south direction through the existing zoo site. To the north, Zoo Drive intersects Golf Links Road and becomes Mountain Boulevard. To the south, Zoo Drive becomes Sheldon Street and intersects Malcolm Avenue. Access to Interstate 580 is available via Golf Links Road immediately north of the zoo.

The following discussion reviews the intersections evaluated in this study, along with recent site access and circulation improvements and existing transit, pedestrian, bicycle, and parking conditions. (See **Subsection 3.11.5.2** below for discussion of existing intersection operations.)

#### 3.11.4.1 Study Intersections

The Master Plan study conducted in 1998 included a qualitative analysis of PM peak hour traffic at the Zoo Drive / Mountain Boulevard / Golf Links Road intersection. For the purposes of the current study, intersection operating conditions were analyzed at seven intersections in the vicinity of the Master Plan area for the peak hours of the weekday AM and PM periods (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM, respectively) and the weekend midday period (12:00 PM to 2:00 PM). These seven intersections were selected in coordination with the City of Oakland Transportation Services Division (TSD) and Community Economic Development Agency (CEDA) and include locations that could be significantly affected by traffic from the buildout of the amended Master Plan. As shown on **Figure 3.11-1**, the following seven study intersections were selected for analysis:

1. Zoo Drive / Mountain Boulevard / Golf Links Road (three-way stop-controlled);



SOURCE: AECOM



**Figure 3.11-1**  
Project Site and Study Intersections

2. Golf Links Road / I-580 Westbound On-Ramp (signalized);
3. Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue (signalized);
4. 106th Avenue / Malcolm Avenue / Zoo Drive (one-way stop-controlled);
5. 106th Avenue / I-580 Westbound On-Ramp (all-way stop-controlled);
6. 106th Avenue / Foothill Boulevard (all-way stop-controlled); and
7. 106th Avenue / MacArthur Boulevard (signalized).

**Figure 3.11-2** shows the existing intersection geometry (lane configurations and signal control) for the seven study intersections. **Figure 3.11-3** shows the seasonally adjusted Existing Baseline traffic volumes during the weekday AM and PM and weekend midday peak hours.

All of the seven study intersections currently operate at acceptable levels of service. (See **Subsection 3.11.5.2** below for discussion of existing intersection operations.)

#### **3.11.4.2 Site Access and Circulation Improvements**

The zoo has completed the following transportation and circulation improvements since approval of the Master Plan:

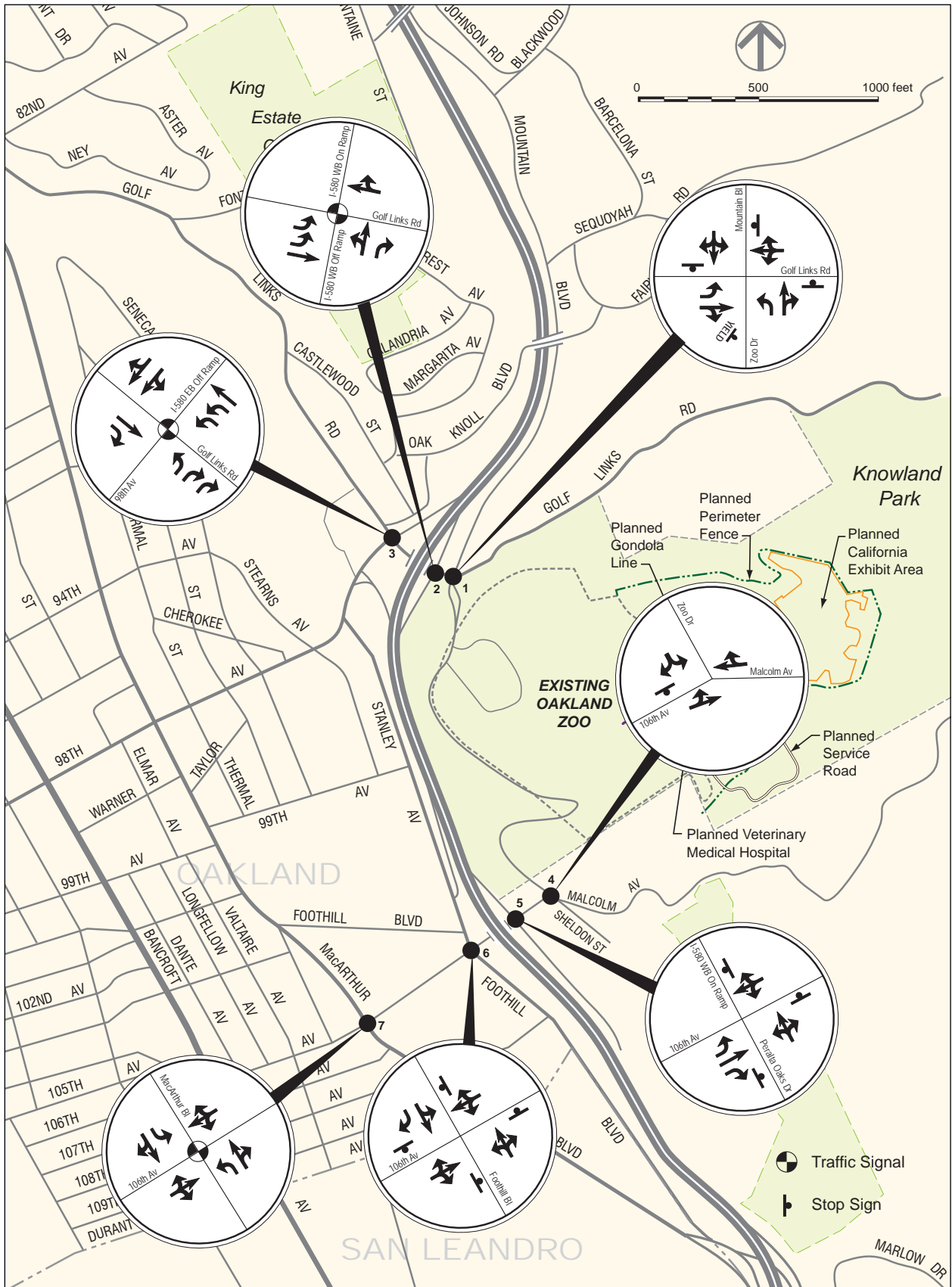
1. Zoo Drive was widened to 30 feet to accommodate two-way traffic and a bicycle/pedestrian lane;
2. The parking lot located to the north of the main parking lot was repaved in 2007; and
3. A landscaped buffer was installed along the main parking lot.

#### **3.11.4.3 Transit Conditions**

AC Transit provides local and regional bus service within Alameda and Contra Costa counties and between the East Bay and San Francisco's Transbay Terminal. On March 29, 2010, AC Transit expanded service to the Oakland Zoo. Expanded operation of AC Transit bus line 46 now includes service between Oakland Coliseum BART and the Oakland Zoo. Service to and from the zoo runs during the weekdays from 9:00 AM until 6:30 PM. No weekend service is provided.

#### **3.11.4.4 Pedestrian Conditions**

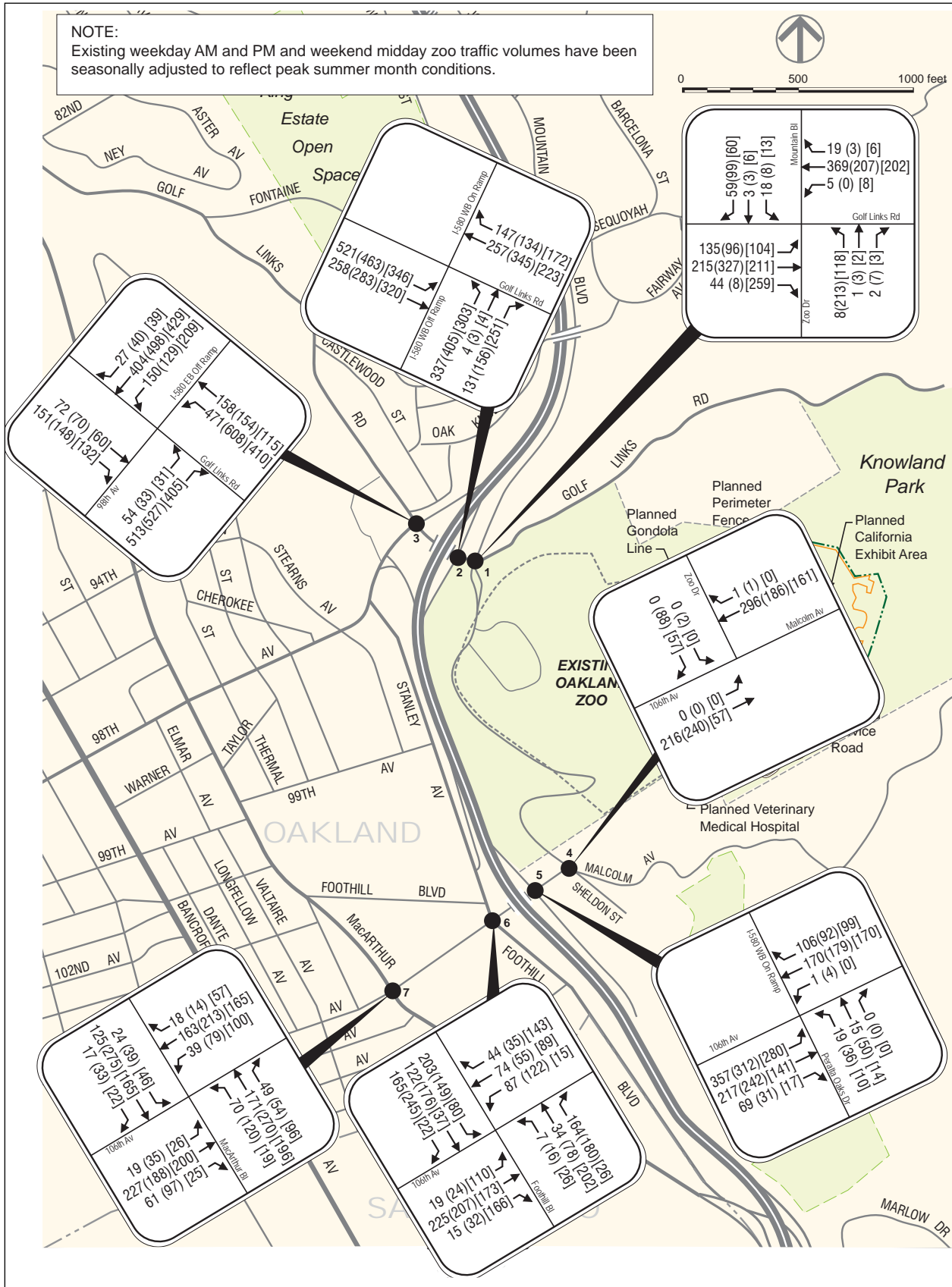
Sidewalks are provided along the west side of Mountain Boulevard, on Golf Links Road north of the Master Plan area, on Sheldon Avenue, and on 106th Avenue in the vicinity of the zoo's southern exit. Crosswalks are provided on three approaches of the Golf Links Road / Mountain Boulevard / Zoo Drive intersection at the zoo entrance. Site observations undertaken during the weekday midday period (Wednesday, April 21, 2009) indicate that the existing pedestrian facilities currently operate under acceptable conditions. Low volumes of pedestrians were



SOURCE: AECOM

Figure 3.11-2  
Existing Lane Geometry





SOURCE: AECOM

**Figure 3.11-3**  
Existing Baseline Traffic Volumes  
AM (PM) [Weekend] Peak Hour

observed in the vicinity of Master Plan area. The widening of Zoo Drive to 30 feet has improved conditions for pedestrians.

#### 3.11.4.5 Bicycle Conditions

Bikeways are typically classified as Class 1, Class 2, and Class 3 facilities, depending primarily on the level of separation from vehicular traffic, as follows:

- *Class 1 Bicycle Facility.* Also known as a bicycle path, this is a dedicated path for bicyclists and pedestrians that does not permit motorized travel. Bicycle paths create a relaxed environment for non-motorized travel and reduce the risk of potential conflict between vehicles and bicyclists. Often these facilities are located in parks or greenway areas, areas connecting two dead-end streets, or atop railroad right-of-way that is no longer in use. There are no existing Class 1 bicycle facilities in the immediate vicinity of the Master Plan area.
- *Class 2 Bicycle Facility.* Also known as a bicycle lane, this is a portion of the roadway network that has been striped and signed for bicycle use. Provision of Class 2 facilities requires sufficient right-of-way between the vehicle stream and the curb or curbside parking. Bicycle lanes are typically used along collector or major streets with medium to high traffic volumes, providing additional travel space for bicyclists along busy roadway segments. There are no existing Class 2 bicycle facilities in the immediate vicinity of the Master Plan area.
- *Class 3 Bicycle Facility.* Also known as a bicycle route, this is a bikeway that primarily serves to connect other facilities and destinations in the bikeway network but provides a lower level of service than Class 1 or Class 2 facilities. These routes include signage but do not have roadway markings or striping to indicate reserved space for the bicyclist. Bicycle routes are easier to provide because they do not require right-of-way to be reallocated from vehicular traffic. Bicycle routes currently exist on Golf Links Road between 98th Avenue and Skyline Boulevard and on Mountain Boulevard.
- *Class 3A and 3B Bicycle Facilities.* These facilities are similar to Class 3 facilities in that they are shared bicycle-automobile facilities. Class 3A facilities (“arterial bicycle routes”) generally have lower posted speed limits (around 25 miles per hour) and feature shared lane bicycle stencils with wide curb lanes. Class 3B facilities (“bicycle boulevards”) are bikeways on low-volume residential streets that give priority to bicycle traffic.

The widening of Zoo Drive to 30 feet has improved conditions for bicyclists. Additionally, according to the City of Oakland Bicycle Master Plan (City of Oakland 2007), the existing Class 3 bicycle facilities on Golf Links Road and Mountain Boulevard are proposed to be upgraded to Class 2 facilities.

Little bicycle activity currently occurs at the Oakland Zoo. The Oakland Zoo currently provides one bicycle rack at the main entrance which has the capacity to serve up to seven bicycles. Informal bicycle parking (e.g., trees, fences, signs) is also available at the zoo. A number of observations conducted during weekday and weekend periods did not observe any bicycles parked at the rack. Current demand for bicycle parking is estimated to be considerably less than supply.

### 3.11.4.6 Parking Conditions

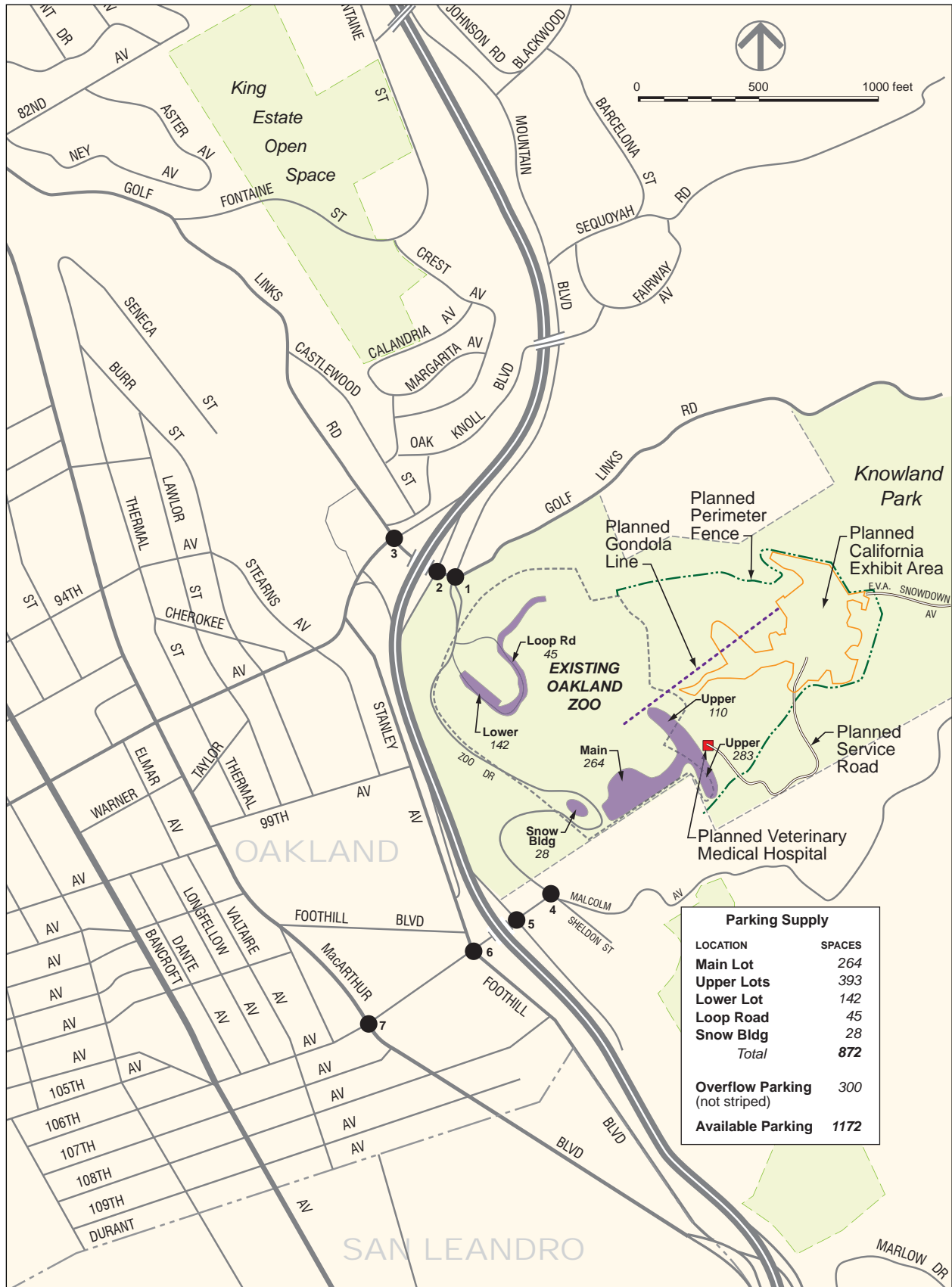
The existing parking supply at the zoo is described in **Table 3.11-1** and shown on **Figure 3.11-4**. As shown in **Table 3.11-1**, there are 1,172 parking spaces available for use at the arboretum, zoo, and related support facilities. The zoo currently provides 872 striped spaces (including 17 spaces that meet Americans with Disabilities Act accessibility requirements) and 300 unstriped spaces available for staff and visitors. In addition, as noted above, the zoo provides one bicycle rack at the main entrance for bicycle parking.

**TABLE 3.11-1: EXISTING PARKING SUPPLY AT OAKLAND ZOO**

Location	Parking Supply (number of spaces)	Notes
<b>Striped Parking</b>		
Main Lot	264	Includes 11 ADA-accessible spaces
Upper Lot	110	Includes school bus parking
Snow Building	28	Includes 2 ADA-accessible spaces
Lower Lot	142	
Loop Road	45	Includes 4 ADA-accessible spaces
Upper Parking	283	
<i>Total Striped Parking</i>	<i>872</i>	<i>Includes 17 ADA-accessible spaces</i>
<b>Overflow Parking (Not Striped)</b>		
Entrance Road	75	
Front Lawn	200	
Operations Lot	25	
<i>Total Overflow Parking</i>	<i>300</i>	
<b>TOTAL</b> (striped and overflow parking)	<b>1,172</b>	<b>Includes 17 ADA-accessible spaces</b>
ADA = Americans with Disabilities Act		
Source: AECOM, 2010.		

Observations conducted during the midday peak period (12:00 PM to 2:00 PM) on Wednesday April 21, 2009, and pneumatic hose count data collected at the zoo entrance/exits during the week of April 16, 2009 to April 22, 2009, show the zoo parking lot currently operates under capacity. The hose count data show weekday peak parking demand occurs between the hours of 12:00 PM and 1:00 PM and weekend peak parking demand occurs between the hours of 2:00 PM and 3:00 PM. Summaries of the results of the pneumatic hose counts are provided in **Appendix K-1**.

The repaving of the existing overflow parking lot (completed in 2007) and the provision of a landscaped buffer along the main parking lot have improved parking conditions at the zoo. Visitors do not routinely use on-street parking or parking within the residential areas adjacent to



SOURCE: AECOM

**Figure 3.11-4**  
Existing Parking Supply

the zoo, because space is typically available in the zoo parking lots and long walking distances make off-site parking less desirable.

### 3.11.5 SIGNIFICANCE CRITERIA AND IMPACT ASSESSMENT

#### 3.11.5.1 Methodology

**Evaluating Intersection Level of Service.** The operation of a local roadway network is commonly evaluated using the Level of Service (LOS) methodology. This methodology qualitatively characterizes traffic conditions associated with varying levels of vehicular traffic, ranging from LOS A (indicating free-flow traffic conditions with little or no delay experienced by motorists) to LOS F (indicating congested conditions where traffic flows exceed design capacity and result in long queues and delays). The LOS methodology applies to both signalized and unsignalized intersections. **Table 3.11-2** presents the LOS definitions for signalized and unsignalized intersections.

**TABLE 3.11-2: INTERSECTION LEVEL OF SERVICE DEFINITIONS**

Level of Service	Description	Average Total Delay (seconds/vehicle)	
		Signalized Intersections	Unsignalized Intersections
A	Little or no delay	$\leq 10.0$	$\leq 10.0$
B	Short traffic delay	$> 10.0$ and $\leq 20.0$	$> 10.0$ and $\leq 15.0$
C	Average traffic delay	$> 20.0$ and $\leq 35.0$	$> 15.0$ and $\leq 25.0$
D	Long traffic delay	$> 35.0$ and $\leq 55.0$	$> 25.0$ and $\leq 35.0$
E	Very long traffic delay	$> 55.0$ and $\leq 80.0$	$> 35.0$ and $\leq 50.0$
F	Extreme traffic delay	$> 80.0$	$> 50.0$

Source: Transportation Research Board, *Highway Capacity Manual*, 2000.

Signalized intersection analyses are conducted using the methodology of the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM) (Transportation Research Board 2000) operations methodology. The operational analysis uses various intersection characteristics (e.g., traffic volumes, lane geometry, and signal phasing/timing) to estimate the average control delay experienced by motorists at an intersection.

At unsignalized (one-way, three-way, and all-way stop-controlled) study intersections, traffic conditions were also evaluated using the 2000 HCM operations methodology. With this methodology, the LOS is related to the total delay per vehicle for the intersection as a whole (for all-way stop-controlled intersections) or for each stop-controlled approach only (for one- and two-way stop-controlled intersections). Total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs the queue. This time

includes the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position.

**Analyzing Patterns of Zoo Traffic.** Existing turning movement counts were collected at each of the study intersections during the weekday AM and PM peak hours (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM) on Tuesday, April 16, 2009, and during the weekend midday peak hour (12:00 PM to 2:00 PM) on Saturday, January 30, 2010. Traffic data collected at the zoo between September 2006 and October 2009 were used to calculate the seasonal variation in attendance (Oakland Zoo 2009).

The results of the analysis show that zoo traffic peaks during the summer months (June, July, and August), with approximately 34 percent of annual attendance occurring during this period. Zoo attendance and vehicle traffic are approximately 49 percent lower during the month of January and 15 percent lower during the month of April than during the peak summer months.

In general, the zoo is open daily from 10:00 AM to 4:00 PM. Operating hours are extended on Friday, Saturday, and Sunday during the peak summer months, when the zoo is open from 9:30 AM to 6:00 PM. During the peak summer months, weekly attendance is slightly higher on weekends (51 percent of the weekly total) than on weekdays (49 percent of the weekly total). Summer period traffic analysis was conducted in order to ensure a more conservative analysis. Weekday AM and PM peak hour turning movement counts, conducted in April, were factored up 117 percent and weekend midday peak hour turning movement counts, conducted in January, were factored up 203 percent. These adjustments account for the seasonal changes in zoo activity.

Seasonal adjustment calculations are provided in **Appendix K-6**.

**Attendance Estimates for Proposed California Exhibit.** In the 1998 MND, project vehicle trip generation was developed using a 1994 base year attendance figure and traffic projections (based on a two-percent annual growth rate) as well as 1995 vehicle counts and surveys. For this current analysis, project vehicle trip generation has been updated using revised attendance forecasts and trip generation rates provided in the Institute of Transportation Engineers (ITE), *Trip Generation, 8th Edition, 2007*.

Estimates of the likely effects of the proposed new California Exhibit on Oakland Zoo attendance were developed by Hausrath Economics Group (HEG) (see **Appendix D**). For transportation and environmental analysis of the exhibit proposal, annual attendance estimates were prepared for Year 2015 and Year 2035 both with and without the proposed California Exhibit. Attendance estimates without the new exhibit provide a future baseline for considering the effects of the proposed California Exhibit on attendance, both initially and as likely to stabilize over the longer term.

Six attendance scenarios are identified:

- *Existing Attendance.* Both 2010 and 2009 actual attendance figures are represented, as traffic counts were conducted in both of those years. Weekday peak hour counts were conducted in 2009 while weekend peak hour counts were conducted in 2010.
- *Existing plus Project.* This scenario is identified for CEQA purposes, although it is not a realistic outcome because it assumes the entire project is built and complete today. The peak additional attendance for the proposed California Exhibit (+150,000 visits for first full year of operation in Fiscal Year 2016) is added to the existing zoo attendance for 2009 and 2010.
- *Year 2015 without Project.* This scenario represents attendance as estimated for the zoo in Year 2015 without the proposed California Exhibit.
- *Year 2015 plus Project.* This scenario is identified for CEQA purposes, so analysis can reflect peak future attendance. The scenario represents attendance for the first full year of operation with the proposed California Exhibit (Fiscal Year 2016).
- *Year 2035 without Project.* This scenario represents attendance as estimated for the zoo in Year 2035 without the proposed California Exhibit.
- *Year 2035 plus Project.* This scenario represents attendance as estimated for the zoo in Year 2035 with the proposed California Exhibit.

**Vehicle Trips for Proposed California Exhibit.** The attendance estimates were converted into estimates of numbers of vehicles visiting the zoo each year using ratios provided by zoo staff, based on actual experiences at the Oakland Zoo. The ratio of 3.6 visitors per vehicle incorporates all vehicles, including automobiles, vans, and buses (Hausrath Economics Group 2010).

Attendance and vehicle trip estimates for each of the six scenarios are shown in **Table 3.11-3**.

**TABLE 3.11-3: ANNUAL ATTENDANCE ESTIMATES FOR OAKLAND ZOO WITH AND WITHOUT CALIFORNIA EXHIBIT**

Year/Scenario	Without California Exhibit		With California Exhibit	
	Visitors	Vehicles <sup>1</sup>	Visitors	Vehicles <sup>1</sup>
Existing (2009) Conditions <sup>2</sup>	670,700	186,306	820,700	227,972
Existing (2010) Conditions <sup>2</sup>	629,300	174,806	779,300	216,472
Future Year 2015 Conditions	600,000	166,667	750,000	208,333
Future Year 2035 Conditions	600,000	166,667	700,000	194,444

The estimates of future attendance identify average annual attendance patterns over time and are focused on the attendance effects of the new exhibit.

<sup>1</sup> 3.6 visitors/vehicle, ratio provided by Oakland Zoo staff. Includes all vehicles: automobiles, vans, and buses.

<sup>2</sup> Traffic counts were taken in 2009 and supplemented in 2010 to establish existing conditions for the project.

Source: AECOM, 2010. Oakland Zoo, 2010. Hausrath Economics Group, 2010.

Attendance adjustment factors are provided in **Appendix K-6**.

### 3.11.5.2 Traffic Features of Proposed Master Plan Amendment

**Existing Intersection Operations.** As a basis for evaluating the traffic impacts of the buildout of the amended Master Plan, the seven study intersections were analyzed using Trafficware’s Synchro 7 software package based on the methodologies outlined in the 2000 HCM. Existing Baseline volumes were seasonally adjusted based on vehicle attendance data provided by the Oakland Zoo (see Subsection 3.11.5.1 above). The LOS results for the seasonally adjusted Existing Baseline weekday AM and PM and weekend midday peak hour for the seven study intersections are summarized in **Table 3.11-4**.

**TABLE 3.11-4: INTERSECTION LOS SUMMARY – EXISTING CONDITIONS**

#	Intersection	Traffic Control <sup>1</sup>	Peak Hour	Existing Conditions	
				LOS	Delay <sup>2</sup>
1	Zoo Drive/Mountain Boulevard/ Golf Links Road	TWSC	AM	C	16.9
			PM	C	16.6
			Weekend	C	19.1
2	Golf Links Road/I-580 Westbound On-Ramp	Signal	AM	C	22.9
			PM	D	38.5
			Weekend	C	27.0
3	Golf Links Road/I-580 Eastbound Off-Ramp/98th Avenue	Signal	AM	C	27.8
			PM	C	29.9
			Weekend	C	28.8
4	106th Avenue/Malcolm Avenue/ Zoo Drive	OWSC	AM	A	0.0
			PM	A	9.9
			Weekend	A	9.4
5	106th Avenue/I-580 Westbound On-Ramp	AWSC	AM	B	11.3
			PM	B	11.3
			Weekend	A	9.8
6	106th Avenue/Foothill Boulevard	AWSC <sup>3</sup>	AM	C	17.3
			PM	C	21.2
			Weekend	C	21.1
7	106th Avenue/MacArthur Boulevard	Signal	AM	A	9.6
			PM	B	11.2
			Weekend	B	10.7

**Bold** denotes intersection operating at unacceptable conditions

LOS = Level of Service

<sup>1</sup> AWSC = All-Way Stop-Controlled; OWSC = One-Way Stop-Controlled; TWSC = Three-Way Stop-Controlled

<sup>2</sup> The LOS and delay for one- and two-way stop-controlled intersections represent the worst movement or approach. The LOS and delay for signalized intersections and all-way stop-controlled intersections represent the average delay for all movements.

<sup>3</sup> Due to limitations in the Highway Capacity Manual methodology the three-lane eastbound approach is modeled as a two-lane approach.

Source: AECOM, 2010.



Generally, the City of Oakland considers LOS D acceptable for intersections outside of the downtown area. As shown in **Table 3.11-4**, all of the seven study intersections currently operate at acceptable LOS.

The LOS calculation sheets for all study intersections and for all scenarios are provided in **Appendix K-2**.

**Number of Trips Generated by Buildout of Amended Plan.** The California Exhibit included in the proposed Master Plan amendment would employ approximately 29 new employees and would generate an annual increase of approximately 150,000 visitors under existing and Year 2015 conditions and an annual increase of approximately 100,000 visitors under Year 2035 conditions with average vehicle occupancy of 3.6 visitors per vehicle.<sup>1</sup> **Table 3.11-5** shows zoo attendance and associated vehicle trips during peak hours under existing conditions, Year 2015 conditions, and cumulative Year 2035 conditions with and without the California Exhibit included in the proposed Master Plan amendment. **Table 3.11-6** shows the total number of vehicle trips expected to be generated by the buildout of the amended Master Plan during peak hours. Transit mode split is not factored into this trip generation in order to provide a conservative estimate of vehicle traffic impacts.

**TABLE 3.11-5: ANNUAL ZOO ATTENDANCE AND PEAK SUMMER MONTH CONDITIONS PEAK HOUR VEHICLE TRIPS: EXISTING CONDITIONS, YEAR 2015 CONDITIONS, AND CUMULATIVE YEAR 2035 CONDITIONS WITH AND WITHOUT CALIFORNIA EXHIBIT**

Scenario	Annual Attendance (vehicles)	Weekday <sup>1</sup>		Weekend <sup>2</sup>
		AM Peak Hour	PM Peak Hour	Midday Peak Hour
Existing (2010) Conditions	174,806	63	325	442
plus California Exhibit	216,472	74	378	548
Year 2015 Conditions	166,667	57	291	422
plus California Exhibit	208,333	68	344	528
Cumulative Year 2035 Conditions	166,667	57	291	422
plus California Exhibit	194,444	64	326	493

<sup>1</sup> Weekday AM and PM peak hour counts conducted on April 16, 2009. Volumes have been adjusted to reflect peak summer month conditions, and existing (2009) annual attendance of 670,700 visitors.

<sup>2</sup> Weekend midday peak hour counts conducted on January 30, 2010. Volumes have been adjusted to reflect peak summer month conditions.

Source: AECOM, 2010. Oakland Zoo, 2010.

<sup>1</sup> Projected annual attendance and observed vehicle occupancy ratio provided by Hausrath Economics Group and Oakland Zoo staff, 2010.

**TABLE 3.11-6: TOTAL PEAK HOUR VEHICLE TRIPS GENERATED BY BUILDOUT OF AMENDED MASTER PLAN**

Land Use	Weekday						Weekend		
	AM Peak Hour			PM Peak Hour			Midday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Veterinary Medical Hospital	1	0	1	0	1	1	0	0	0
Overnight Camping Area <sup>1</sup>	3	4	7	8	4	12	2	2	4
<b>Total Trips (without California Exhibit)</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>8</b>	<b>5</b>	<b>13</b>	<b>2</b>	<b>2</b>	<b>4</b>
California Exhibit (Existing and Year 2015 Conditions) <sup>2</sup>	8	3	11	2	51	53	66	40	106
<b>Total Trips (Existing and Year 2015 Conditions)</b>	<b>12</b>	<b>7</b>	<b>19</b>	<b>10</b>	<b>56</b>	<b>66</b>	<b>68</b>	<b>42</b>	<b>110</b>
California Exhibit (Year 2035 Conditions) <sup>3</sup>	5	2	7	1	34	35	44	27	71
<b>Total Trips (Year 2035 Conditions)</b>	<b>9</b>	<b>6</b>	<b>15</b>	<b>9</b>	<b>39</b>	<b>48</b>	<b>46</b>	<b>29</b>	<b>75</b>

<sup>1</sup> Rate determined using Institute of Transportation Engineers (ITE) land use code for campgrounds.

<sup>2</sup> Based on attendance growth projections of 150,000 annual visitors under Existing and Year 2015 conditions. Projections provided by Hausrath Economics Group, 2010.

<sup>3</sup> Based on attendance growth projections of 100,000 annual visitors under Year 2035 conditions. Projections provided by Hausrath Economics Group, 2010.

Source: AECOM, 2010. Oakland Zoo, 2010.

As shown in **Table 3.11-6**, the buildout of the amended Master Plan would generate a total of approximately 19 additional trips during the weekday AM peak hour, approximately 66 trips during the weekday PM peak hour, and approximately 110 trips during the weekend midday peak hour with a projected annual increase in attendance of 150,000 visitors under existing and Year 2015 conditions. The buildout of the amended Master Plan would generate a total of approximately 15 additional trips during the weekday AM peak hour, approximately 48 trips during the weekday PM peak hour, and approximately 75 trips during the weekend midday peak hour with a projected annual increase in attendance of 100,000 visitors under Year 2035 conditions. The buildout of the amended Master Plan would not be expected to generate 100 or more weekday PM peak hour trips; therefore, an ACCMA Metropolitan Transportation System (MTS) roadway segment analysis is not required for this study.<sup>2</sup>

Of these totals, the California Exhibit would generate approximately 11 trips during the weekday AM peak hour, approximately 53 trips during the weekday PM peak hour, and approximately

<sup>2</sup> According to Metropolitan Transportation System (MTS) standards (2009 Congestion Management Program, Alameda County Congestion Management Agency, 2009), an MTS CMP analysis is required if a project would generate 100 or more PM peak hour trips.

106 trips during the weekend midday peak hour with a projected annual increase in attendance of 150,000 visitors under existing and Year 2015 conditions. The California Exhibit would generate approximately seven trips during the weekday AM peak hour, approximately 35 trips during the weekday PM peak hour, and approximately 71 trips during the weekend midday peak hour under Year 2035 conditions with a projected annual increase in attendance of 100,000 visitors (see **Table 3.11-5** and **Table 3.11-6**).

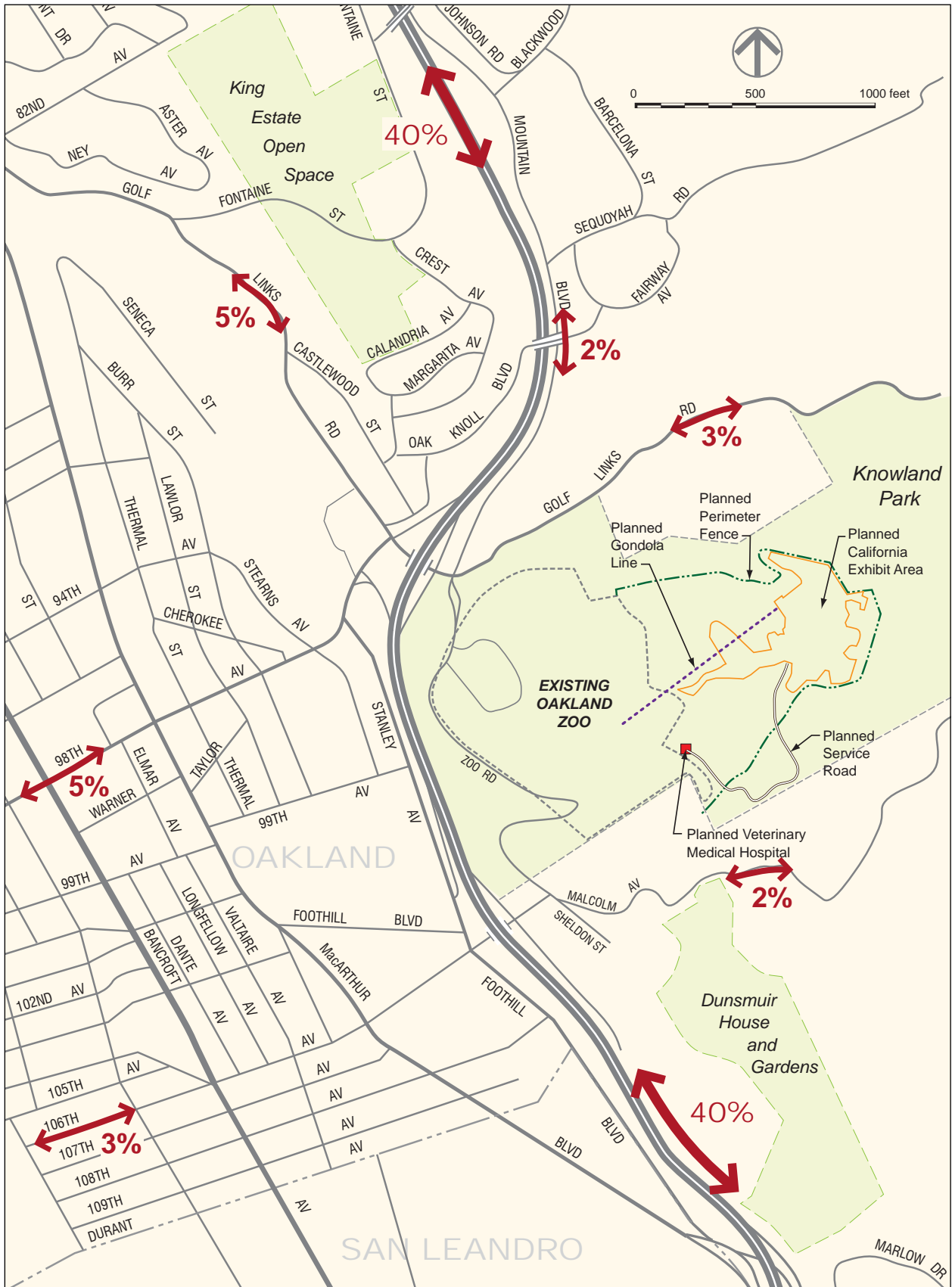
The proposed Veterinary Medical Hospital would employ one new staff person and would not be open to the public. Professional staff at the existing Veterinary Medical Hospital (two full-time veterinarians and two technicians) would move to the new facility. Reuse of the existing Veterinary Medical Hospital as zoo-related conservation/research and office uses would not bring any new employees to the site. The proposed Veterinary Medical Hospital would generate one additional trip during the weekday AM and PM peak hours and would not generate additional trips during the weekend midday peak hour (see **Table 3.11-6**). Although veterinary researchers would occasionally visit the new facility, these trips would be few and would not occur regularly. Trips generated by researchers are accounted for in the projected annual attendance increase.

The proposed overnight camping area would provide approximately 11 ten- by twenty-foot canvas tents and would generate approximately seven trips during the weekday AM peak hour, approximately 12 trips during the weekday PM peak hour, and approximately four trips during the weekend midday peak hour (see **Table 3.11-6**). Since the overnight camping area would relocate existing overnight camping activities at the zoo, including these additional trips represents a conservative analysis.

**Trip Distribution.** The trip distribution pattern for the buildout of the amended Master Plan was developed using information from the ACCMA Countywide Transportation Demand model, turning movement counts taken at the zoo entrance/exit, and pneumatic hose counts taken at the zoo driveways (April 14, 2009 through April 20, 2009).

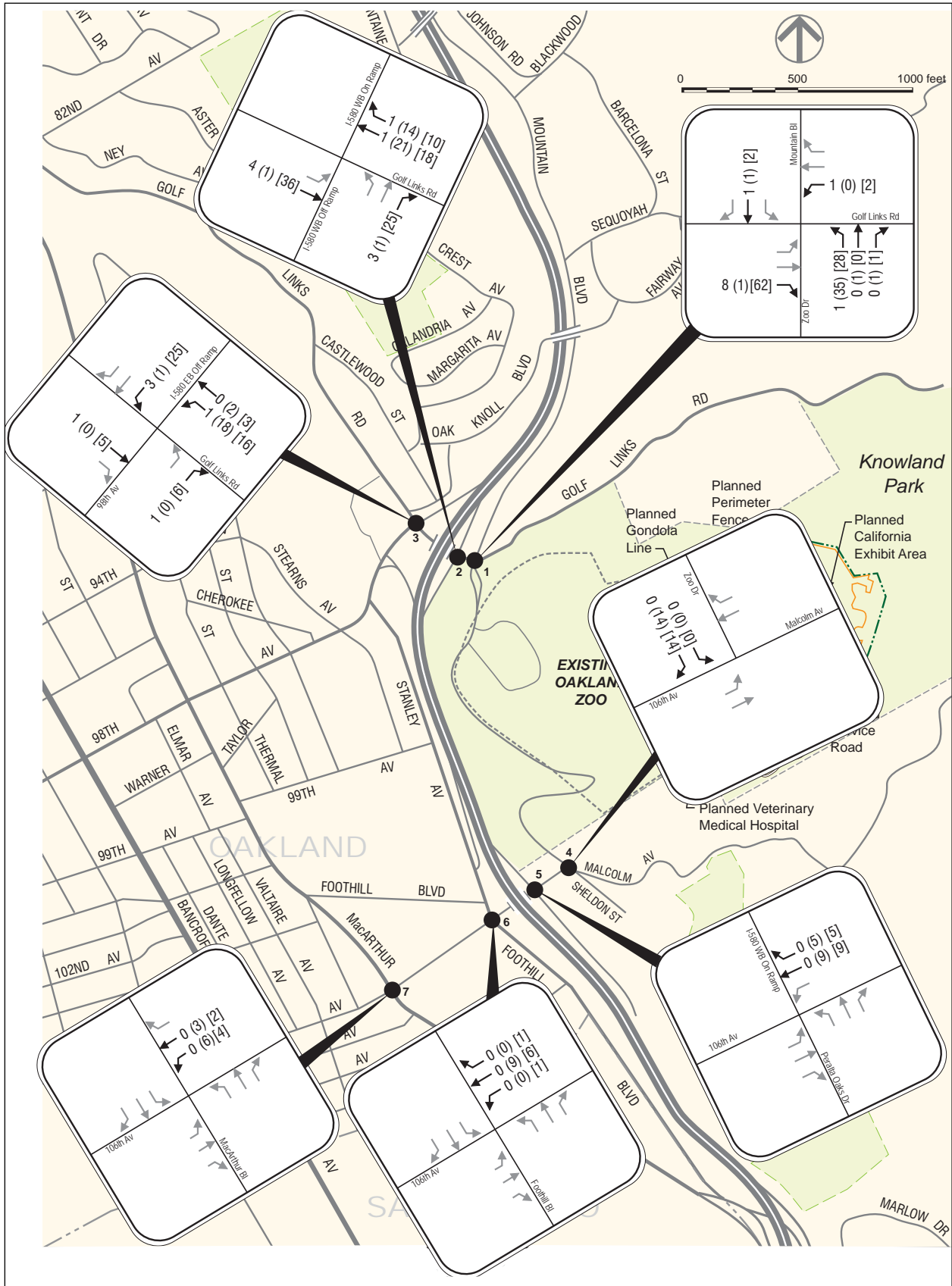
Trips associated with the buildout of the amended Master Plan were distributed through the seven study intersections using the trip distribution pattern illustrated on **Figure 3.11-5**. Traffic volumes associated with the buildout of the amended Master Plan under Existing and Year 2015 conditions, with the projected increase of 150,000 annual visitors, are illustrated on **Figure 3.11-6**. Traffic volumes associated with the buildout of the amended Master Plan under Year 2035 conditions, with the projected increase of 100,000 annual visitors, are illustrated on **Figure 3.11-7**.

**Existing Plus Project Conditions.** Trips associated with the buildout of the amended Master Plan were added to the Existing Baseline intersection volumes to derive Existing plus Project traffic volumes. **Figure 3.11-8** illustrates Existing plus Project traffic volumes. **Table 3.11-7** compares levels of service at each study intersection under Existing and Existing plus Project conditions during the weekday AM and PM and weekend midday peak hours.



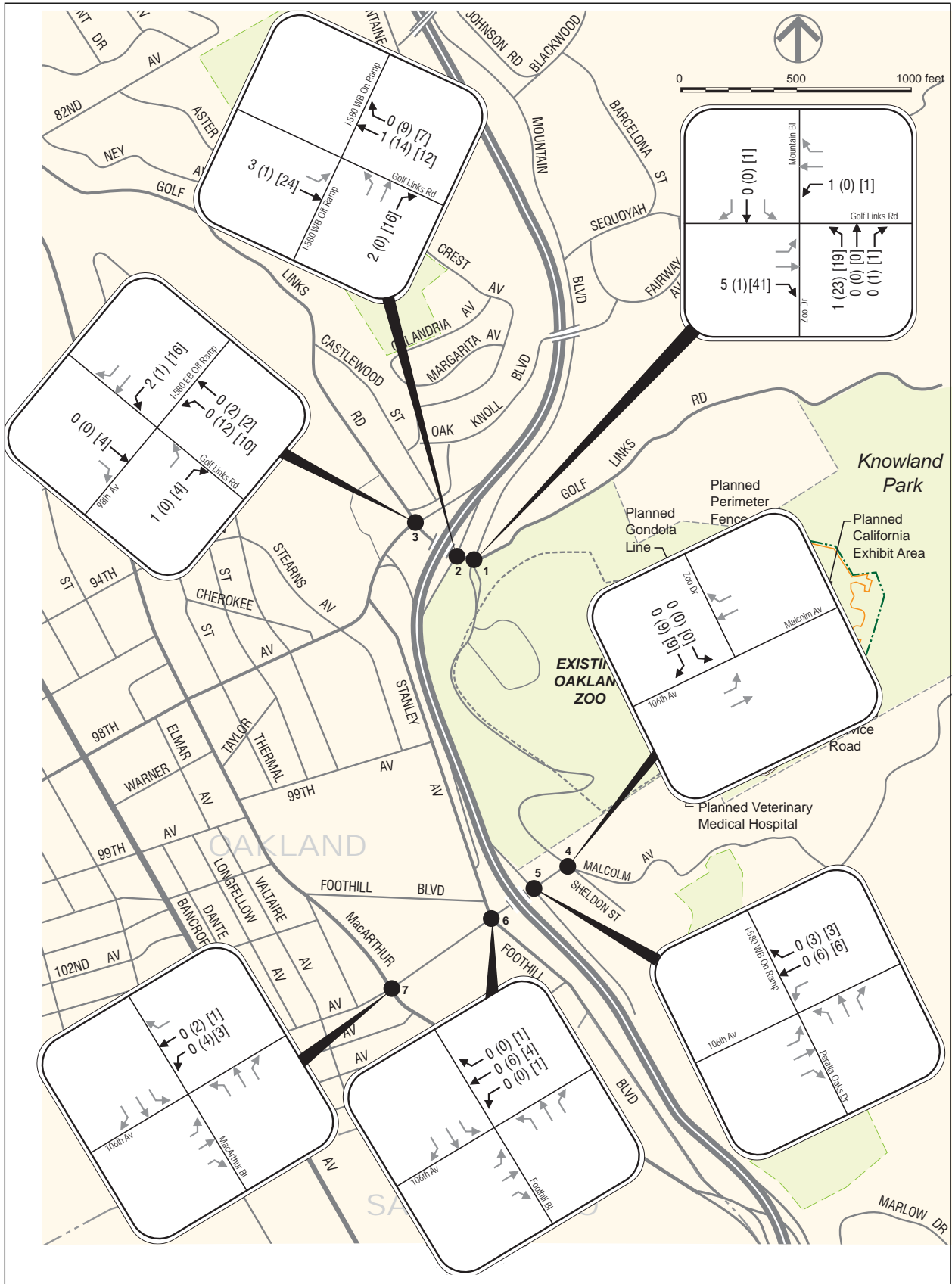
SOURCE: AECOM

**Figure 3.11-5**  
Project Trip Distribution



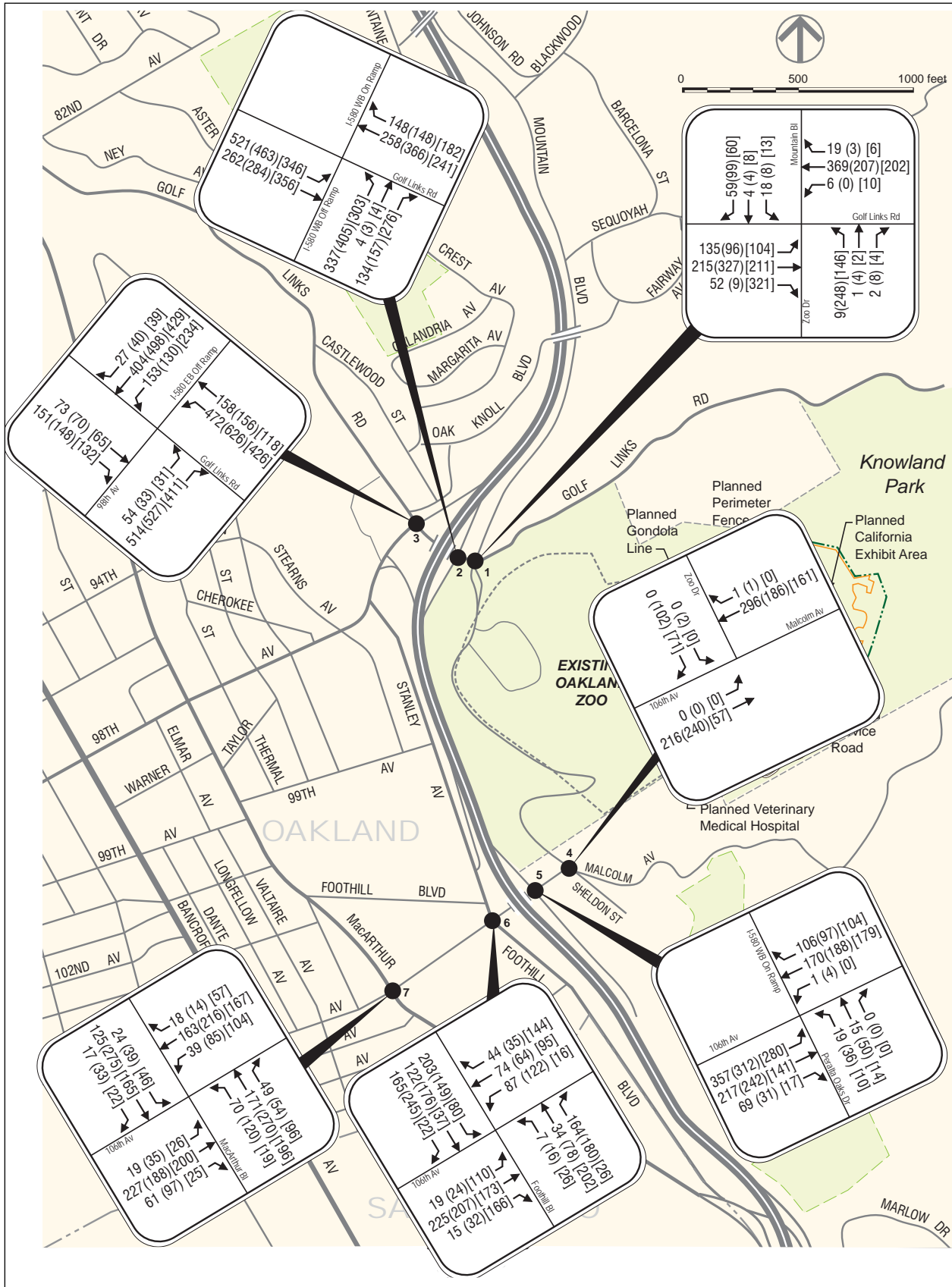
SOURCE: AECOM

**Figure 3.11-6**  
 Project Traffic Volumes (150,000 Annual Visitors)  
 AM (PM) [Weekend] Peak Hour



SOURCE: AECOM

**Figure 3.11-7**  
 Project Traffic Volumes (100,000 Annual Visitors)  
 AM (PM) [Weekend] Peak Hour



SOURCE: AECOM

**Figure 3.11-8**  
Existing Plus Project Traffic Volumes  
AM (PM) [Weekend] Peak Hour

**TABLE 3.11-7: INTERSECTION LEVEL OF SERVICE COMPARISON: EXISTING BASELINE AND EXISTING PLUS PROJECT CONDITIONS**

#	Intersection	Traffic Control <sup>1</sup>	Peak Hour	Existing Conditions		Existing plus Project Conditions	
				LOS	Delay <sup>2</sup>	LOS	Delay
1	Zoo Drive/Mountain Boulevard/ Golf Links Road	TWSC	AM	C	16.9	C	17.1
			PM	C	16.6	C	18.2
			Weekend	C	19.1	C	29.5
2	Golf Links Road/I-580 Westbound On-Ramp	Signal	AM	C	22.9	C	23.0
			PM	D	38.5	D	39.2
			Weekend	C	27.0	D	31.5
3	Golf Links Road/I-580 Eastbound Off-Ramp/98th Avenue	Signal	AM	C	27.8	C	27.2
			PM	C	29.9	C	30.0
			Weekend	C	28.8	C	28.0
4	Avenue/Malcolm Avenue/ Zoo Drive	OWSC	AM	A	0.0	A	0.0
			PM	A	9.9	A	9.9
			Weekend	A	9.4	A	9.5
5	106th Avenue/I-580 Westbound On-Ramp	AWSC	AM	B	11.3	B	11.3
			PM	B	11.3	B	11.4
			Weekend	A	9.8	A	9.9
6	106th Avenue/Foothill Boulevard	AWSC <sup>3</sup>	AM	C	17.3	C	17.3
			PM	C	21.2	C	21.2
			Weekend	C	21.1	C	21.5
7	106th Avenue/MacArthur Boulevard	Signal	AM	A	9.6	A	9.6
			PM	B	11.2	B	11.2
			Weekend	B	10.7	B	10.7

**Bold** denotes intersection operating at unacceptable conditions.

LOS = Level of Service

<sup>1</sup> AWSC = All-Way Stop-Controlled; OWSC = One-Way Stop-Controlled; TWSC = Three-Way Stop-Controlled

<sup>2</sup> The LOS and delay for one- and two-way stop-controlled intersections represent the worst movement or approach. The LOS and delay for signalized intersections and all-way stop-controlled intersections represent the average delay for all movements.

<sup>3</sup> Due to limitations in the Highway Capacity Manual methodology the three-lane eastbound approach is modeled as a two-lane approach.

Source: AECOM, 2010.



Generally, the City of Oakland considers LOS D or better acceptable for intersections outside of the downtown area. As shown in **Table 3.11-7**, all seven study intersections would continue to operate at acceptable conditions under Existing plus Project conditions.

**Construction Traffic.** Construction in accordance with the buildout of the amended Master Plan is expected to employ about 160 workers during the 42-month construction period (see **Chapter 2, Project Description**). Plans for construction period phasing and equipment under the proposed Master Plan amendment are summarized in **Table 3.11-8**. Plans for construction period phasing and employees are summarized in **Table 3.11-9**.

**TABLE 3.11-8: CONSTRUCTION PERIOD VEHICLES AND EQUIPMENT**

Phase	Duration (months)	Construction Vehicles and Equipment Peak Daily Number			
		Aircraft <sup>1</sup>	Trucks	Other <sup>2</sup>	Total
Phase 1	12	0	3	6	9
Phase 2	8	1	5	17	23
Phase 3	6	0	5	10	15
Phase 4	8	0	5	9	14
Phase 5	8	0	5	9	14
<b>Total</b>	<b>42</b>	<b>1</b>	<b>23</b>	<b>51</b>	<b>75</b>

<sup>1</sup> Installation of one or more of the gondola towers is expected to require use of a helicopter. The helicopter would be used for up to one day.

<sup>2</sup> Other construction equipment includes bobcats, scrapers, bulldozers, compacters, front-end loaders, pavers, etc.

Source: Oakland Zoo, 2010.

**TABLE 3.11-9: CONSTRUCTION PERIOD PHASING AND EMPLOYEES**

Phase	Duration (months)	Construction Workers	
			Peak Daily Number
Phase 1	12		32
Phase 2	8		43
Phase 3	6		31
Phase 4	8		34
Phase 5	8		20

Source: Oakland Zoo 2010.

As shown in **Table 3.11-8**, the number of trucks that would come to and from the site would vary depending on the construction phase. A daily maximum of five trucks is expected during most phases. In all phases, a majority of the trips would be made by small-medium flatbed trucks. The use of a helicopter would be required for construction of at least one of the towers of the gondola people-moving system. The helicopter would be used for a maximum of one day during Phase 2.

As shown in **Table 3.11-9**, the number of construction workers would vary depending on the construction phase. The largest daily maximum would be during Phase 2, when a maximum of 34 workers are expected.

### 3.11.5.3 CEQA Thresholds/Criteria of Significance

The project would have a significant impact on the environment if it would conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit. Specifically, the project would have a significant impact if it would:

- a) At a study signalized intersection located outside the downtown area,<sup>3</sup> cause the LOS to degrade to worse than LOS D (i.e., E);
- b) At a study signalized intersection which is located within the downtown area, cause the LOS to degrade to worse than LOS E (i.e., F);
- c) At a study signalized intersection located outside the downtown area where the Level of Service is LOS E, cause the total intersection average vehicle delay to increase by four (4) or more seconds or degrade to worse than LOS E (i.e., F);
- d) At a study signalized intersection for all areas where the Level of Service is LOS E, cause the average delay for any of the critical movements to increase by six (6) or more seconds or degrade to worse than LOS E (i.e., F);
- e) At a study signalized intersection for all areas where the Level of Service is LOS F, cause the total intersection average vehicle delay to increase by two (2) or more seconds, or the average delay for any of the critical movements to increase by four (4) or more seconds, or the volume-to-capacity (v/c) ratio to exceed three (3) percent (but only if the delay values cannot be measured accurately);
- f) At a study unsignalized intersection for all areas, add 10 or more vehicles and after project completion satisfy the Caltrans peak hour volume warrant;

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<sup>3</sup> Downtown is defined in the Land Use and Transportation Element of the Oakland General Plan (page 67) as the area generally bounded by West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland estuary to the south, and I-980/Brush Street to the west (City of Oakland 1998).

- g) For a Congestion Management Program (CMP) required analysis (i.e., projects that generate 100 or more PM peak hour trips), cause a roadway segment on the Metropolitan Transportation System (MTS) to operate at LOS F or increase the v/c ratio by more than three (3) percent for a roadway segment that would operate at LOS F without the project;
- h) Result in substantially increased travel times for AC Transit buses;
- i) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- j) Substantially increase traffic hazards to motor vehicles, bicycles, or pedestrians due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- k) Result in less than two emergency access routes for streets exceeding 600 feet in length unless otherwise determined by the Fire Chief, or his/her designee, in specific instances due to climactic, geographic or topographic conditions;
- l) Fundamentally conflict with adopted policies, plans, or programs regarding public transit, bicycles, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities; or
- m) Make a considerable (i.e., significant) contribution to cumulative impacts by exceeding at least one of the criteria above under a future year scenario.

These criteria are discussed below.

#### 3.11.5.4 Project Impacts

- a) **At a study signalized intersection located outside the downtown area,<sup>4</sup> would the project cause the LOS to degrade to worse than LOS D (i.e., E)?**

As shown in **Table 3.11-7**, under Existing plus Project conditions, trips associated with the buildout of the amended Master Plan would not cause the LOS to degrade to worse than LOS D at a study signalized intersection located outside the downtown area under Existing plus Project conditions. Thus, the buildout of the amended Master Plan would not create a significant impact under Existing plus Project conditions; therefore, no mitigation measures are required.

The proposed Master Plan amendment would result in similar traffic impacts as identified in the 1998 MND prepared for the approved Master Plan.

**Impact:** Less-than-significant

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<sup>4</sup> Downtown is defined in the Land Use and Transportation Element of the Oakland General Plan (page 67) as the area generally bounded by West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland estuary to the south, and I-980/Brush Street to the west (City of Oakland 1998).

**Mitigation:** None required

- b) At a study signalized intersection which is located within the downtown area, would the project cause the LOS to degrade to worse than LOS E (i.e., F)?**

The Master Plan amendment area is not located within the downtown area. Therefore, this criterion is not applicable to the proposed Master Plan amendment.

**Impact:** No impact

**Mitigation:** None required

- c) At a study signalized intersection located outside the downtown area where the Level of Service is LOS E, would the project cause the total intersection average vehicle delay to increase by four (4) or more seconds or degrade to worse than LOS E (i.e., F)?**

As shown in **Table 3.11-7**, under Existing plus Project conditions, trips associated with the buildout of the amended Master Plan would not cause the total intersection average delay to increase by four or more seconds or degrade to worse than LOS E (i.e., LOS F) at a study signalized intersection located outside the downtown area where the level of service is LOS E.

Neither the proposed Master Plan amendment nor the approved Master Plan would create a significant impact under Existing plus Project conditions; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

- d) At a study signalized intersection for all areas where the Level of Service is LOS E, would the project cause the average delay for any of the critical movements to increase by six (6) or more seconds or degrade to worse than LOS E (i.e., F)?**

As shown in **Table 3.11-7**, under Existing plus Project conditions, the buildout of the amended Master Plan would not cause an increase in the average delay for any of the critical movements of six seconds or more or degrade LOS to worse than LOS E (i.e., LOS F) at a study signalized intersection where the level of service is LOS E.

Neither the proposed Master Plan amendment nor the approved Master Plan would create a significant impact under Existing plus Project conditions; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

- e) **At a study signalized intersection for all areas where the Level of Service is LOS F, would the project cause the total intersection average vehicle delay to increase by two (2) or more seconds, or the average delay for any of the critical movements to increase by four (4) or more seconds, or the volume-to-capacity (v/c) ratio to exceed three (3) percent (but only if the delay values cannot be measured accurately)?**

As shown in **Table 3.11-7**, under Existing plus Project conditions, the buildout of the amended Master Plan would not cause the total intersection average vehicle delay to increase by two or more seconds, or the average delay for any of the critical movements to increase by four or more seconds, or the v/c ratio to exceed three percent at a study signalized intersection where the level of service is LOS F.

Neither the proposed Master Plan amendment nor the approved Master Plan would create a significant impact under Existing plus Project conditions; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

- f) **At a study unsignalized intersection for all areas, would the project add 10 or more vehicles and after project completion satisfy the Caltrans peak hour volume warrant?**

The buildout of the amended Master Plan would add ten or more vehicles to the following study unsignalized intersections:

Intersection #1 Zoo Drive / Mountain Boulevard / Golf Links Road; and,  
Intersection #4 106th Avenue/Malcolm Avenue/ Zoo Drive.

However, buildout of the amended Master Plan would not satisfy the Caltrans peak hour volume warrants at either study unsignalized intersection during the weekday AM and PM or weekend midday peak hours under Existing plus Project conditions.

Caltrans peak hour volume warrant worksheets are provided in **Appendix K-3**.<sup>5</sup>

The 1998 MND did not conduct a Caltrans peak hour volume warrant. The 1998 MND stated that future project traffic generated during the afternoon commute hour would not have a measurable impact on off-site vehicle operations for the following reasons: closure of the zoo one hour prior to the weekday peak commute hour, distribution of exiting visitor vehicles to the

<sup>5</sup> It should be noted that upon adoption of the California Manual on Uniform Traffic Control Devices (MUTCD) (September 26, 2006), Caltrans has adopted MUTCD peak hour volume warrants, i.e., Caltrans and MUTCD peak hour volume warrants are one and the same.

Malcolm Avenue exit, and local roadway improvements (signal installation) underway at the I-580 ramps.

Neither the proposed Master Plan amendment nor the approved Master Plan would create a significant impact under Existing plus Project conditions; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

**g) For a Congestion Management Program (CMP) required analysis (i.e., projects that generate 100 or more PM peak hour trips), would the project cause a roadway segment on the Metropolitan Transportation System (MTS) to operate at LOS F or increase the v/c ratio by more than three (3) percent for a roadway segment that would operate at LOS F without the project?**

Neither the proposed Master Plan amendment nor the approved Master Plan would generate 100 or more PM peak hour trips. Therefore, neither would create a significant impact in relation to this criterion, and an MTS roadway segment analysis is not required.

**Impact:** Less-than-significant

**Mitigation:** None required

**h) Would the project result in substantially increased travel times for AC Transit buses?**

AC Transit bus line 46 provides service between the Oakland Zoo and the Coliseum BART station with 30-minute headways between 9:00 AM and 6:30 PM on the weekdays and no service on the weekend. The bus travels on Mountain Boulevard and continues through intersection #1, the Zoo Drive / Mountain Boulevard / Golf Links Road intersection, in the vicinity of the Master Plan area. This study unsignalized intersection would continue to operate at acceptable LOS C under Existing plus Project conditions. While AC Transit travel time would increase in conjunction with increases in traffic congestion and intersection delay at intersection #1, the Zoo Drive / Mountain Boulevard / Golf Links Road intersection, trips associated with the buildout of the amended Master Plan would not result in substantially increased travel times for AC Transit buses. The largest increase in delay during times when the bus line is in operation is 1.6 seconds during the weekday PM peak hour. Since AC Transit schedules service to the minute, an increase in delay of 1.6 seconds would not affect bus schedules. Therefore, the potential impact of the buildout of the amended Master Plan would be less-than-significant.

**Impact:** Less-than-significant

**Mitigation:** None required

**i) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?**

Under the proposed Master Plan amendment, installation of one or more of the proposed gondola support structures is expected to require use of a helicopter (see **Chapter 2, Project Description**). The helicopter would be used for up to one day during construction. Consequently, helicopter use during construction would not be expected to result in a change in air traffic patterns that would result in substantial safety risks.

The approved Master Plan did not include a gondola people-moving transportation system, and therefore helicopter use during construction was not anticipated.

Neither the proposed Master Plan amendment nor the approved Master Plan would adversely affect air traffic patterns or present a substantial air safety risk. Therefore, neither would create a significant impact in relation to this criterion, and no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

**j) Would the project substantially increase traffic hazards to motor vehicles, bicycles, or pedestrians due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?**

**Traffic Hazards During Operation.** Because zoo patrons visiting the proposed California Exhibit would travel via the proposed gondola people-moving system, roads included in the proposed Master Plan amendment are limited to a primary emergency vehicle access road, a service road/secondary emergency vehicle access road, a road extending through the California Exhibit, and a public access path (see **Chapter 2, Project Description**). Vehicles would use the roads infrequently, and therefore traffic hazards would be minimal.

**Traffic Hazards During Construction.** Potential short-term construction impacts would include impacts associated with the delivery of construction materials and equipment, and removal of construction debris. During the construction period, temporary and intermittent transportation impacts would result from truck movements as well as construction worker vehicles traveling to and from the project site. Construction-related traffic would typically be expected to occur between Monday and Friday, from 7:00 AM to 5:00 PM, with construction-related activities on weekends occurring only on an as-needed basis.

Construction-related traffic would result in a temporary reduction in the capacities of project area streets due to the slower movements and larger turning radii of construction trucks compared to passenger vehicles. Construction-related truck traffic that occurs during the peak commute hours could result in worse levels of service and higher delays at local intersections than

during off-peak hours. If parking of construction workers' vehicles cannot be accommodated within the project site, it would temporarily increase parking occupancy levels in the area. Within the vicinity of the construction site, Zoo Drive is a 30-foot-wide, two-lane roadway. The roadway configuration and width would adequately accommodate construction trucks and other heavy vehicles entering and exiting the zoo.

The total number of daily and peak hour construction-related trucks and workers would be fewer than the number of vehicle trips that would be generated by ongoing operations under the buildout of the amended Master Plan. Therefore, short-term impacts on the road and transit network would be less than the impacts from ongoing operations and would not substantially affect transportation conditions. The City of Oakland's Standard Condition of Approval addressing construction period parking and traffic management (**SCA-TRANS-1**) would reduce construction traffic impacts to less-than-significant levels and no mitigation measures are required.

**Summary.** Neither the proposed Master Plan amendment nor the approved Master Plan would substantially increase traffic hazards for motor vehicles, bicycles, or pedestrians. Therefore, neither would create a significant impact in relation to this criterion, and no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

**k) Would the project result in less than two emergency access routes for streets exceeding 600 feet in length unless otherwise determined by the Fire Chief, or his/her designee, in specific instances due to climactic, geographic or topographic conditions?**

Neither the proposed Master Plan amendment nor the approved Master Plan would result in fewer than two emergency access routes.

In accordance with Oakland Fire Department requirements, the amended Master Plan includes provision of a primary emergency vehicle access road extending from the end of Snowdown Avenue to the proposed California Exhibit. The road would be widened to approximately 20 feet in width, with turnouts located approximately every 300 feet along the road's approximately 1,450-foot length. Additionally, the amended Master Plan includes the extension of a service road from the existing upper parking lot to the proposed Veterinary Medical Hospital. This secondary emergency vehicle access road would be approximately 14 feet in width with a shoulder approximately two feet in width. (See **Chapter, 2 Project Description.**)

The approved Master Plan included an emergency vehicle access road extending from the end of Snowdown Road to the California 1820 exhibit.



Both the proposed Master Plan amendment and the approved Master Plan would provide two emergency access routes in compliance with Oakland Fire Department requirements. Therefore, neither would create a significant impact in relation to this criterion, and no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

**l) Would the project fundamentally conflict with adopted policies, plans, or programs regarding public transit, bicycles, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?**

Policies of the City of Oakland General Plan encourage alternative means of transportation, such as transit, biking, and walking. Key applicable policies include the following Land Use and Transportation Element policies (City of Oakland 1998):

*Policy T3.5: Including Bikeways and Pedestrian Walks.* The City should include bikeways and pedestrian walks in the planning of new, reconstructed, or realized streets, wherever possible.

*Policy T4.1: Incorporating Design Features for Alternative Travel.* The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking.

*Policy T6.2: Improving Streetscapes.* The city should make major efforts to improve the visual quality of streetscapes. Design of the streetscape, particularly in neighborhoods and commercial centers, should be pedestrian-oriented and include lighting, directional signs, trees, benches, and other support facilities.

Consistent with these policies, the amended Master Plan would provide for pedestrian, bicycle, and transit access to the Oakland Zoo and the rest of Knowland Park. In lieu of vehicle access to the California Exhibit, the proposed Master Plan amendment would provide for visitor access via a gondola people-moving system. Visitors would travel through the California Exhibit on foot. The amended Master Plan would provide adequate pedestrian amenities; in addition to pedestrian access within the California Exhibit, a public access path would be provided to allow pedestrian access between existing fire roads within Knowland Park. The path would be for pedestrian use only and would not be designed for motorized traffic (see **Chapter 2, Project Description**). Additionally, the extension of AC Transit bus line 46 will improve the transportation link between the Oakland Zoo and the Coliseum BART station.

Neither the proposed Master Plan amendment nor the approved Master Plan would conflict with adopted policies, plans, or programs supporting alternative transportation. Therefore, neither would create a significant impact in relation to this criterion, and no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

### 3.11.5.5 Cumulative Impacts

The traffic analysis was conducted following the guidelines established by the City of Oakland and using the ACCMA Countywide Transportation Demand model. Evaluations were conducted for the following future scenarios:

- Year 2015 Baseline;
- Year 2015 plus Project;
- Cumulative Year 2035 Baseline; and
- Cumulative Year 2035 plus Project.

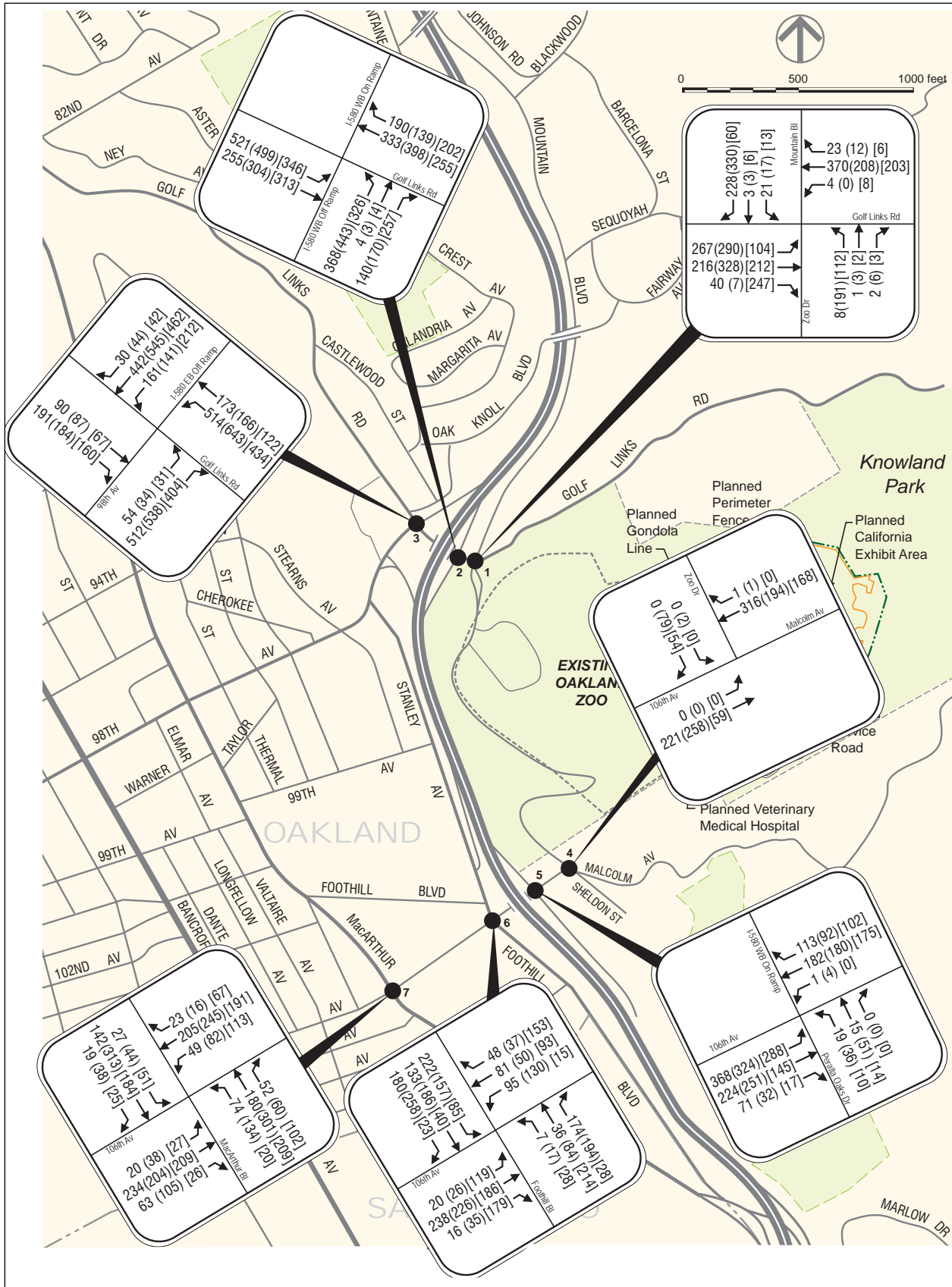
The geographic scope for assessing the potential for cumulative transportation and circulation impacts is the area encompassed by the ACCMA Countywide Transportation Demand model.

#### *Year 2015 Conditions*

**Background.** Intersection turning movement volumes for Year 2015 Baseline conditions were derived through the use of the ACCMA Countywide Transportation Demand model. The ACCMA model traffic projections for Year 2015 Baseline conditions use ABAG's Projections 2007 and reflect anticipated growth associated with future development in the area.

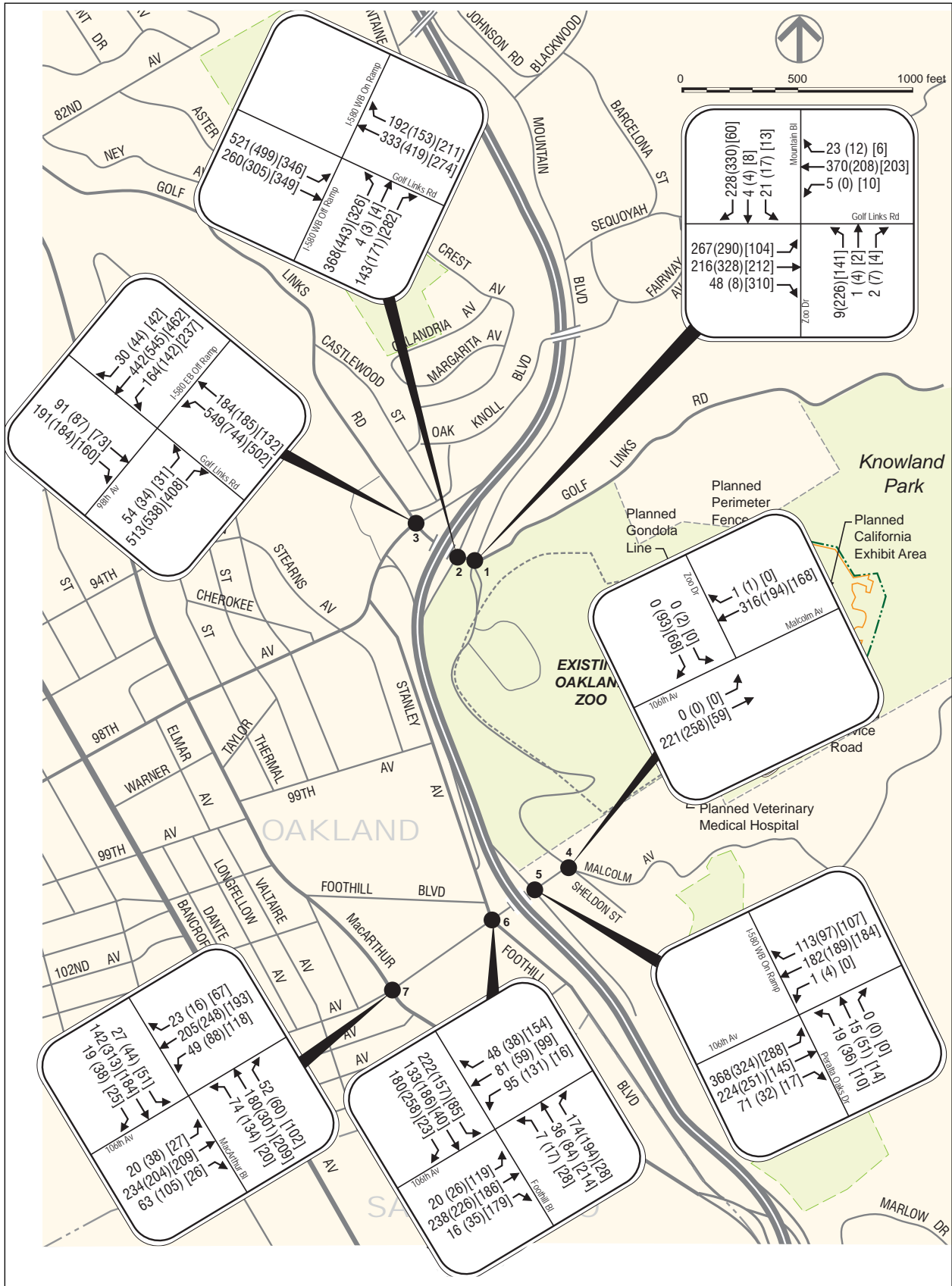
Attendance projections developed by Hausrath Economics Group (HEG) (see **Appendix D**) have been incorporated into the analysis to account for growth in zoo traffic without the project between 2010 and 2015. It was determined that approximately 629,300 visitors (174,806 vehicles) visited the facility in 2010, and it was estimated that approximately 600,000 visitors (166,667 vehicles) would visit the facility in 2015 without the buildout of the amended Master Plan (see **Table 3.11-3** and **Table 3.11-5**). Year 2015 Baseline conditions traffic volumes were adjusted to include this projected 4.7-percent decrease in annual zoo attendance from Existing Baseline conditions. This decrease was applied to all zoo-related traffic during the weekday AM and PM and weekend midday peak hours. Year 2015 Baseline conditions traffic volumes were developed by applying the ACCMA Countywide Transportation Demand model forecasted growth to the resulting weekday AM and PM and weekend midday peak hour turning movement volumes. Year 2015 Baseline traffic volumes are illustrated on **Figure 3.11-9**.

Year 2015 plus Project traffic volumes were developed by adding weekday AM and PM and weekend midday peak hour trips associated with the buildout of the amended Master Plan over Year 2015 Baseline traffic volumes. Year 2015 plus Project traffic volumes are illustrated on **Figure 3.11-10**. Levels of service at each study intersection under Year 2015 Baseline and Year 2015 plus Project conditions during the weekday AM and PM and weekend midday peak hour are summarized in **Table 3.11-10**.



SOURCE: AECOM

**Figure 3.11-9**  
 Year 2015 Baseline Traffic Volumes  
 AM (PM) [Weekend] Peak Hour



SOURCE: AECOM

**Figure 3.11-10**  
 Year 2015 Plus Project Traffic Volumes  
 AM (PM) [Weekend] Peak Hour

**TABLE 3.11-10: INTERSECTION LEVEL OF SERVICE COMPARISON: YEAR 2015 BASELINE AND YEAR 2015 PLUS PROJECT**

#	Intersection	Traffic Control <sup>1</sup>	Peak Hour	2015 Baseline		2015 plus Project	
				LOS	Delay <sup>2</sup>	LOS	Delay
1	Zoo Drive/Mountain Boulevard/ Golf Links Road	TWSC	AM	D	26.2	D	26.6
			PM	<b>E</b>	35.9	<b>E</b>	41.2
			Weekend	C	17.9	D	27.3
2	Golf Links Road/I-580 Westbound On-Ramp	Signal	AM	C	32.4	C	32.5
			PM	D	38.2	D	42.1
			Weekend	C	24.9	C	25.9
3	Golf Links Road/I-580 Eastbound Off-Ramp/ 98th Avenue	Signal	AM	C	29.0	C	29.0
			PM	C	33.3	C	33.7
			Weekend	C	29.3	C	30.2
4	106th Avenue/Malcolm Avenue/ Zoo Drive	OWSC	AM	A	0.0	A	0.0
			PM	A	9.8	B	9.9
			Weekend	A	9.5	A	9.5
5	106th Avenue/I-580 Westbound On-Ramp	AWSC	AM	B	11.6	B	11.6
			PM	B	11.5	B	11.6
			Weekend	A	10.0	A	10.0
6	106th Avenue/Foothill Boulevard	AWSC <sup>3</sup>	AM	C	21.5	C	21.5
			PM	D	25.8	D	26.5
			Weekend	D	29.4	D	30.1
7	106th Avenue/MacArthur Boulevard	Signal	AM	B	10.1	B	10.1
			PM	B	12.0	B	12.2
			Weekend	B	11.2	B	11.5

**Bold** denotes intersection operating at unacceptable conditions.

LOS = Level of Service

<sup>1</sup> AWSC = All-Way Stop-Controlled; OWSC = One-Way Stop-Controlled; TWSC = Three-Way Stop-Controlled

<sup>2</sup> The LOS and delay for one- and two-way stop-controlled intersections represent the worst movement or approach. The LOS and delay for signalized intersections and all-way stop-controlled intersections represent the average delay for all movements.

<sup>3</sup> Due to limitations in the Highway Capacity Manual methodology the three-lane eastbound approach is modeled as a two-lane approach.

Source: AECOM, 2010.

Generally, the City of Oakland considers LOS D or better acceptable for intersections outside of the downtown area. As shown in **Table 3.11-10**, the eastbound approach to intersection #1, the Zoo Drive / Mountain Boulevard / Golf Links Road intersection would operate at an unacceptable LOS E during the weekday PM peak hour, with and without the addition of project-related traffic. All other study intersections would operate at acceptable LOS under Year 2015 plus Project conditions.

A project's contribution to cumulative impacts is considered "considerable" (i.e., significant) when the project exceeds at least one of the significance criteria in future years. Presented below is a discussion of the project's contribution to Year 2015 cumulative impacts.

**a) At a study signalized intersection which is located outside the downtown area, would the project cause the Level of Service (LOS) to degrade to worse than LOS D (i.e., E) in 2015?**

As shown in **Table 3.11-10**, the buildout of the amended Master Plan would not cause the LOS to degrade to worse than LOS D at a study signalized intersection located outside the downtown area under Year 2015 plus Project conditions.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact under this criterion; therefore, no mitigation measures would be required.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) At a study signalized intersection located outside the downtown area where the Level of Service is LOS E, would the project cause the total intersection average vehicle delay to increase by four (4) or more seconds or degrade to worse than LOS E (i.e., F) in 2015?**

As shown in **Table 3.11-10**, under Year 2015 plus Project conditions, the buildout of the amended Master Plan would not cause the total intersection average delay to increase by four or more seconds or degrade to worse than LOS E (i.e., LOS F) at a study signalized intersection located outside the downtown area where the level of service is LOS E.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact under Year 2015 plus Project conditions; therefore, no mitigation measures would be required.

**Impact:** Less-than-significant

**Mitigation:** None required

**c) At a study signalized intersection for all areas where the Level of Service is LOS E, would the project cause the average delay for any of the critical movements to increase by six (6) or more seconds or degrade to worse than LOS E (i.e., F) in 2015?**

As shown in **Table 3.11-10**, under Year 2015 plus Project conditions, the buildout of the amended Master Plan would not cause an increase in the average delay for any of the critical

movements of six seconds or more or degrade LOS to worse than LOS E (i.e., LOS F) at a study signalized intersection where the level of service is LOS E.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact under Existing plus Project conditions; therefore, no mitigation measures would be required.

**Impact:** Less-than-significant

**Mitigation:** None required

- d) At a study signalized intersection for all areas where the Level of Service is LOS F, would the project cause the total intersection average vehicle delay to increase by two (2) or more seconds, or the average delay for any of the critical movements to increase by four (4) or more seconds, or the volume-to-capacity (v/c) ratio to exceed three (3) percent (but only if the delay values cannot be measured accurately) in 2015?**

As shown in **Table 3.11-10**, under Year 2015 plus Project conditions, the buildout of the amended Master Plan would not cause the total intersection average vehicle delay to increase by two or more seconds, or the average delay for any of the critical movements to increase by four or more seconds, or the v/c ratio to exceed three percent at a study signalized intersection where the level of service is LOS F.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact under this criterion; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

- e) At a study unsignalized intersection for all areas, would the project add 10 or more vehicles and after project completion satisfy the Caltrans peak hour volume warrant in 2015?**

The buildout of the amended Master Plan would add ten or more vehicles to the following study unsignalized intersections:

Intersection #1 Zoo Drive / Mountain Boulevard / Golf Links Road; and,  
Intersection #4 106th Avenue/Malcolm Avenue/ Zoo Drive.

However, buildout of the amended Master Plan would not satisfy the Caltrans peak hour volume warrants at either study unsignalized intersection during the weekday AM and PM or weekend midday peak hours under Year 2015 plus Project conditions.

With the approved Master Plan, Caltrans peak hour volume warrants were not conducted.

Caltrans peak hour volume warrant worksheets are provided in **Appendix K-3**.<sup>6</sup>

**Impact:** Less-than-significant

**Mitigation:** None required

**f) Would the project result in substantially increased travel times for AC Transit buses?**

AC Transit bus line 46 provides service between the Oakland Zoo and the Coliseum BART station with 30-minute headways between 9:00 AM and 6:30 PM on the weekdays and no service on the weekend. The bus travels on Mountain Boulevard and continues through intersection #1, the Zoo Drive / Mountain Boulevard / Golf Links Road intersection, in the vicinity of the Master Plan area. This study unsignalized intersection would operate at unacceptable LOS E during the weekday PM peak hour under Year 2015 Baseline and plus Project conditions. While AC Transit travel time would increase in conjunction with increases in traffic congestion and intersection delay at intersection #1, the Zoo Drive / Mountain Boulevard / Golf Links Road intersection, trips associated with the buildout of the amended Master Plan would not result in substantially increased travel times for AC Transit buses. The largest increase in delay during times when the bus line is in operation is 5.3 seconds during the PM peak hour. Since AC Transit schedules service to the minute, an increase in delay of 5.3 seconds would not affect bus schedules. Therefore, the potential impact of the buildout of the amended Master Plan would be less-than-significant.

**Impact:** Less-than-significant

**Mitigation:** None required

***Cumulative Year 2035 Conditions***

**Background.** Intersection turning movement volumes for Cumulative Year 2035 Baseline conditions were derived through the use of the ACCMA's Countywide Transportation Demand model. The ACCMA model traffic projections for Cumulative Year 2035 Baseline conditions use ABAG's Projections 2007 and reflect anticipated growth associated with future development in the area.

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<sup>6</sup> It should be noted that upon adoption of the California Manual on Uniform Traffic Control Devices (MUTCD) (September 26, 2006), Caltrans has adopted MUTCD peak hour volume warrants, i.e., Caltrans and MUTCD peak hour volume warrants are one and the same.



Attendance projections provided by the HEG (see **Appendix D**) have been incorporated into the analysis to account for zoo traffic between 2015 and 2035. It was determined that approximately 629,300 visitors (174,806 vehicles) visited the facility in 2010, and it is estimated that approximately 600,000 visitors (166,667 vehicles) would visit the facility in 2035 without the proposed buildout of the amended Master Plan (see **Table 3.11-3** and **Table 3.11-5**). Forecasts for Cumulative Year 2035 Baseline traffic volumes were adjusted to include the projected 4.7-percent decrease in annual zoo attendance from Existing Baseline conditions. This decrease was applied to all zoo-related traffic during the weekday AM and PM and weekend midday peak hours. Cumulative Year 2035 Baseline conditions traffic volumes were developed by applying the ACCMA Countywide Transportation Demand model forecasted growth to the resulting weekday AM and PM and weekend midday peak hour turning movement volumes. Cumulative Year 2035 Baseline traffic volumes are illustrated on **Figure 3.11-11**. Cumulative Year 2035 plus Project traffic volumes were developed by adding weekday AM and PM and weekend midday peak hour trips from the buildout of the amended Master Plan amendment over Cumulative Year 2035 Baseline traffic volumes. Year 2015 plus Project traffic volumes are illustrated on **Figure 3.11-12**. Levels of service at each study intersection under Cumulative Year 2035 Baseline and Cumulative Year 2035 plus Project conditions during the weekday AM and PM and weekend midday peak hour are summarized in **Table 3.11-11**.

Generally, the City of Oakland considers LOS D or better acceptable for intersections outside of the downtown area. As shown in **Table 3.11-11**, intersections that would already be performing unacceptably would continue to operate unacceptably with the addition of traffic associated with the proposed Master Plan amendment. The following five study intersections would operate at unacceptable conditions under Cumulative Year 2035 plus Project conditions:

Intersection #1 Zoo Drive / Mountain Boulevard / Golf Links Road (weekday PM peak hour);

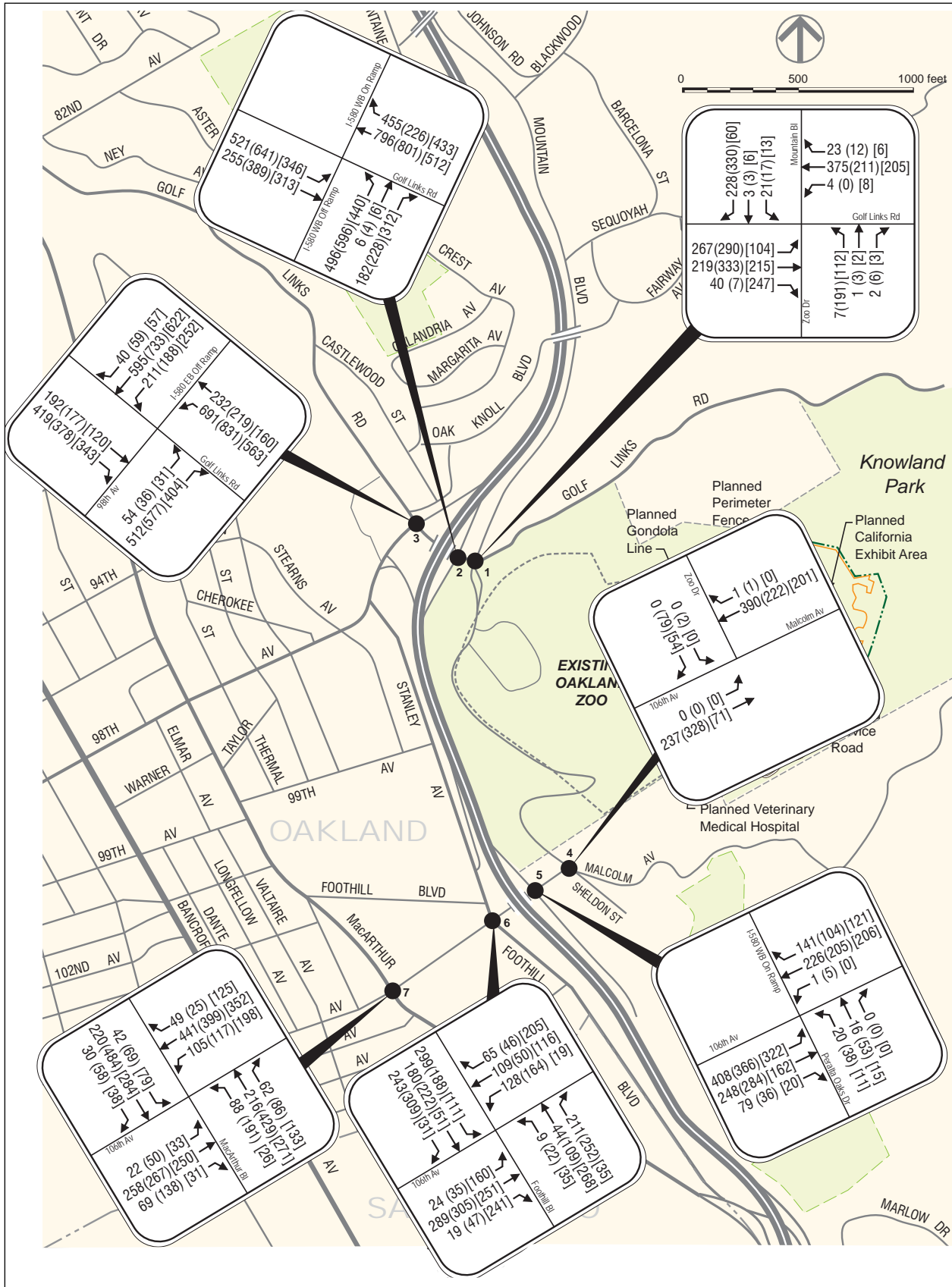
Intersection #2 Golf Links Road / I-580 Westbound On Ramp (weekday AM, weekday PM, and weekend midday peak hours);

Intersection #3 Golf Links Road / I-580 Eastbound Off Ramp / 98th Avenue (weekday PM and weekend midday peak hours);

Intersection #6 106th Avenue / Foothill Boulevard (weekday AM, weekday PM, and weekend midday peak hours); and

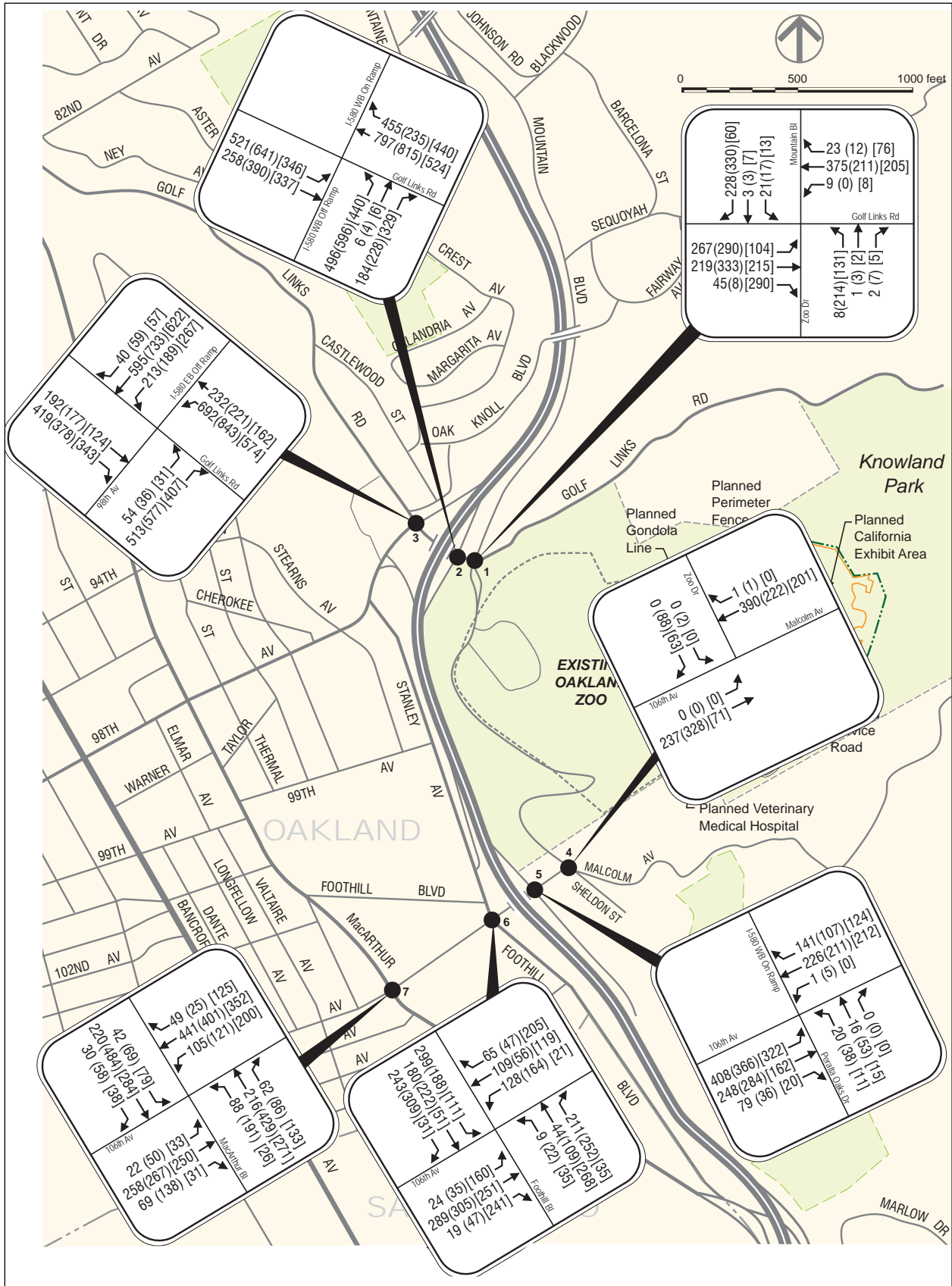
Intersection #7 106th Avenue / MacArthur Boulevard (weekend midday peak hour).

A project's contribution to cumulative impacts is considered "considerable" (i.e., significant) when the project exceeds at least one of the significance criteria in future years. Presented below is a discussion of the project's contribution to Year 2035 cumulative impacts.



SOURCE: AECOM

**Figure 3.11-11**  
 Cumulative Year 2035 Baseline Traffic Volumes  
 AM (PM) [Weekend] Peak Hour



SOURCE: AECOM

**Figure 3.11-12**  
 Cumulative Year 2035 Plus Project Traffic Volumes  
 AM (PM) [Weekend] Peak Hour

**TABLE 3.11-11: INTERSECTION LEVEL OF SERVICE COMPARISON: CUMULATIVE YEAR 2035 BASELINE AND CUMULATIVE YEAR 2035 PLUS PROJECT CONDITIONS**

#	Intersection	Traffic Control <sup>1</sup>	Peak Hour	2035 Baseline		2035 plus Project	
				LOS	Delay <sup>2</sup>	LOS	Delay
1	Zoo Drive/Mountain Boulevard/ Golf Links Road	TWSC	AM	D	26.9	D	27.2
			PM	<b>E</b>	<b>36.4</b>	<b>E</b>	<b>39.6</b>
			Weekend	C	18.2	C	23.9
2	Golf Links Road/I-580 Westbound On-Ramp	Signal	AM	<b>F</b>	<b>263.5</b>	<b>F</b>	<b>263.8</b>
			PM	<b>F</b>	<b>160.3</b>	<b>F</b>	<b>166.7</b>
			Weekend	<b>F</b>	<b>144.9</b>	<b>F</b>	<b>149.7</b>
3	Golf Links Road/I-580 Eastbound Off-Ramp/98th Avenue	Signal	AM	D	49.5	D	49.8
			PM	<b>F</b>	<b>93.1</b>	<b>F</b>	<b>93.6</b>
			Weekend	<b>E</b>	<b>55.9</b>	<b>E</b>	<b>59.2</b>
4	106th Avenue/Malcolm Avenue/ Zoo Drive	OWSC	AM	A	0.0	A	0.0
			PM	A	10.0	B	10.1
			Weekend	A	9.6	A	9.7
5	106th Avenue/I-580 Westbound On-Ramp	AWSC	AM	B	13.3	B	13.3
			PM	B	12.9	B	13.0
			Weekend	B	10.8	B	10.9
6	106th Avenue/Foothill Boulevard	AWSC <sup>3</sup>	AM	<b>F</b>	<b>75.4</b>	<b>F</b>	<b>75.4</b>
			PM	<b>F</b>	<b>85.5</b>	<b>F</b>	<b>86.9</b>
			Weekend	<b>F</b>	<b>126.7</b>	<b>F</b>	<b>128.4</b>
7	106th Avenue/MacArthur Boulevard	Signal	AM	C	24.7	C	24.7
			PM	C	33.5	C	34.8
			Weekend	<b>E</b>	<b>61.9</b>	<b>E</b>	<b>63.6</b>

**Bold** denotes intersection operating at unacceptable conditions.

LOS = Level of Service

<sup>1</sup> AWSC = All-Way Stop-Controlled; OWSC = One-Way Stop-Controlled; TWSC = Three-Way Stop-Controlled

<sup>2</sup> The LOS and delay for one- and two-way stop-controlled intersections represent the worst movement or approach. The LOS and delay for signalized intersections and all-way stop-controlled intersections represent the average delay for all movements. Delays greater than 50.0 seconds at stop-controlled intersections and 120.0 seconds at signalized intersections tend to increase exponentially and are generally considered unreliable.

<sup>3</sup> Due to limitations in the Highway Capacity Manual methodology the three-lane eastbound approach is modeled as a two-lane approach.

Source: AECOM, 2010.

**a) At a study signalized intersection which is located outside the downtown area, would the project cause the Level of Service (LOS) to degrade to worse than LOS D (i.e., E)?**

As shown in **Table 3.11-11**, the buildout of the amended Master Plan would not cause the LOS to degrade to worse than LOS D at a study signalized intersection located outside the downtown area under Cumulative Year 2035 plus Project conditions.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

**b) At a study signalized intersection located outside the downtown area where the Level of Service is LOS E, would the project cause the total intersection average vehicle delay to increase by four (4) or more seconds or degrade to worse than LOS E (i.e., F) in 2035?**

**Intersection #3: Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue.** With the buildout of the amended Master Plan, the study signalized intersection of Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue would operate at LOS E during the weekend midday peak hour under Cumulative Year 2035 plus Project conditions; however, the addition of traffic generated by the buildout of the amended Master Plan amendment would not contribute considerably to a cumulative significant impact at this intersection.

With the buildout of the amended Master Plan, the study signalized intersection of Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue would operate at LOS E during the weekend midday peak hour in 2035. The intersection would operate with a delay of 55.9 seconds under Cumulative Year 2035 Baseline conditions and 59.2 seconds under Cumulative Year 2035 plus Project conditions during the weekend midday peak hour. The increase in intersection delay would be 3.3 seconds, which is below the four-second threshold of significance. The buildout of the amended Master Plan therefore would not contribute considerably to a significant cumulative impact at this intersection under Cumulative Year 2035 plus Project conditions.

When the approved Master Plan was evaluated in the 1998 MND, the intersection of Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue had not yet been signalized. With signalization and the completion of the improvements in progress, this intersection was expected to operate at acceptable LOS C during the PM peak hour and was not analyzed during the weekend midday peak hour; therefore, no mitigation measure was recommended.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

**Intersection #7: 106th Avenue / MacArthur Boulevard.** With the buildout of the amended Master Plan, the study signalized intersection of 106th Avenue / MacArthur Boulevard would operate at LOS E during the weekend midday peak hour under Cumulative Year 2035 plus Project conditions; however, the addition of traffic generated by the buildout of the amended Master Plan would not contribute considerably to a cumulative significant impact at this intersection.

With the buildout of the amended Master Plan, the study signalized intersection of 106th Avenue / MacArthur Boulevard would operate at LOS E during the weekend midday peak hour in 2035. The intersections would operate with a delay of 61.9 seconds under Cumulative Year 2035 Baseline conditions and 63.6 seconds under Cumulative Year 2035 plus Project conditions during the weekend midday peak hour. The increase in intersection delay would be 1.7 seconds, which would not exceed the four-second threshold of significance. The buildout of the amended Master Plan amendment therefore would not contribute to a significant cumulative impact at this intersection under Cumulative Year 2035 plus Project conditions.

When the approved Master Plan was evaluated in the 1998 MND, the intersection of 106th Avenue / MacArthur Boulevard was not analyzed. No impacts were identified and no mitigation measures were recommended.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

- c) **At a study signalized intersection for all areas where the Level of Service is LOS E, would the project cause the average delay for any of the critical movements to increase by six (6) or more seconds or degrade to worse than LOS E (i.e., F) in 2035?**

**Intersection #3: Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue.** With the buildout of the amended Master Plan, the study signalized intersection of Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue would operate at LOS E during the weekend midday peak hour under Cumulative Year 2035 plus Project conditions; however, the addition of traffic generated by the buildout of the amended Master Plan amendment would not contribute considerably to a cumulative significant impact at this intersection.

The eastbound right and northbound left critical movements would operate with a delay of 37.3 seconds and 40.6 seconds, respectively, under Cumulative Year 2035 Baseline conditions, and 37.6 seconds and 40.8 seconds, respectively, under Cumulative Year 2035 plus Project conditions during the weekend midday peak hour. The increase in critical movement delay would be 0.3 second and 0.2 second, respectively, which would not exceed the six-second threshold of significance. The proposed Master Plan amendment therefore would not contribute considerably to a significant cumulative impact at this intersection under Cumulative Year 2035 plus Project conditions during the weekend midday peak hour.

When the approved Master Plan was evaluated in the 1998 MND, the intersection of Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue had not yet been signalized and was not analyzed during the weekend midday peak hour; therefore, no mitigation measure was recommended.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

**Intersection #7: 106th Avenue / MacArthur Boulevard.** With the buildout of the amended Master Plan amendment, the study signalized intersection of 106th Avenue / MacArthur Boulevard would operate at LOS E during the weekend midday peak hour under Cumulative Year 2035 plus Project conditions; however, the addition of traffic generated by the buildout of the amended Master Plan would not contribute considerably to a cumulative significant impact at this intersection.

The westbound left-through-right critical movements would operate with a delay of 145.8 seconds under Cumulative Year 2035 Baseline conditions and 149.7 seconds under Cumulative Year 2035 plus Project conditions during the weekend midday peak hour. The increase in critical movement delay would be 3.9 seconds, which would not exceed the six-second threshold of significance. The buildout of the amended Master Plan therefore would not contribute considerably to a significant cumulative impact at this intersection under Cumulative Year 2035 plus Project conditions.

When the approved Master Plan was evaluated in the 1998 MND, the intersection of 106th Avenue / MacArthur Boulevard was not analyzed; therefore, no impacts were identified and no mitigation measures were recommended.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

- d) **At a study signalized intersection for all areas where the Level of Service is LOS F, would the project cause the total intersection average vehicle delay to increase by two (2) or more seconds, or the average delay for any of the critical movements to increase by four (4) or more seconds, or the volume-to-capacity (v/c) ratio to exceed three (3) percent (but only if the delay values cannot be measured accurately) in 2035?**

**Intersection #2: Golf Links Road / I-580 Westbound On-Ramp.** With the buildout of the amended Master Plan, the study signalized intersection of Golf Links Road / I-580 Westbound On-Ramp would operate at LOS F during the weekday AM and PM and weekend midday peak hours under Cumulative Year 2035 plus Project conditions; however, the addition of traffic generated by the buildout of the amended Master Plan would not contribute considerably to a cumulative significant impact at this intersection.

Because delay values over 120.0 seconds tend to increase exponentially and are thus generally considered unreliable, the increase in v/c ratio as a result of the buildout of the amended Master Plan traffic was evaluated instead. The intersection would operate with a v/c ratio of 1.46 under Cumulative Year 2035 Baseline conditions and 1.47 under Cumulative Year 2035 plus Project conditions during the weekday AM peak hour. During the weekday PM peak hour, the intersection would operate with a v/c ratio of 1.34 under Cumulative Year 2035 Baseline conditions and 1.36 under Cumulative Year 2035 plus Project conditions. During the weekend midday peak hour, the intersection would operate with a v/c ratio of 1.13 under Cumulative Year 2035 Baseline conditions and 1.15 under Cumulative Year 2035 plus Project conditions. Since the maximum increase in v/c ratio would not exceed the three-percent threshold of significance, the buildout of the amended Master Plan would not contribute considerably to a cumulative significant impact at this intersection under Cumulative Year 2035 plus Project conditions.

When the approved Master Plan was evaluated in the 1998 MND, the intersection of Golf Links Road / I-580 Westbound On-Ramp had not yet been signalized. With signalization and the completion of the improvements in progress, this intersection was expected to operate at acceptable LOS C during the weekday PM peak hour and no mitigation measure was recommended. The intersection was not analyzed during the weekday AM or weekend midday peak hours.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

**Intersection #3: Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue.** With the proposed Master Plan amendment, the study signalized intersection Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue would operate at LOS F during the weekday PM peak hour under Cumulative Year 2035 plus Project conditions; however, the addition of traffic generated by the buildout of the amended Master Plan would not contribute considerably to a significant cumulative impact at this intersection.



The intersection would operate with a delay of 93.1 seconds under Cumulative Year 2035 Baseline conditions and 93.6 seconds under Cumulative Year 2035 plus Project conditions during the weekday PM peak hour (see **Table 3.11-13**). Since the increase in intersection average delay would be 0.5 second, which would not exceed the two-second threshold of significance, critical movement delay was analyzed.

The eastbound right and northbound left critical movements would operate with a delay of 50.2 seconds and 44.4 seconds, respectively, under Cumulative Year 2035 Baseline conditions, and 50.3 seconds and 44.5 seconds, respectively, under Cumulative Year 2035 plus Project conditions during the weekday PM peak hour. The increase in critical movement delay would be 0.1 second, which would not exceed the four-second threshold of significance. The buildout of the amended Master Plan therefore would not contribute considerably to a significant cumulative impact at this intersection under Cumulative Year 2035 plus Project conditions during the weekday PM peak hour.

When the approved Master Plan was evaluated in the 1998 MND, the intersection of Golf Links Road / I-580 Eastbound Off-Ramp / 98th Avenue had not yet been signalized. With signalization and the completion of the improvements in progress, this intersection was expected to operate at acceptable LOS C during the weekday PM peak hour; therefore, no mitigation measure was recommended.

Neither the proposed Master Plan amendment nor the approved Master Plan would contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

**Impact:** Less-than-significant

**Mitigation:** None required

**e) At a study unsignalized intersection for all areas, would the project add 10 or more vehicles and after project completion satisfy the Caltrans peak hour volume warrant in 2035?**

Although Intersection #6 106th Avenue / Foothill Boulevard would operate at unacceptable conditions under Cumulative Year 2035 plus Project conditions, the buildout of the amended Master Plan would not add ten vehicle trips to the study unsignalized intersection. The buildout of the amended Master Plan would not contribute considerably to a significant cumulative impact; therefore, no mitigation measures are required.

The buildout of the amended Master Plan would add ten or more vehicles to the following study unsignalized intersections:

Intersection #1 Zoo Drive / Mountain Boulevard / Golf Links Road; and,

Intersection #4 106th Avenue/Malcolm Avenue/ Zoo Drive.

After project completion Caltrans peak hour volume warrants would not be met at either of the study unsignalized intersection during the weekday AM and PM or weekend midday peak hours under 2035 plus Project conditions.

Caltrans peak hour volume warrant worksheets are provided in **Appendix K-3**.<sup>7</sup>

**Impact:** Less-than-significant

**Mitigation:** None required

**f) Would the project result in substantially increased travel times for AC Transit buses?**

AC Transit bus line 46 provides service between the Oakland Zoo and the Coliseum BART station with 30-minute headways between 9:00 AM and 6:30 PM on the weekdays and no service on the weekend. The bus travels on Mountain Boulevard and continues through intersection #1, the Zoo Drive / Mountain Boulevard / Golf Links Road intersection, in the vicinity of the Master Plan area. This study unsignalized intersection would continue to operate at unacceptable LOS E during the weekday PM peak hour under Cumulative Year 2035 Baseline and plus Project conditions. While AC Transit travel time would increase in conjunction with increases in traffic congestion and intersection delay at intersection #1, the Zoo Drive / Mountain Boulevard / Golf Links Road intersection, trips associated with the proposed Master Plan amendment would not result in substantially increased travel times for AC Transit buses because the average delay would increase by only 3.2 seconds. The largest increase in delay during times when the bus line is in operation is 3.2 seconds during the PM peak hour. Since AC Transit schedules service to the minute, an increase in delay of 5.3 seconds would not affect bus schedules. Therefore, the potential impact of the buildout of the amended Master Plan would be less-than-significant.

**Impact:** Less-than-significant

**Mitigation:** None required

### **3.11.5.6 Planning-Related Non-CEQA Considerations**

This subsection discusses transportation-related topics that are not considerations under CEQA but are evaluated to inform decision makers and the public about these issues.

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<sup>7</sup> It should be noted that upon adoption of the California Manual on Uniform Traffic Control Devices (MUTCD) (September 26, 2006), Caltrans has adopted MUTCD peak hour volume warrants, i.e., Caltrans and MUTCD peak hour volume warrants are one and the same.

**Transit Ridership.** This discussion evaluates the proposed Master Plan amendment’s potential to:

Increase the average ridership on AC Transit lines by three (3) percent at bus stops where the average load factor in place would exceed 125 percent over a peak thirty minute period.

Based on observations of existing zoo transit trips and transit mode share, the buildout of the amended Master Plan would not be expected to generate significant transit trips during the weekday AM or PM peak hour. AC Transit does not provide service to the Oakland Zoo on the weekend. The buildout of the amended Master Plan would not be expected to increase ridership by three percent. Therefore, the impact to transit ridership would be less-than-significant.

**Parking Impacts.** The Court of Appeal has held that parking is not part of the permanent physical environment, that parking conditions change over time as people change their travel patterns, and that unmet parking demand created by a project need not be considered a significant environmental impact under CEQA unless it would cause significant secondary effects. Parking supply/demand varies by time of day, day of week, and seasonally. As parking demand increases faster than the supply, parking prices rise to reach equilibrium between supply and demand. Decreased availability and increased costs result in changes to people’s mode and pattern of travel. However, the City of Oakland, in its review of the proposed Master Plan amendment, wants to ensure that the zoo’s parking supply, along with measures to lessen parking demand (by encouraging the use of non-auto travel modes), would result in minimal adverse effects on zoo visitors, and that any secondary effects (such as on air quality due to drivers searching for parking spaces) would be minimized. As such, although not required by CEQA, parking conditions are evaluated in this SMND/Addendum.

Parking deficits may be associated with secondary physical environmental impacts, such as air quality and noise effects, caused by congestion resulting from drivers circling as they look for a parking space. However, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, shuttles, taxis, bicycles or travel by foot), may induce drivers to shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service, in particular, would be in keeping with the City’s “Transit First” policy.

Additionally, regarding potential secondary effects, cars circling and looking for a parking space in areas of limited parking supply is typically a temporary condition, often offset by a reduction in vehicle trips due to others who are aware of constrained parking conditions in a given area. Hence, any secondary environmental impacts that might result from a shortfall in parking in the amended Master Plan are considered less-than-significant.

This SMND/Addendum evaluates whether the estimated parking demand associated with the buildout of the amended Master Plan would be met by the proposed parking supply or by the

existing parking supply within a reasonable walking distance of the Master Plan area. Project-displaced parking results from a project's removal of standard on-street parking, City or Redevelopment Agency owned/controlled parking, and/or legally required off-street parking (non-open-to-the-public parking that is legally required). The buildout of the amended Master Plan would not displace any existing parking.

**Parking Supply.** The buildout of the amended Master Plan does not include any additional parking and no additional parking spaces would be provided. The Oakland Zoo currently provides 872 striped spaces (including 17 ADA-accessible spaces) and 300 unstriped parking spaces for staff and visitors. At completion of the amended Master Plan, the existing total of 1,172 spaces would remain. On-street parking or parking within the residential areas adjacent to the zoo is not routinely used by visitors, because space is typically available in the parking lots and long walking distances make off-site parking less desirable.

The zoo currently has one formal bicycle rack at the main zoo entrance which has the capacity to serve up to seven bicycles. The City of Oakland Municipal Code has no specific bicycle facility requirements for a zoo; however, it does state that in cases where the Municipal Code does not prescribe a number of spaces, the Director of City Planning is required to prescribe a number of bicycle parking spaces based on the number of employees, residents, or customers and the nature of operations conducted on the site (City of Oakland Planning Code, Section 17.117.040, 2010). A number of observations conducted during weekday and weekend periods did not observe any bicycles parked at the rack. Current demand for bicycle parking is estimated to be considerably less than supply. Demand would not be expected to substantially increase with the project. The zoo would provide new bicycle racks as determined by the Director of City Planning.

**Project Parking Demand.** Parking demand was compared to parking supply in order to identify any deficits or surpluses. Hourly vehicle arrival and departure information collected from pneumatic hose counts taken at the zoo driveways in April 2009 was used to determine the rate of accumulation and peak hour of occupancy in the zoo parking lot. These parking occupancies were confirmed through field counts. Historical zoo-collected data on entrances and exits were also used to assess existing parking demand. Because vehicle traffic is approximately 15 percent lower during the month of April (when the hose counts were conducted) the weekday and weekend peak parking demand was factored up to determine the seasonally adjusted peak parking demand. Parking demand generated by the buildout of the amended Master Plan was calculated based on an annual increase of 150,000 visitors under Existing and Year 2015 conditions, and an annual increase of 100,000 visitors under Year 2035 conditions, resulting from California Exhibit attendance. Existing weekday and weekend parking demand was factored up based on this attendance increase to determine parking demand for the buildout of the amended Master Plan under Existing conditions, Year 2015 conditions, and Year 2035

conditions. Parking demand associated with the buildout of the amended Master Plan is summarized in **Table 3.11-12**.

**TABLE 3.11-12: PARKING DEMAND ASSOCIATED WITH BUILDOUT OF AMENDED MASTER PLAN**

Scenario	Weekday Peak Hour (number of spaces)	Weekend Peak Hour (number of spaces)
Existing and Year 2015 Conditions <sup>1</sup>	58	108
Cumulative Year 2035 Conditions <sup>2</sup>	39	72

<sup>1</sup> Parking demand for Existing and Year 2015 conditions is based on projected annual attendance of 150,000 visitors. Projections provided by Hausrath Economics Group, 2010.

<sup>2</sup> Parking demand for Year 2035 conditions is based on projected annual attendance of 100,000 visitors. Projections provided by Hausrath Economics Group, 2010.

Source: AECOM, 2010.

The parking lot currently operates under capacity during the weekday and weekend midday peak hours. As shown in **Table 3.11-12**, the buildout of the amended Master Plan would increase weekday parking demand by 58 spaces and weekend parking demand by 108 spaces under Existing and Year 2015 conditions, and would increase weekday parking demand by 39 spaces and weekend parking demand by 72 spaces under Year 2035 conditions. Estimated weekday and weekend parking demand is summarized in **Table 3.11-13**.

**TABLE 3.11-13: PARKING DEMAND: EXISTING CONDITIONS, YEAR 2015 CONDITIONS, AND CUMULATIVE YEAR CONDITIONS WITH AND WITHOUT BUILDOUT OF AMENDED MASTER PLAN**

Scenario	Weekday Peak Hour	Weekend Peak Hour
Existing Conditions	358	664
plus Buildout of Amended Master Plan <sup>1</sup>	416	772
Year 2015 Conditions	320	633
plus Buildout of Amended Master Plan <sup>1</sup>	378	741
Cumulative Year 2035 Conditions	320	633
plus Buildout of Amended Master Plan <sup>2</sup>	359	705

<sup>1</sup> Parking demand for Existing and Year 2015 conditions is based on projected annual attendance of 150,000 visitors. Projections provided by Hausrath Economics Group, 2010.

<sup>2</sup> Parking demand for Year 2035 conditions is based on projected annual attendance of 100,000 visitors. Projections provided by Hausrath Economics Group, 2010.

Source: AECOM, 2010.

As indicated by the estimates in **Table 3.11-13**, the existing total of 1,172 spaces would be adequate to meet weekday and weekend peak period demand under all scenarios. No additional parking is required.

Bicycle parking demand is not expected to increase substantially. Site observations conducted during the midday period (Wednesday, April 21, 2009) showed a majority of bicycle parking in the zoo vicinity was unoccupied. The buildout of the amended Master Plan is not expected to significantly increase demand for bicycle parking; thus, it was determined that there would be adequate bicycle parking supply to meet peak period demand under all scenarios. No additional bicycle parking is required.

### **3.11.5.7 Summary**

In summary, neither the approved Master Plan reviewed in the 1998 MND nor the proposed Master Plan amendment reviewed in this SMND/Addendum would result in any significant cumulative impacts on transportation or circulation.

### 3.11.6 CONCLUSIONS

The buildout of the amended Master Plan would not result in significant new transportation and circulation impacts or a substantial increase in the severity of previously identified transportation and circulation impacts compared to the 1998 MND. Thus, impacts would be similar to those addressed in the 1998 MND, and would continue to be less-than-significant. Previously imposed mitigation measures from the 1998 MND have been identified and, where appropriate, have been clarified, refined, or deleted. This section also identified the applicable provisions of the City's Standard Conditions of Approval. No new mitigation measures are required.

### 3.11.7 REFERENCES

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CHAPTER

4

**PERSONS INVOLVED IN  
REPORT PREPARATION**

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**4.1 CITY OF OAKLAND**

COMMUNITY & ECONOMIC DEVELOPMENT AGENCY

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