File No. ER960036
Ref No. _____

City of Oakland
Oakland, California

INITIAL STUDY AND ENVIRONMENTAL REVIEW CHECKLIST
California Environmental Quality Act (CEQA)

I. **PROJECT PROPONENT:** Dr. Joel Parrott, Executive Director, Oakland Zoo
East Bay Zoological Society

II. **PROJECT NAME:** Oakland Zoo in Knowland Park Master Plan

III. **PROJECT ADDRESS AND LOCATION:** 9777 Golf Links Road, Oakland, CA 94605
The Zoo is located in south Oakland, east of Interstate-580 and adjacent to Anthony Chabot Regional Park.

IV. **LEAD AGENCY:** City of Oakland
Community and Economic Development Agency
Zoning Division
1330 Broadway, 2nd Floor
Oakland, CA 94612

Agency Contact: Anu Raud Telephone No. (510) 238-6346

V. **ENVIRONMENTAL DETERMINATION:**

On the basis of this initial environmental evaluation:

☐ I find that the proposed project *could not* have a significant effect on the environment, and a Negative Declaration will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the attached *mitigation measures* have been incorporated into the project. Therefore, a **Mitigated Negative Declaration** will be prepared.

☐ I find that the proposed project *may* have a significant effect on the environment, and an **Environmental Impact Report** (EIR) is required to assess the effects on the environment.

WILLIE YEE
Environmental Review Officer

By: ANU RAUD
Environmental Review Coordinator

Anu Raud 3-28-97
Signature Date

ATTACHMENT F

VI. DESCRIPTION OF THE PROJECT

BACKGROUND

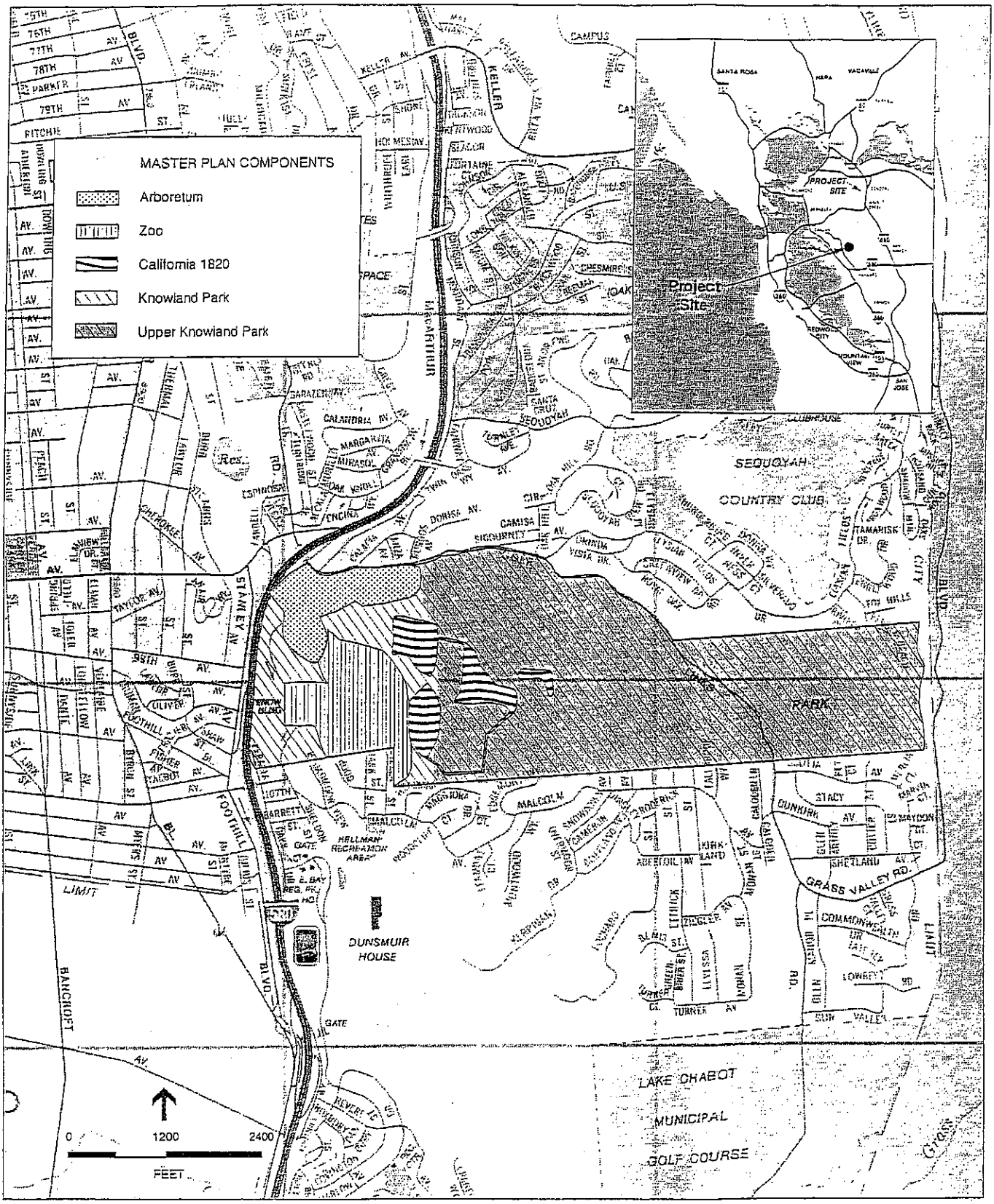
The East Bay Zoological Society (EBZS) has prepared an updated Master Plan for the Oakland Zoo in Knowland Park to provide expanded programs and facilities to meet future growth needs. The proposed Master Plan is an update of an earlier Master Plan prepared in 1990. This Master Plan represents a refinement of the earlier planning document. Extensive environmental studies of the site have been conducted to identify sensitive resources. Utilizing these studies, the Master Plan update has been designed to minimize or avoid impacts to sensitive resources. The Master Plan provides a development program for new facilities to be constructed over the next 20 years. The EBZS also has applied for a Major Conditional Use Permit.

THE PROJECT

The Oakland Zoo in Knowland Park (the Park) is composed of three unique landscape environments: the Arboretum, the Zoo, and Upper Knowland Park. The Park totals 443 acres of which 350 acres are in the undeveloped Upper Knowland Park, 56 acres are within the Arboretum, and 37 acres are in the Zoo (see Figure 1: Master Plan Components). The 1996 Master Plan is designed to minimize disturbance to undeveloped lands by clustering new development and efficiently using existing developed areas. The Master Plan would preserve approximately 73% (325 acres) of the site as open space. The remaining 27% (118 acres) of the site represents existing and planned development for zoological and recreational use. The Master Plan proposes new development affecting 118 acres. Of this, approximately 25 acres of undeveloped lands located in Upper Knowland Park would be developed and the remaining 93 acres would consist of improvements and new projects within the developed 37-acre Zoo and 56-acre Arboretum.. Table 1 presents a breakdown of existing and proposed development.

TABLE 1: EXISTING AND PROPOSED AREAS OF DEVELOPMENT

	Existing (acres)	Proposed (acres)
Undeveloped Lands	350	325
Arboretum	56	56
Zoo	37	37
California 1820	0	25
Total	443	443



SOURCE: Amphion Environmental, Inc.

Figure 1
Master Plan Components

The proposed projects included in the Master Plan are based on future growth needs for the expansion of programs and facilities. New development is planned to be in compliance with the standards set forth in the Americans with Disabilities Act (ADA). The Master Plan also proposes habitat enhancement and revegetation with native plants throughout the Park as the proposed new development is implemented. The natural oak woodland, native grasslands, coast scrub and riparian woodland communities will be augmented by plants of appropriate oaks, redwoods, bay trees, bunch grasses, shrub species and others, such as eucalyptus, French broom and other exotic plants are removed.

MAJOR COMPONENTS OF THE MASTER PLAN

The Master Plan is organized into three major components: Arboretum, Zoo, and California 1820. Presented below is a brief description of each component. The Arboretum and Zoo are existing areas in the Park and would undergo facility improvements. California 1820 represents a new development and would include construction in undeveloped land areas. Figure 2 shows the project site plan.

Arboretum

The existing Arboretum includes an international collection of trees planted by Frederick Talbot, an early Bay Area lumber and shipping magnate whose estate was located in this portion of the Zoo. Group and individual picnic areas are currently dispersed throughout the meadow and knoll. Parking facilities are available for 335 cars; and an additional 183 spaces are available in an overflow parking lot.

Improvements proposed by the Master Plan include:

- Center for Science and Environmental Education including approximately 16,695 square feet consisting of four classrooms (each 35 seating capacity), library, offices (relocating existing staff from temporary office facilities), a small theater (40 seating capacity), and auditorium (143 seating capacity). Existing parking facilities will be used for staff and visitors; and three new parking spaces will be provided for the three Zoo Mobiles.
- Three new picnic shelters.
- Removal of existing restrooms from riparian corridor and construction of a new restroom.
- Pedestrian hiking trail connecting the meadow with Upper Knowland Park.
- Existing one-way access road widened to 30 feet to accommodate two-way traffic and bicycle/ pedestrian lane.
- New plantings installed as Arboretum ages.

Zoo

The Zoo contains exhibits of exotic animals in natural habitats, a children's rides area, and a Children's Zoo. Over the next ten years the animal exhibits will be arranged to highlight three major environmental themes: the African Savanna, Tropical Rainforests of the World, and California 1820. The African Savanna and Tropical Rainforests of the World are planned to be located in the existing boundaries of the Zoo, and the proposed California 1820 exhibit would be located in both the Zoo and Upper Knowland Park.

SOURCE: Amphion Environmental, Inc.

Figure 2
Site Plan

Parking facilities are available for 556 cars. The Snow Building is presently available for parties and receptions, and its adjacent parking lot can accommodate 26 cars.

Improvements proposed by the Master Plan include:

- In the African Savanna, a new trail extending from the existing elephant exhibit to the center of the Zoo will be constructed. Along this trail new exhibits will include warthog, green monkeys and hyena, and overlooks will provide opportunities to view the lions, impala, greater kudu and baboon exhibits.
- In the African Savanna, a small African village will provide visitor services including a restroom, food service, and cultural hut adjacent to existing elephant exhibit.
- In the Tropical Rainforest, additional dense plantings will be added to the existing exhibits along Rainforest trails to create a tropical environment. Graphics, state-of-the-art enrichment tools and interactive displays for educational and interpretive purposes will be installed.
- Australian Walk About will include a new visitor pathway and provide a new home in an area of tall eucalyptus trees for the Zoo's existing wallabies, wallaroos and large flightless emus
- Improvements and upgrades to existing Children's Zoo.
- Improvements to the Snow Building including upgraded kitchen and restroom facilities.
- Paving existing overflow parking lots (292 spaces) in the future to accommodate attendance increases.
- A wall located along the southerly boundary across from the main parking area to screen parking from adjacent residences and provide a sound barrier.
- Improved Safari Restaurant and gift center.
- Improved main entrance including landscaping, new ticket booths, new signage and banners.
- Improved secondary entrance (Summer entrance) including landscaping, new ticket booth, signage and banners.
- Other improvements and upgrades to the Zoo.

California 1820

California 1820 will be located primarily in Upper Knowland Park and represents new development on approximately 25 acres of undeveloped land. The central theme focuses on regional extinction, featuring native California species which occurred prior to the Gold Rush. Five ecological units will be highlighted by the exhibits: grassland, chaparral, oak woodland, riparian and canyon.

Improvements proposed by the Master Plan include:

- Canyon Exhibit featuring golden eagle, jaguar, bald eagle, white tailed deer, bobcat, great horned owl, walk-through aviary and California reptile.
- River Exhibit featuring grizzly bear, Tule elk, river otter, great blue heron and sand crane.
- American Bison, cougar, barn owl, and grey wolf exhibits.
- California Interpretive Center providing viewing platform and interpretive exhibits.
- Off-site Breeding area.

- Paving of existing fire road to accommodate shuttle bus.

PROJECT PHASING

The Master Plan presents a development program for the next 20 years. Project phasing will occur in three primary phases: Phase I - Center for Science and Environmental Education; Phase II - California 1820; and Phase III - on-going improvements.

Phase I - Development of Center for Science and Environmental Education. Construction of this facility is planned for the Spring of 1997 with completion of construction and occupation of the facility scheduled to occur in December 1997.

Phase II - Development of the California 1820 exhibit which is planned to commence in 2000 with completion in 2001.

Phase III - On-going Park enhancements and maintenance will occur commencing in the Spring of 1997 and continue throughout the 20-year planning horizon of the Master Plan. The type of activities that will occur include exhibit improvements and relocations, landscaping, renovations, and maintenance

PARK OPERATIONS

The Park is open daily from 10:00 a.m. to 4:00 p.m. The Park is closed on Thanksgiving and Christmas days; and may close when weather conditions are severe. The Snow Building is available for rental by the public on a daily basis for daytime and evening events. Events at the Snow Building may not extend beyond 2:00 a.m.

VII. DESCRIPTION OF THE ENVIRONMENTAL SETTING

The Park is located off of Golf Links Road and is situated between I-580 to the west and Chabot Regional Park to the east. The Proposed Master Plan represents a plan for the entire 443-acre Park property. The site comprises gently rolling to hilly terrain with oak woodland dispersed on the slopes of ridges. Existing development comprises the Zoo and Arboretum, located at the westerly end of the property; and the undeveloped open space of Upper Knowland Park which encompasses the eastern portion of the property.

The Park is within the One-Family Residential (R-30) Zone. The R-30 zone permits the development of permanent residential activities and civic activities that can be classified as either essential service or limited childcare. The development proposed by the Master Plan may be permitted upon the granting of a conditional use permit. The project would be required to obtain approval by the Oakland Planning Commission of a Major Conditional Use Permit. The Commission's action would be appealable to the City Council.

VIII. ENVIRONMENTAL EFFECTS

(CEQA requires that an explanation of all answers except No Impacts be provided along with this checklist, including a discussion of ways to mitigate any significant effects identified. A "No Project" answer must be adequately supported by the referenced information sources cited. As defined here, a significant effect is considered a substantial adverse effect.)

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Earth. Will the project result in:				
1. Unstable earth conditions, including mudslides, landslides or changes in geologic substructures either on or off-site?	☐	☒	☐	☐

Comment

A geotechnical report prepared by Harza for the Center for Science and Environmental Education and African Savanna Exhibit and field observations, indicate the presence of unstable slopes on the site. In addition, the site is located in an area designated as "most susceptible to landsliding on "Map 1D Landslide Potential" in the *Oakland General Plan Update Land-Use and Transportation Element Technical Report #6*. Unstable slopes can be undermined by seismic activity, heavy precipitation, cutting and filling activities, and over burden leading to landslides and mudslides. Slope failure could pose hazards to people, animals and Park facilities. These hazards can be increased if structures and facility improvements are not properly designed and constructed. Impacts associated with slope failure could be significant but can be mitigated to less than significant levels through conformance with the following engineering and design standards and procedures.

Mitigation Measures

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.

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.

1c) Additional geotechnical studies shall be required prior to design and construction of the remaining proposed Master Plan buildings, roads and facilities.

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.

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.

Significance after Mitigation: Less than significant.

Source: ESA, *Oakland Zoo Master Plan Update Special Studies Preliminary Geology Study Technical Report*, September 1995.
Harza, *Fault Rupture Hazard and Geotechnical Investigation for Environmental Education Center and Building Additions Oakland Zoo, Oakland, California*, April 29, 1994.
Naval Medical Center Oakland and City of Oakland, *Draft EIS/EIR for the Disposal and Reuse of the Naval Medical Center Oakland*, September 1996.
City of Oakland, *Oakland General Plan Update, Land Use and Transportation Element, Technical Report #6*, October 1995.
City of Oakland, *Chabot Observatory and Science Center, Draft EIR*, August 28, 1995.
City of Oakland, *Ordinance No. 10312, Article 6, Grading, Excavation and Fill.*
U.S.G.S., 7.5 Minute Series (Topographic) Map, Oakland East Quadrangle.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
2. Any increase in wind or water erosion of soils, either on or off-site, due to increased water runoff caused by conversion of pervious to impervious surfaces or to other factors?	☐	☒	☐	☐

Comment

The Master Plan proposes new facilities and roadways on varying degrees of slope. Steeper slopes generally have a higher erosion potential than flatter slopes. There are high levels of erosion on the areas of the site with steep slopes.

Conversion of pervious surfaces to impervious surfaces, such as building foundations and pavement, could increase on-site erosion. However, the amount of surface area proposed to be converted would not be substantial to significantly increase on-site erosion. In addition, unvegetated areas on the site, such as the Shuttle Road, are currently susceptible to substantial erosion due to surface water runoff. In fact, paving these unvegetated areas and installing drainage controls, as proposed in the Master Plan, would substantially reduce on-site erosion.

Construction activities may also induce short-term erosion impacts. However, project compliance with Ordinance No. 10312 and the recommended mitigation measures will reduce potential erosion impacts to a less than significant level.

Mitigation Measures

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.

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 as outlined in the California Stormwater Best Management Practice Handbook, Construction Activity, shall be implemented to reduce erosion.

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 erosioin.

2d) Erosion control methods and implementation procedures shall be monitored during construction and modified as conditons warrant.

Significance after Mitigation: Less than significant.

Source: Harza, *Fault Rupture Hazard and Geotechnical Investigation for Environmental Education Center and Building Additions Oakland Zoo, Oakland, California*, April 29, 1994.
Naval Medical Center Oakland and City of Oakland, *Draft EIS/EIR for the Disposal and Reuse of Naval Medical Center Oakland*, September 1996.
City of Oakland, *Oakland General Plan Update, Land Use and Transportation Element, Technical Report #6*, October 1995.
City of Oakland, *Ordinance No. 10312, Article 6, Grading, Excavation and Fill.*
U.S.G.S., 7.5 Minute Series (Topographic) Map, Oakland East Quadrangle.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
3. Changes in deposition or erosion that result in changes in siltation, deposition or erosion which may modify the channel of a creek, inlet, lake, or any other waterway?	☐	☒	☐	☐

Comment

There are several intermittent and ephemeral waterways located throughout the site. In addition, Arroyo Viejo Creek, a perennial waterway flows along the northern boundary of the site. Erosion during construction and uncontrolled surface water runoff has the potential to increase soil deposition, resulting in water quality degradation and potential changes to channel capacity and flow patterns. Construction activities must be in compliance with Ordinance No. 10312 and the recommended mitigation measures would reduce these potential impacts to a less than significant level.

Mitigation Measures

3a) Mitigation Measures 2a - 2d shall be implemented.

Significance after Mitigation: Less than significant.

Source: ESA, *Oakland Zoo Master Plan Update Special Studies Preliminary Geology Study Technical Report*, September 1995.
Harza, *Fault Rupture Hazard and Geotechnical Investigation for Environmental Education Center and Building Additions Oakland Zoo, Oakland, California*, April 29, 1994.
City of Oakland, *Ordinance No. 10312, Article 6, Grading, Excavation and Fill.*
U.S.G.S., 7.5 Minute Series (Topographic) Map, Oakland East Quadrangle.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
4. Major changes in topography or ground surface relief features, or disruptions, displacements, compaction or overcovering of the soil?	☐	☒	☐	☐

Comment

Although minimal grading would be required to construct new facilities and recontour the proposed Shuttle Road, significant alterations to topography and ground surface relief would not occur as a result of the proposed project because facilities have been designed to accommodate the existing natural topography.

The geotechnical report prepared by Harza for the Center for Environmental Science and Education and the African Savanna Exhibit indicated the presence of expansive soils beneath these sites. These soils may be present at other locations beneath the Zoo property and be subject to settlement. Facilities and roads constructed on these soils, if not properly designed and engineered, could be susceptible to damage. This is considered a potentially significant impact.

Mitigation Measures

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.

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.

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.

Significance after Mitigation: Less than significant.

Source: ESA, *Oakland Zoo Master Plan Update Special Studies Preliminary Geology Study Technical Report*, September 1995.
Harza, *Fault Rupture Hazard and Geotechnical Investigation for Environmental Education Center and Building Additions Oakland Zoo, Oakland, California*, April 29, 1994.
U.S.G.S., 7.5 Minute Series (Topographic) Map, Oakland East Quadrangle.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
5. Construction on loose fill or other unstable land that might expose people or property to geologic hazards, such as earthquakes, liquefaction or ground failure, or similar seismic hazards?	☐	☒	☐	☐

Comment

The Park is located in the San Francisco Bay region, an area with potential for periodic seismic activity. There are approximately four active faults within a 40-mile radius of the project site. The Harza geotechnical study identified that the sites for the Center for Science and Environmental Education and the African Savanna exhibit would be located within the Alquist Priolo Earthquake Hazard Zone of the Hayward Fault. Fault trenching undertaken by HARZA found no evidence of any faulting or displacement at either site. The Hayward Fault Zone runs north to south beneath the western portion of the Park. A supplemental geotechnical investigation for the Center for Science and Environmental Education prepared by Kleinfelder identified that the site for the Center is located about 50 feet from the active Hayward Fault. The entire Park site is located in an area with extreme groundshaking and landslide potential in the event of a large magnitude earthquake. Due to the proximity of the Hayward Fault, it is likely that intense groundshaking and high peak ground accelerations would occur on the site as a result of a major earthquake event. Consequently, considerable structural and non-structural damage to buildings, roadways and facilities would be likely. In addition, significant risk of injury to people and animals during a seismic event would be present. Although seismic hazards are potentially significant, there are several engineering and design modifications as well as precautionary procedures that can be implemented to reduce these seismic hazards.

The low intensity land use of the site as a Zoo-Park is consistent with the City of Oakland's policy for land use in areas of high seismic risk. The limited number of proposed structures in the Master Plan would also reduce the potential for seismic-related risks to structures and people.

Mitigation Measures

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.

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.

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.

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 objectives.

5e) The Zoo's Emergency Preparedness and Response Plan, and Animal Capture Plan shall be updated as proposed facilities are developed.

Significance after Mitigation: Less than significant.

Source: Harza. *Fault Rupture Hazard and Geotechnical Investigation for Environmental Education Center and Building Additions Oakland Zoo. Oakland, California*, April 29, 1994.
Kleinfelder, *Geotechnical Investigation Report Proposed Center for Science and Environmental Education Oakland Zoo, Oakland. California*, November 22, 1996.
Naval Medical Center Oakland and City of Oakland. *Draft EIS/EIR for the Disposal and Reuse of Naval Medical Center Oakland*, September 1996.
City of Oakland, *Oakland General Plan Update, Land Use and Transportation Element, Technical Report #6*, October 1995.
City of Oakland, *Chabot Observatory and Science Center*, Draft EIR, August 28, 1995.
City of Oakland, *Oakland Zoo Master Plan Update Special Studies Preliminary Geology Study Technical Report*, September 1995.
City of Oakland, *Land Use Element of the Oakland Comprehensive Plan*, April 1980.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
6. Construction within one-quarter mile of an earthquake fault?	☐	☒	☐	☐

Comment

As mentioned under Comment #5 above, the Hayward Fault Zone runs through the western portion of the Park. The mitigation measures discussed in relation to question #5 would apply to this question, and would significantly reduce seismic-related risks.

Source: *ESA, Oakland Zoo Master Plan Update Special Studies Preliminary Geology Study Technical Report*, September 1995.
Harza, *Fault Rupture Hazard and Geotechnical Investigation for Environmental Education Center and Building Additions Oakland Zoo, Oakland, California*, April 29, 1994.
Naval Medical Center Oakland and City of Oakland, *Draft EIS/EIR for the Disposal and Reuse of Naval Medical Center Oakland*, September 1996.
City of Oakland, *Oakland General Plan Update, Land Use and Transportation Element, Technical Report #6*, October 1995.
City of Oakland, Chabot Observatory and Science Center Draft EIR, August 28, 1995.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
7. Substantial depletion of a nonrenewable natural resource or inhibition of its extraction?	☐	☐	☐	☒

Comment

The proposed Master Plan Update would not result in a substantial depletion of a nonrenewable natural resource or inhibit its extraction. Implementation of the Master Plan would include the disturbance of less than ten acres of topsoil with no significant mineral and/or agricultural value.

Source: Harza, *Fault Rupture Hazard and Geotechnical Investigation for Environmental Education Center and Building Additions Oakland Zoo, Oakland, California*, April 29, 1994.
City of Oakland, *Oakland General Plan Update, Land Use and Transportation Element, Technical Report #6*, October 1995.

Air. Will the project result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
8. Substantial air emissions, deterioration of ambient air quality or the creation of objectionable odors?	☐	☒	☐	☐

Comment

The San Francisco Bay Area air basin is currently designated as a non-attainment area with respect to state standards for ozone (O_3) and inhalable particulate matter (PM_{10}). Therefore, a project-generated violation of the O_3 and/or PM_{10} state standards at nearby air monitoring stations is considered a significant impact. Project-related exposure of sensitive receptors to substantial pollutant concentrations is also considered a significant impact. In addition, the BAAQMD recommends various thresholds and tests of significance (BAAQMD, 1996). For reactive organic gases and nitrogen oxides (NO_x), a net increase of 80 lbs/day is considered significant, while for sulfur oxides (SO_x), a net increase of 150 pounds per day (lbs/day) is considered significant. For PM_{10}, an increase of 80 lbs/day is considered significant, and for carbon monoxide (CO), an increase of 550 lbs/day of CO would be considered significant if it leads to a possible local violation of CO standards (i.e., a "hot spot").

Land uses such as schools, children's day care centers, hospitals, and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions. Recreational uses would also be considered sensitive compared to commercial and industrial areas due to the greater exposure to ambient air quality conditions. Sensitive receptors in the project vicinity include Park patrons and residential uses located adjacent to the southern Park boundary.

Construction of proposed Master Plan facilities would generate dust (PM_{10}) due to earthmoving activities and vehicle travel over unpaved surfaces. Construction activities would also generate short-term emissions of criteria pollutants associated with equipment exhaust emissions. This would be a short-term adverse impact, and would be potentially significant depending on the areal extent of construction at any given time. The nearest sensitive receptors are residents of the neighborhood adjacent to the southern Park boundary. Although prevailing winds are westerly, it is possible that dust could be carried occasionally into the adjacent neighborhood by a northerly or northwesterly wind.

The BAAQMD does not require quantification of construction emissions (BAAQMD, 1996), but considers any project's construction-related impacts to be less-than-significant if required dust-control measures are implemented. The extent of dust-control measures required by the BAAQMD depends on the size of the project. The BAAQMD specifies "basic control measures" for all construction sites, "enhanced control measures" for construction sites

greater than four acres, and "optional control measures" for construction sites that are large in area or located near sensitive receptors.

Implementation of the proposed Master Plan would result in a total disturbance at Master Plan buildout of less than ten acres. Project development would be phased, with individual project areas resulting in surface disturbance of less than four acres.[1] Thus, the project would be subject to BAAQMD basic control measures. Construction-related PM_{10} emissions are considered to be potentially significant at the local and regional level.

Equipment exhaust emissions during construction would result from vehicular traffic generated by the construction activities, including automobiles transporting workers to and from the project site, and from construction equipment and machinery. Similar to dust emissions, the equipment activity level would be related to project size and extent of earthmoving requirements in site preparation. Emission levels for construction activities would vary depending on the type of equipment, duration of use, operation schedules, and the number of construction workers. Although these emissions, in combination with other existing emissions sources, would temporarily contribute to local air quality degradation, these emissions would be minor, having a less-than-significant impact. As indicated above, the projects that would be implemented under the Master Plan are limited in their earthmoving requirements.

During operation, the Park would have stationary (e.g., boilers for heating, combustion activities) and mobile (vehicle trips to, from, and within the Park) sources of air pollutants. Most stationary sources would be permitted by the BAAQMD, and would not be considered a significant source of air pollution. The only new mobile source emissions associated with Master Plan implementation would be the propane-powered shuttle buses. There would be up to 36 shuttle bus trips per day along the 1.2-mile loop road, with an average of 18 to 20 daily trips. This low number of trips combined with use of propane fuel would result in insignificant increases in zoo-related mobile source emissions.

Motor vehicle trips associated with an increase in Park attendance would be the main source of operational emissions of criteria air pollutants. Mobile source emissions were calculated using EMFAC7F emission factors for year 2005, an average trip length of 7.9 miles (BAAQMD, 1996), a projected 16% increase in estimated attendance levels by year 2000 (over baseline levels), and a projected 38% increase in estimated attendance levels by year 2010 (over baseline levels), and worst-case emissions (peak weekend day during the peak month) are presented as follows:

[1] There would be minimal surface disturbance (less than one acre for each project) associated with new animal exhibits (limited to fence installation and construction of shelters), the shuttle road for shuttle buses, widening of Zoo Drive, and the California Interpretive Center. Construction of the proposed Shuttle Road would generally follow the existing fire road, minimizing surface disturbance (with only small areas of fill required to accommodate a wider roadbed in some locations). The California Interpretive Center would have a foundation design that retains surface topography, which would minimize grading requirements. Construction of the Trail along Arroyo Viejo Creek would result in minor amounts of grading (less than 0.25 acre) to accommodate the trail on currently undeveloped land. The proposed Center for Science and Environmental Education would be the largest building to be constructed under the Master Plan and would result in disturbance of less than two acres.

TABLE 2: PROJECT-RELATED ESTIMATED DAILY REGIONAL EMISSIONS

Pollutant	Project-Related Emission (pounds/day)[a]			Significance Threshold[b]
	Baseline 1995	2000	2101	
Carbon Monoxide	118	92	59	550 lbs/day
Reactive Organic Gases	9	7	4	80 lbs/day
Nitrogen Oxides	16	14	14	80 lbs/day
Particulate Matter (PM_{10})	11	13	16	80 lbs/day

[a] Based on California Air Resources Board model URBEMIS5 using EMFAC7F1.1 emission factors.
[b] Bay Area Air Quality Management District, 1996.

Although implementation of the Master Plan would result in traffic increases in the future, project-related emissions (except PM_{10}) are projected to decrease by up to 50% by year 2010, due to decreases in projected emission rates. There would be an increase in PM_{10} emissions, but this increase would be insignificant since emissions would be well below the significance threshold. Project-related emissions would be below BAAQMD significance thresholds for all other mobile source emissions, and therefore, no significant local or regional air quality impacts would occur with implementation of the Master Plan.

Implementation of the proposed Master Plan could result in a reduction in emissions from some existing sources. Under the proposed Master Plan, the existing one-way Zoo Drive (providing access to the main entrance) would be widened to provide two-way ingress and egress to the Park. Existing residential receptors along the southern boundary and exit road could experience a reduction in emissions from egressing vehicles since egressing vehicles could use Zoo Drive under the proposed Master Plan and school buses (which now travel up to the main entrance and parking lot) would be directed to the lower entrance and parking lots adjacent to the proposed Center for Science and Environmental Education near the northern boundary. In addition, the existing Zoo overflow parking lot and fire road (proposed Shuttle Road) are unpaved and an existing source of dust emissions. Proposed paving of the overflow parking lot and Shuttle Road would reduce existing dust emissions currently associated with these two facilities.

Compost piles located in the Zoo in the lower canyon area (north of the existing fire road/proposed Shuttle Road near the overflow parking lot) are an existing source of moderate odors. The current compost piles are less than four feet in height, covered with straw, and are occasionally aerated. Under the proposed Master Plan, the compost operation would be relocated about 100 feet to the south, to an area adjacent to the overflow parking lot. Although the composting operation would be relocated slightly nearer to adjacent residences, it would be setback approximately 500 feet from the nearest residence; and this would not significantly increase nuisance odor potential at residences. A new composting system will be used which would reduce odor potential. This new system would contain the materials within long, air- and water-tight bags that speed decomposition while eliminating odors and the potential for water quality degradation.

Mitigation Measures

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.

Significance after Mitigation: Less than significant.

Source: Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans*, 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
9. Alteration of air movement, moisture, temperature, or any change in climate, either locally or regionally?	☐	☐	☐	☒

Comment

No buildings or activities required by the Master Plan would be capable of altering wind, moisture, or temperature in public areas. The relatively small scale of the project would not be capable of changing the micro and/or regional climate.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Water. Will the project result in:				
10. Discharge into surface waters resulting in substantial degradation of surface water quality, including but not limited to turbidity, absorption rates, drainage patterns, or the rate or amount of surface runoff?	☐	☒	☐	☐

Comment

The project site is located within the Arroyo Viejo Creek Watershed. There are several intermittent and ephemal waterways scattered throughout the site. In addition, Arroyo Viejo Creek, a perennial waterway, flows along the northern boundary of the site. Erosion during project construction activities has the potential to increase soil deposition in these waterways, resulting in increased water turbidity, and potential changes to channel capacity and morphology. However, project compliance with Ordinance No. 10312 and the recommended mitigation measures will reduce potential impacts to a less than significant level.

Construction of the proposed Trail and picnic facilities in the vicinity of Arroyo Viejo Creek could temporarily affect the creek water quality, and pose changes to channel capacity and morphology. This is considered a short term potentially significant impact, however, implementation of the recommended mitigation measures would reduce impacts to a less than significant leve.

The conversion of pervious to impervious surfaces through the development of facilities, roadways and paths has the potential to alter existing drainage patterns, and increase the rate and amount of surface runoff. Although these changes are expected to be minimal, they are considered to be potentially significant.

An increase in impervious surfaces at the site has the potential to alter absorption rates. However, recharge over much of the site including the ridgetops and slopes below, is presently limited by steepness and shallow/clayey soils. Therefore, significant impacts to absorption rates would not be likely.

The manure handling operations would be relocated out of the existing perennial stream located within the River Exhibit, thereby potentially enhancing overall water quality. In addition, the existing restrooms located in the drainage swale in the Arboretum would be relocated adjacent to the meadow and parking lot thereby potentially enhancing water quality in this drainage.

Development of the California 1820 Exhibit area, has the potential to impact the natural flow patterns, and degrade water quality in the intermittent drainages within these areas and is considered to be a potentially significant impact.

Mitigation Measures

To mitigate for increased water turbidity the following mitigation measure shall be implmented:

10a) Mitigation Measures 2a - 2d shall be implemented.

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.

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.

To mitigate for potential impacts of the conversion of pervious 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.

To mitigate for potential project impacts to 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.

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 County, and the East Bay Municipal District.

Significance after Mitigation: Less than significant.

Source: Naval Medical Center Oakland and City of Oakland, *Draft EIS/EIR Disposal and Reuse for the Naval Medical Center Oakland*, September 1996.
City of Oakland, *Oakland General Plan Update, Land Use and Transportation Element, Technical Report #6*, October 1995.
City of Oakland, *Chabot Observatory and Science Center*, Draft EIR, August 28, 1995.
City of Oakland, *Ordinance No. 10312, Article 6, Grading, Excavation and Fill.*
Oakland Zoo Education Department, Proposed Restoration Plan for the Knowland Park Branch of Arroyo Viejo Creek, Development Plan and EIR, 1993-4.

U.S.G.S., 7.5 Minute Series (Topographic) Map, Oakland East Quadrangle.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
11. Alterations to the course of flood waters, or the exposure of people or property to water related hazards such as flooding or tidal waves?	☐	☒	☐	☐

Comment

The project site is not located within a 100 year floodplain as determined by the Federal Emergency Management Act. However, Arroyo Viejo Creek is susceptible to flooding downstream near the Bay. Surge discharges as a result of flushing of the proposed River Exhibit facility may pose downstream flooding in the Arroyo Viejo watershed if the following mitigation measure is not implemented.

Mitigation Measure

11a) See Mitigation Measure 10e.

Significance after Mitigation: Less than significant.

Source: Naval Medical Center Oakland, and City of Oakland. *Draft EIS/EIR for the Disposal and Reuse of Naval Medical Center Oakland*, September 1996.
City of Oakland, Chabot Observatory and Science Center Draft EIR, August 28, 1995.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
12. Change in groundwater quantity, through direct addition or withdrawal, or interception of an aquifer by cuts or excavation?	☐	☐	☐	☒

Comment

There would be no changes in groundwater quantity or interception of an aquifer by cuts or excavation as a result of the project, since there are no proposed wells associated with the Master Plan, and groundwater is not available at the depths of proposed grading.

Source: Naval Medical Center Oakland and City of Oakland, *Draft EIS/EIR for the Disposal and Reuse of Naval Medical Center Oakland*, September 1996.
City of Oakland, *Chabot Observatory and Science Center Draft EIR*, August 28, 1995.

Biotic. Will the project result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
13. Reduction in quantity or diversity of plant and animal species in the project vicinity, interfere with migratory or other natural movement patterns, degrade existing habitats or require extensive vegetation removal?	☐	☒	☐	☐

Comment

A comprehensive biological report, *Biotic Resources Survey: The Oakland Zoo at Knowland Park*, dated November 1996 was prepared by Cheung Environmental Consulting and used in analyzing potential project impacts. This document is on file at the City of Oakland's Community and Economic Development Agency and available for public review. Please refer to it for a detailed discussion of plant and wildlife species that occur on the project site. Figure 3, on the following page, shows the natural communities and plants in the study area.

Plants

The proposed project would result in the commitment of approximately 25 acres to buildings, exhibits, and landscaped areas to develop the California 1820 Exhibit area. Of this 25 acres, approximately 5 - 10 acres are already committed to ongoing Zoo operations including a fire road, composting area, and the existing Bison enclosure. The remaining acreage consists of natural grassland, shrubland and oak woodland.

The areas proposed for the Trail, Interpretive Center, Off-site Breeding Area, and Shuttle Road would experience a complete loss of habitat while the animal exhibit areas may retain some characteristics of natural vegetation. The heaviest impact would occur in the new Bison Exhibit, where it is expected that the grasslands would be entirely eliminated, some trees and shrubs would be lost as a result of browsing, and woody plant regeneration would be halted. Other California 1820 Exhibits that do not feature large grazing animals would be less impacted. Loss of needlegrass grassland, oak woodland, and several types of shrublands are considered to be a potentially significant impact.

Development of individual exhibits proposed as part of the California 1820 Exhibit area and the Center for Science and Environmental Education would result in the removal of trees. The City of Oakland's Tree Preservation Ordinance governs the removal of trees protected by ordinance and requires a tree removal permit. Trees located within the areas designated for development of the California 1820 Exhibit area and the Center for Science and Environmental Education were surveyed and trees eligible for protection under the

Insert for Figure 3

Ordinance identified. Approximately 98 protected trees (73 native and 25 non-native) would be removed to develop the California 1820 Exhibit area and 67 non-native trees would be removed to develop the Center for Science and Environmental Education.

Appendix A includes the results of the tree survey completed for the project. The loss of protected trees is considered to be a significant impact.

Mitigation Measure

13a) The proposed Master Plan would include the 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 non-native 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 currently 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 result.

- 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 non-natives 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.

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 shall be replanted 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 or 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.

Significance after Mitigation: Less than significant.

Wildlife

The quantity of some animal species would potentially be decreased by project construction and degradation of habitat for small vertebrates and invertebrates in enclosures such as the Bison Exhibit. However, the Habitat Enhancement Plan and preservation of open space to the east of the California 1820 Exhibit proposed by the Master Plan would reduce potential impacts to less than significant levels.

Small vertebrates such as Pacific treefrogs and invertebrate species living in Arroyo Viejo Creek may be temporarily impacted by sedimentation of the creek due to construction of the proposed viewing platforms. Project compliance with Ordinance No. 10312 and the recommended mitigation measures would reduce potential impacts to a less than significant level.

Vehicle and pedestrian traffic on the proposed paved shuttle road could interfere with diurnal movements of wildlife species in the project area, including deer and several reptile species in the area. The Master Plan's requirement that a maximum speed of 10 miles per hour will be observed and development of an educational program to inform the shuttle drivers and Zoo personnel driving to the off-site breeding exhibit to watch for and yield to all wildlife would reduce this impact to a level less than significant.

Mitigation Measures

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.

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.

Significance after Mitigation: Less than significant.

Source: Cheung Environmental Consulting, *Biotic Resources Survey: The Oakland Zoo at Knowland Park*, November 1996.
Cheung Environmental Consulting, Tree Surveys conducted Summer 1995, and January, 1997.
City of Oakland, *Oakland Municipal Code, Article 6.*

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
14. Reduce the numbers of any unique, rare or endangered species of plants or animals?	☐	☒	☐	☐

Comment

Plants

The Shuttle Road, as proposed, would remove a colony of rare and endangered robust monardella (*Monardella villosa ssp. globosa*) near the proposed Interpretive Center. This would be considered a significant impact.

Mitigation Measures

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.

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.

Significance after Mitigation: Less than significant.

Source: Cheung Environmental Consulting, *Biotic Resources Survey: The Oakland Zoo at Knowland Park*, November 1996.
City of Oakland, *Ordinance No. 10312, Article 6, Grading, Excavation and Fill.*

Wildlife

Alameda Whipsnake. Although no State-threatened Alameda whipsnakes were observed during field visits, most of the project site has all or most of the habitat features which are suitable for the Alameda whipsnake and would be considered potential habitat. Several of the proposed components of the Master Plan would have no impact on the Alameda whipsnake because they are either located in unsuitable habitat or are being constructed within the boundaries of the existing Zoo and Arboretum. These include the Tropical Rain

Forests of the World, Arboretum, Children's Zoo, African Savannah, and the Center for Science and Environmental Education.

Impacts to the Alameda whipsnake would potentially be significant unless mitigation is incorporated. If present on the site, the Alameda whipsnake could be expected to use portions of nearly all of the habitats on site, including chamise chaparral, Diablan sage scrub, Coyote brush scrub, grassland, oak woodland, and possibly some of the areas of French broom. Potential impacts to the Alameda whipsnake include:

- Direct mortality during grading to construct the shuttle road.

- Loss of potential Alameda whipsnake habitat. Table 3 identifies the maximum acreage of potential Alameda whipsnake habitat in each exhibit and in the area outside of the exhibit but enclosed by the proposed Shuttle Road. The level of impact in each of the areas identified will vary. For example, potential whipsnake habitat in the Bison exhibit is expected to be severely impacted due to trampling of the vegetation or denuding of the slopes by the bison. Impacts in the Canyon and River Exhibits are expected to be moderate.

  Impacts in the Gray wolf exhibit are expected to be less severe as only minor modification of the habitats within these exhibits will take place. Alameda whipsnakes may be consumed or harmed by exhibit animals. Impacts to the habitat in the project area enclosed by the Shuttle Road, but outside of the exhibits would be minimal. Creation of the proposed hiking trail would result in removal of chamise chaparral habitat. No acreage of potential Alameda whipsnake habitat to be removed for Trail construction was calculated because of the small size of the area to be removed and habitat enhancement benefits the Trail would provide by opening what is currently a dense closed-canopy stand of chamise chaparral and because of the other mitigation measures which shall be implemented.

- Potential restriction of movement into and out of the area enclosed by the Shuttle Road and increased risk of road mortality due to vehicle traffic on the Shuttle Road.

- Potential for spread of French broom. French broom typically occurs in dense closed-canopy stands that allow little light penetration and minimal habitat value for the whipsnake. French broom, which is present in several areas on the project site can invade high quality whipsnake habitat and degrade its value. Some of the stands of broom on the site are more open and are in close proximity to high quality whipsnake habitat. These stands may currently provide some value as whipsnake habitat, if whipsnakes are present on the site.

  However, in the long run, removal of as much broom as possible from the site and measures to prevent its spread would benefit the whipsnake.

Special-Status Birds. Although not observed on the project site, Cooper's hawk and sharp-shinned hawk potentially occur on the site and Cooper's hawk potentially nest there. If nests are present during construction of the Shuttle Road and creek-viewing platforms, this would be considered a potentially significant impact.

Special-Status Invertebrates. Two invertebrates, the San Francisco Lacewing and the Bridge's Coast Range snail have some potential to occur in the riparian and woodland areas. Impacts to these species would be avoided by the Master Plan's proposed careful siting of project components in woodland and riparian habitats. No foreign material would be used in construction of the proposed Trail and it would be as narrow as possible. This would minimize potential impacts to the travel of the snails, if present.

TABLE 3: ALAMEDA WHIPSNAKE HABITAT POTENTIALLY IMPACTED BY PROJECT

Exhibit or Location	Acreage of Habitat Types					
	Chamise Chaparral	Diablan Sage Scrub	Coyote Brush Scrub	French Broom	Grassland	Oak Woodland
Bison /Interpretive Center	3.6	0.0	0.7	0.0	3.5	0.0
Off-site Breeding Areat	0.0	0.0	0.0	0.0	0.0	.8
Gray Wolf Exhibit	0.0	0.4	1.4	0.2	1.5	0.2
River Exhibit	0.0	0.2	0.3	5.6	5.0	0.5
Canyon Exhibit	0.0	0.0	0.0	4.2	0.9	7.3
TOTAL WITHIN EXHIBITS	**3.6**	**0.6**	**2.4**	**10.0**	**10.9**	**8.8**
Habitat Enclosed by Shuttle Road but Outside Exhibits	0.0	1.3	5.8	4.0	18.9	28.0
TOTAL	**3.6**	**1.9**	**8.2**	**14.0**	**29.8**	**36.8**

Mitigation Measures

To mitigate for the potential direct mortality to Alameda whipsnakes, loss of Alameda whipsnake habitat, the restriction of movement of Alameda whipsnakes, and the spread of French broom, the following measures shall be implemented.

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.

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.

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.

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.

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 off-site 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.

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.

To mitigate for potential impacts to special status birds, the following measure shall be implemented:

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.

To mitigate for potential impacts to special status invertebrates, the following measure shall be implemented:

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

Significance after Mitigation: Less than significant.

Source: Cheung Environmental Consulting, *Biotic Resources Survey: The Oakland Zoo at Knowland Park*, November 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
15. Introduction of new species of plants or animals into an area, or result in a barrier to the replenishment of existing plant species, or the migration or movement of animals?	☐	☒	☐	☐

Comment

Plants

Grading and landscaping would create open, disturbed soil suitable for colonization by weeds. Operation of the Shuttle Bus and other vehicles (e.g., security and fire suppression) would import weed seeds into the California 1820 Exhibit area. Because the Interpretive Center, Off-site Breeding Area and new exhibits would be set within native habitat in Upper Knowland Park, some of these weeds will invade the native habitat, especially where soil disturbance has occurred. This would be a significant impact.

Mitigation Measure

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.

Significance after Mitigation: Less than significant.

Wildlife

Potential impacts and recommended mitigation measures discussed under the wildlife section of Questions #13 and #14 are applicable.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
16. Deterioration to existing aquatic or wildlife habitat?	☐	☒	☐	☐

Comment

Plants

Several seeps and springs exist in Knowland Park in or near the proposed California 1820 Exhibit area. The proposed Master Plan has sited exhibit areas to avoid these resources. The proposed Trail would parallel Arroyo Viejo Creek and cross one of its major tributaries, potentially resulting in degradation of this waterway from sedimentation and damage to riparian vegetation. This is considered a significant impact.

Mitigation Measure

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.

Significance after Mitigation: Less than significant.

Wildlife

Potential impacts and recommended mitigation measures discussed under the wildlife section of Questions #13 and #14 are applicable.

Noise. Will the project result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
17. Increase in existing ambient noise levels near sensitive noise receptors?	☐	☐	☒	☐

Comment

The predominant source of noise at the project site and vicinity is motor vehicle traffic traveling on the I- 580 freeway. Other sources of noise primarily relate to activities associated with the Park (loading and unloading activities, cars and buses driving to the Zoo's main entrance, pedestrian activities, animals, etc.). Noise measurements collected at various locations along the southern Park boundary indicate that residences located adjacent to the southern boundary (near the parking lots and proposed Shuttle Road) are subject to

noise levels of 55 to 60 dBA (Ldn), decreasing with distance from the I-580 freeway. Noise measurement data is presented in Table B-1 of Appendix B.

Noise measurement data indicate that daytime noise levels at the Zoo's main parking lot and overflow parking lot were higher on Saturday than on Friday. When the distance attenuation effects of freeway noise are considered with the collected noise data, it appears that existing Zoo-related activities at the main entrance parking lot increase ambient noise levels by 1 to 2 dBA in the vicinity of the southern Park boundary (refer to Appendix B for more discussion).

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. Sensitive noise receptors are generally considered to be uses including hospitals, schools, and residences. Sensitive receptors in the project vicinity include residential uses located directly adjacent to the southern Park boundary and nearest the Zoo. Residential sideyards and backyards abut the Park property boundary. With the Zoo's main parking lot set back approximately 50 feet from the property line and residences set back a minimum of 15 feet, the closest distance between residential receptors and noise sources in the parking lot is approximately 65 feet. Along the northern Park boundary, there are multi-family residential uses on Mountain Boulevard that are located 500 to 600 feet north of the Park entrance. Single-family residences located on Golf Links Road are located approximately 700 to 800 feet from the Park entrance.

The City of Oakland, in its noise regulations, recognizes the variable sensitivity of certain activities to noise and thus, established noise exposure criteria defining acceptable noise levels. The City utilizes the land use compatibility noise guidelines recommended by the State of California and they are presented in Figure B-2 of Appendix B. For single-family residential uses, State guidelines indicate that noise levels up to 60 dBA (Ldn or CNEL) are considered normally acceptable. "Normally acceptable" is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some ambiguity in areas where noise levels fall within the overlapping range. In this analysis, noise levels up to 60 dBA are considered normally acceptable for residential uses since residences in the project vicinity are currently subject to noise levels of 60 dBA or less. When existing noise measurement data are compared to City noise guidelines, noise levels at residences located along the southern Park boundary are considered normally acceptable for residential uses, even those located adjacent to the Zoo's main parking lot.

The potential significance of impacts identified in this Initial Study are defined by comparing existing and projected noise levels at the site and adjacent areas with two criteria: (1) the City-adopted state land use compatibility noise guidelines for all specified uses and City guidelines for extensive natural recreation areas; and (2) a determination of whether the incremental noise increase would be noticeable to most people. A 10-dBA incremental noise increase is perceived by most people to be a doubling in the loudness of a sound. A 5-dBA increase is readily noticed by most people, while a 3-dBA increase is marginally

noticeable to most people. For this Initial Study, the proposed project would result in a significant impact if: (1) the project would result in noise increases of 3 dBA or more where noise levels are currently above acceptable levels or where the project would result in acceptability thresholds being exceeded; or (2) the project would result in a 5 dBA or greater noise increase even if the acceptability threshold has not been reached.

Implementation of the proposed Master Plan would have four primary effects on the existing noise environment along the Park's southern boundary: (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 Park entry (Zoo Drive) would result in decreased use of the existing Park exit road (to 106th Avenue) and increased use of the Park entry road.

Projected increases in average and peak attendance levels would result in increased parking demand over existing levels. Since the Zoo's main parking lot is currently utilized on weekdays and weekends, no significant change in noise levels are anticipated. However, the overflow parking area is used less frequently and it is anticipated that this area would be used more frequently as attendance levels increase. Noise levels in the vicinity of the overflow parking lot are 57 dBA (Ldn: see Table B-1 of Appendix B), and the increased parking lot activity would result in a 1 to 2 dBA noise increase. This projected incremental increase is based on the measured noise levels that were attributable to activities at the main parking lot. Even with this increase, ambient noise levels would remain at acceptable levels for residential uses (less than 60 dBA [Ldn]). Therefore, the incremental increase is considered less-than-significant. It should be noted, however, that although most people would not perceive such an increase in ambient noise level, adjacent residents would notice the increased frequency of overflow parking lot use. The proposed provision of a six-foot high (minimum) solid wood or masonry fence along the southern Park boundary (as far east as the east edge of the Zoo's overflow parking lot) would reduce the potential for perceived disturbance by adjacent residents due to increased activity in the overflow parking lot vicinity.

The proposed Master Plan would introduce a new source of noise into the project area. Propane-powered shuttle buses would be used along the proposed Shuttle Road in the California 1820 Exhibit area. A maximum of 36 trips per day would travel along the Shuttle Road, and bus operation would occur during the daytime hours only. The Shuttle Road would be located well within the Park boundary (away from sensitive noise receptors) except for one 500-foot-long section which would extend along the southern Park boundary. Since this road section would be located approximately 100 feet north of the Park boundary, existing residences could be located as close as 150 feet from the roadway. Shuttle buses would travel downhill along this section of the loop road and the primary source of bus noise would be the brakes rather than the motor. No loudspeakers are proposed on the shuttle buses. It is anticipated that this level of shuttle bus activity would increase ambient noise levels by 0.2 dBA (Ldn) at existing residences located along the southern Park boundary adjacent to the Shuttle Road. Such an increase in ambient noise

levels would not be perceptible to most people, and therefore, is not considered significant. In addition, even with this increase, ambient noise levels would remain within acceptable levels for residential uses (60 dBA [Ldn] or less).

Under the proposed Master Plan, school-related bus and vehicular traffic would be directed to the Arboretum parking lots located adjacent to the proposed Center for Science and Environmental Education rather than the Zoo's main entrance parking lot. Such redirection of traffic would result in a decrease in weekday noise at the main entrance parking lot. However, noise levels would increase in the vicinity of the Park entry due to increased bus and vehicular traffic activity at the Center. The existing seven to 12 buses per day would enter the Park at the same location (at Golf Links Road), but rather than travel up Zoo Drive to the Zoo's main entrance, school-related buses and vehicles would enter the loop road to the Center for Science and Environmental Education, remaining to the north of the Zoo. The closest sensitive receptors would be the single-family residences located approximately 1,000 to 1,200 feet to the north. These receptors are currently subject to school-related buses and vehicles as they enter the Park. However, under the Master Plan, these receptors would also be subject to these same buses/vehicles as they leave the Park, increasing the bus/vehicle traffic on Golf Links Road by seven to 12 trips per day. Such an increase in bus and vehicular traffic noise would not significantly change ambient noise levels at these residences due to the intervening distance, time of day (weekdays during the daytime hours only), and level of traffic already occurring in this vicinity.

The proposed two-way Zoo Drive would result in decreased use of the existing Park exit (to 106th Avenue) and increased use of the Park entrance. Implementation of the proposed project would result in a decrease in traffic noise at residences located adjacent to the Park exit and increase along the entrance. There are no sensitive receptors located adjacent to the Park entrance or the section of Golf Links Road between the entrance and freeway (where most Park-related traffic would travel). The closest residential receptors are on Mountain Boulevard approximately 500 feet from this road. At this distance, the incremental increase in traffic noise from the two-way entry is not expected to significantly alter ambient noise levels at these residential receptors.

Source: City of Oakland, *Oakland Comprehensive Plan Noise Element*, September 1974.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
18. Exposure of people to severe noise levels?	☐	☒	☐	☐

Comment

Implementation of the Master Plan would result in short-term noise increases due to construction. For this Initial Study, the proposed project would result in a significant impact if exterior construction noise levels at the nearest residential receptors exceed 70 dBA during the daytime hours.

During project construction, temporary noise increases would result from the operation of heavy equipment. Project construction would occur at various locations around the Park. Construction of the Center for Science and Environmental Education, located in the Arboretum, would occur within 1,000 feet of the northern Park boundary. Construction would also occur along Zoo Drive, the Zoo's main entrance parking lot and overflow parking lot, and the California 1820 Exhibit area. Construction noise levels would fluctuate depending on the construction phase, equipment type and duration of use, distance between noise source and receptor, and presence or absence of barriers between noise source and receptor. To estimate probable noise impacts, typical equipment and construction techniques are assumed.

Construction noise sources range from about 76 to 85 dBA at 50 feet for most types of construction equipment with slightly higher levels of about 88 to 89 dBA for certain types of earthmoving (scrapers, pavers) and impact equipment (jack hammers). The highest noise levels would be generated by rock drills and pile drivers, which can generate noise peaks of approximately 98 and 101 dBA at 50 feet, respectively. The rate of attenuation is about six decibels (dBA) for every doubling of distance from a point source. Based on the small scale of proposed buildings shown on the Master Plan, it is anticipated that pile drivers or rock drills would not be required for project construction. Typical noise levels at 50 feet from the noise source for several types of construction equipment and potential noise attenuation with feasible noise controls are shown in Table B-2 of Appendix B.

Noise peaks generated by construction equipment could result in temporary disturbance (e.g., speech interference) to persons in adjacent buildings if the noise level in the interior of the building exceeds 45-50 dBA (Caltrans, 1991). At 60 dBA, sentence intelligibility decreases to approximately 97%. At 70 dBA, conversation becomes difficult even for very short speaker-listener distances (two to three feet). Based on these speech interference significance criteria, exterior noise levels exceeding 70 dBA are presumed to result in interior speech interference. This assumes a 20-dBA noise reduction that can be achieved with windows closed, and such a noise reduction could be maintained only on a temporary basis in some cases since windows must remain closed at all times.

The closest residences are located a minimum of approximately 65 feet from the southern Park boundary and 1,000 to 1,200 feet from the closest area of construction near the northern Park boundary. When construction occurs along the southern Park boundary in the Zoo's main entrance parking lot and overflow lot, construction noise peaks at residences to the south could reach levels that are approximately 2 dBA lower than those listed in Table B-2 of Appendix B. Noise peaks at the closest receptors adjacent to the southern Park boundary could reach 74 to 87 dBA, periodically exceeding the 70-dBA exterior speech interference noise criterion. This is considered a potentially significant impact.

Mitigation Measure

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 proposed improvements to the main entrance parking lot and overflow parking lot.

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 as listed in Table B-2 of Appendix B, or as required by City ordinance, in order to provide acceptable interior noise levels at nearby or adjacent residential receptors.

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.

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.

5. Stationary noise sources shall be located as far from 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.

When construction occurs along the section of the uphill loop road that extends along the southern Park boundary, residences to the south (which would be approximately 150 feet away) would be subject to noise peaks of 70 to 80 dBA, periodically exceeding the 70-dBA criterion. However, the short-term nature of these noise peaks (two to four weeks for construction of this 500-foot long section of the Shuttle Road) and implementation of noise control measures listed above would reduce potential impacts to a less-than-significant level. Residential receptors located 1,000 feet or more from the northern Park boundary would not be significantly affected by construction noise; at 1,000 feet, the intervening distance would be adequate to maintain construction noise peaks at or below the 70-dBA criteria.

Significance after Mitigation: Less than significant.

Source: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971.
California Department of Transportation, Division of New Technology, Materials & Research, *Noise, Technical Analysis Notes*, March 1991.

Light and Glare. Will the project result in:

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
19. Produce new light or glare in areas sensitive to light and glare (i.e., residents near industrial and commercial uses, freeways, and parks)?	☐	☐	☒	☐

Comment

New development proposed under the Master Plan would introduce limited night lighting on the project site. The proposed Center for Science and Environmental Education would provide for educational opportunities such as classes and lectures that may occur during the evening hours. The facility would be located in the Arboretum. Night lighting would be screened by surrounding trees and vegetation and would not be visible to adjacent residences. Other development would consist primarily of animal exhibits designed to provide a natural environment, the Interpretive Center, the Off-site Breeding Area, and improvements and upgrades to existing facilities; these facilities would not include night lighting. New facilities would be sited to minimize their visibility to adjacent residences. Potential light and glare impacts are considered to be less than significant.

Source: East Bay Zoological Society, *Oakland Zoo in Knowland Park Master Plan*, October 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
20. Produce shade and shadow, or otherwise diminish sunlight or solar access?	☐	☐	☐	☒

Comment

Development proposed by the Master Plan would consist of low-rise, small-scale buildings and animal exhibits designed to provide a natural habitat. New development would not affect the sunlight or solar access available to adjacent residences.

Source: East Bay Zoological Society, *Oakland Zoo in Knowland Park Master Plan*, October 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Land Use and Socioeconomics Factors. Will the project result in:				
21. Conflict with approved plans for the area or the Oakland Comprehensive Plan or alter the present or planned land use or an area?	☐	☐	☐	☒

Comment

The project would expand and enhance existing facilities at the Park. The proposed Master Plan is consistent with the Open Space, Conservation and Recreation (OSCAR) Element of the General Plan. It would provide additional recreational opportunities for the community and would enhance habitat conservation at the site. The Master Plan would preserve about 73 percent of the project site as permanent open space. The project site is zoned R-30 and will require a Major Conditional Use Permit to meet the requirements of the zoning ordinance.

Source: City of Oakland, *Open Space and Conservation and Recreation Element, Oakland General Plan*, October 1995.
Oakland Zoological Society, The Oakland Zoo in Knowland Park Master Plan, October 1996.

	Potentially significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
22. Require relocation of residents and/or businesses, or affect existing housing or create a demand for additional housing?	☐	☐	☐	☒

Comment

The project consists of the updating of the Zoo's Master Plan which includes the proposed enhancement and expansion of recreation and environmental education facilities. The project would not result in the relocation of residents or businesses.

Source: Oakland Zoological Society, *The Oakland Zoo in Knowland Park Master Plan*, October 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
23. Cause a substantial alteration in neighborhood land use, density or character?	☐	☐	☐	☒

Comment

The Master Plan would expand and enhance existing Park facilities and would preserve about 73 percent of the project site as permanent open space. Development proposed under the Master Plan would consist of educational facilities, new animal exhibits, and the upgrade of existing facilities. Structures would be sited to minimize their visibility from adjacent properties. Implementation of the Master Plan would not cause a substantial alteration to neighborhood land use, density or character.

Source: Oakland Zoological Society, *The Oakland Zoo in Knowland Park Master Plan*, October 1996.

Human Health and Risk of Upset. Will the project involve:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
24. The risk of an explosion or the release of hazardous substances, including oil, pesticides, chemicals or radiation, in the event of an accident that could create or expose people to potential health hazards?	☐	☐	☐	☒

Comment

New development proposed by the Master Plan would not involve the use or disposal of potentially hazardous materials. The existing veterinary hospital uses compressed oxygen gas, x-ray film and developer, and autoclave sterilizer and pharmaceuticals. The oxygen gas tank is handled and refilled by an off-site vendor using safe practices. The x-ray film and developer is removed and disposed of by Diagnostic X-ray. The sterilizer uses heat only, and no ethylene oxide is required. Pharmaceuticals are dispensed by a veterinarian and no radioactive materials (e.g., x-ray tracers) are used in the veterinary hospital.

Source: Project Application for The Oakland Zoo in Knowland Park Master Plan November 12, 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
25. Possible interference with an emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

Comment

The Zoo's Emergency Preparedness and Response Plan and Animal Capture Plan address emergency situations at the Zoo; e.g. health emergencies, animal escapes, fire, earthquake. This plan would be updated to incorporate the new facilities and programs developed under the Master Plan. The Master Plan would not conflict with the City's Multi-Hazard Functional Plan (City Emergency Plan).

Source: City of Oakland, *Multi-Hazard Functional Plan (City Emergency Plan).*
Oakland Zoo, *Emergency Preparedness and Response Plan.*
Oakland Zoo, *Animal Capture Plan.*

Transportation/Circulation. Will the project result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
26. Substantially increase vehicular movement resulting in traffic hazards to motor vehicles, bicyclists, or pedestrians; or create a demand for new parking facilities?	☐	☐	☒	☐

Comment

The proposed project would result in an increase to vehicle traffic both on and off the site. The majority of the projected increase in vehicle movements would occur during non-peak periods and would not result in a hazard to vehicles, bicycles, or pedestrians. Master Plan proposed site circulation and access improvements would be sufficient to meet the estimated project peak demand. A discussion of project vehicle trip generation, local traffic operations, proposed access and circulation improvements, project parking demand and related safety issues is provided below.

Project Generated Traffic

Project attendance and vehicle trip generation estimates are shown in Table 4. The forecasts for years 2000 and 2010 are based on an annual attendance growth rate of two percent.[2]

[2] The two percent annual growth rate represents a conservative figure for a projected annual growth rate over the next 15 years. The average attendance growth rate for other Zoos located in the Western U.S. over the past ten years has been less than 1.5%.

Forecast peak hour vehicle trips were determined based on visitor vehicle occupancy rates surveyed at the Park in 1995.[4] The surveys found that occupancy rates averaged approximately 2.8 persons per arriving vehicle and 3.0 persons per departing vehicle.

The difference between average vehicle occupancies is related to a higher percentage of families going to the Zoo than using the picnic / recreational area located in the Arboretum. It is important to note that peak hour vehicle activity is different for arriving and departing traffic. The Park is open from 10:00 a.m. to 4:00 p.m. daily. The peak hour for arriving vehicles generally occurs between noon and 2:00 p.m. under all conditions. Vehicle departures tend to peak between 3:00 p.m. and 5:00 p.m. on weekends and between 2:00 p.m. and 4:00 p.m. on weekdays.

The projected increase in Park attendance in the years 2000 and 2010 would result in an increase in traffic. The net increases in peak hour traffic (arrivals / departures) for average and peak month conditions is summarized in Table 5.

Area Traffic Operations

Existing traffic operations in the study area during the weekday afternoon peak hour (5:00 p.m. to 6:00 p.m.) are characterized as congested and unacceptable at the unsignalized intersections of Golf Links Road / I-580 northbound ramps and Golf Links Road / 98th Avenue. Traffic counts taken in 1995 for *the Disposal and Reuse of Naval Medical Center Oakland EIS/EIR*, determined the unsignalized intersections at 98th Avenue / I-580 southbound on-ramp and Mountain Boulevard /Golf Links Road both currently operate at acceptable levels of service C or better during the afternoon commute hour. The level of service (LOS) of an intersection is a measure of its ability to satisfy travel demand and is defined by the average seconds of delay per vehicle. LOS ranges from A, representing no undue delays, to F, representing a very high level of congestion and delay. The City of Oakland considers LOS D or better conditions as acceptable. LOS criteria are detailed in Appendix C.

The congested intersections at Golf Links Road / I-580 northbound ramps and Golf Links Road / 98th Avenue are currently being signalized as part of the 98th Avenue Improvements project. Signals have been installed at both locations but are not yet operational. Once signalized, both intersections are expected to operate at acceptable LOS C conditions during the afternoon commute period. With the completion of the improvements currently underway, study area afternoon traffic would operate without major congestion or delay.

As shown in Table 4, the highest increase in peak hour Park traffic arrivals and departures would occur on weekends during peak season (summer months) at a time when surrounding area traffic is much lower than on weekdays. The weekend Park traffic would be accommodated at acceptable levels of service at the four intersections described above.

During weekdays, departing Park traffic would add vehicle trips to the afternoon peak hour commute. However, the Park weekday peak hour (4:00 - 5:00 p.m.) for exiting vehicles does not coincide with the peak hour of background commute traffic (5:00 - 6:00 p.m.) in the study area. Weekday traffic exiting the Park during the peak summer months is

[4] Ibid.

currently 115 vehicles (between 4:00 and 5:00 p.m.). The majority of these vehicles have left the area well in advance of the start of the afternoon commute hour. Year 2010 peak month, peak hour departing Park traffic is estimated at 158 vehicles, an increase of 43 vehicle trips over existing summer conditions. As with existing Park operations, the departing traffic would leave the study area prior to the start of the afternoon peak hour commute. The impact of existing Park traffic on background peak hour traffic is and will continue to be minor and will have no measurable effect on off-site study area peak hour traffic operations.

The impact of departing Park vehicles on traffic operations at the unsignalized intersection of Mountain Boulevard/Golf Links Road would continue to be within acceptable limits for the following reasons:

- The intersection currently operates at LOS C or better at all approaches during the afternoon commute peak hour.
- Traffic departing the Park between 4:00 p.m. and 5:00 p.m. will do so against lower non peak hour levels of through (east-west) background traffic.
- Internal circulation planned for the Park will require vehicles parked in the Zoo parking lots to exit via 106th Avenue which is the current pattern for all Park vehicles. With this circulation pattern, the majority of Park visitors will continue to exit onto 106th Avenue.
- Traffic signal installations currently underway at the I-580 ramps will improve traffic operations in the area and will provide additional time (gaps in through traffic) for northbound left-turns at the Mountain Boulevard/Golf Links Road intersection.

TABLE 5: NET INCREASES IN BASELINE (1994) - PEAK HOUR TRAFFIC

	Year 2000	Year 2010
Average Month - Weekday		
Peak Arrivals	+6	+17
Peak Departures	+6	+19
Average Month - Weekend		
Peak Arrivals	+16	+48
Peak Departures	+19	+56
Peak Month - Weekday		
Peak Arrivals	+13	+37
Peak Departures	+15	+43
Peak Month - Weekend		
Peak Arrivals	+22	+64
Peak Departures	+25	+75

Future project traffic generated during the afternoon commute hour would not have a measurable impact on off-site vehicle operations for the following reasons:

1. Park closed one hour prior to weekday peak commute hour.
2. Distribution of exiting visitor vehicles to the Malcolm Drive exist.
3. Local roadway improvements (signal installation) currently under construction.

Pedestrian Circulation

Weekend and weekday observations[5] indicate that the inbound (one-way) Zoo Drive off of Golf Links Road experience a very low level of pedestrian activity. The existing road travels uphill (steep in places) to the Zoo. No sidewalk is provided, although a pedestrian path is located on the uphill side of the road. Currently, pedestrian activity occurs primarily at the Zoo's main entrance parking lot where visitors leave their parked cars and walk from the parking lot directly to the Zoo entrance. Pedestrians occasionally use the pedestrian path along the one-way Zoo Drive, walking from the Park entrance up Zoo Drive to the Zoo. Until recently, an AC transit bus stop was located at the Park entry, however, this stop has been discontinued. Pedestrian activity also occurs at the parking lots located in the Arboretum where visitors leave their parked cars and walk to the picnic facilities available in the Arboretum. Pedestrians have direct access to the Arboretum grounds from the parking lots.

Pedestrian activity would increase as a result of projected increases in Park attendance. Implementation of the Master Plan would provide for improved pedestrian facilities. Zoo Drive would be widened to 30 feet to accommodate two-way traffic and a paved pedestrian/bicycle path. With the development of the Center for Science and Environmental Education, pedestrian activity would increase at the Arboretum parking lots. A bus loading zone in front of the Center would provide drop off and pick-up for school children and other groups attending this facility. This would provide safe access for groups of pedestrians, particularly school children, by eliminating the need to walk from the parking lot to the Center's entrance.

A secondary Zoo entrance (Summer entrance) is located adjacent to the site of the proposed Center for Science and Environmental Education and near the existing Children's Zoo. This entrance is open during the summer months during peak attendance periods. The secondary Zoo entrance would be available throughout the year to groups attending the Center for Science and Environmental Education. This would eliminate the need to transport groups from the Arboretum up Zoo Drive to the main Zoo entrance.

Bicycle Circulation

A the present time, Zoo Drive does not include a bicycle lane, bicycles must ride on the existing roadway. According to Park staff, there is little bicycle activity at the Park. Bicycle racks are provided at the main Zoo entrance, but are rarely used. No bicycle activity was observed at the Parking during two visits made in January 1997. The proposed widening of Zoo Drive would include a paved bicycle/pedestrian lane. Bicyclists would use this lane as they ride up Zoo Drive to the main Zoo entrance. During peak periods in the summer months, the secondary Zoo entrances would be open. The Master Plan proposes improvements for this entrance including bicycle racks. Bicycle improvements proposed by the Master Plan could accommodate potential increases in bicycle activity at the Park.

[5] WSA site observations, January 13 and 24, 1997.

Project Parking Demand

There are about 900 existing parking spaces at the Park. The spaces are centrally located near the main entrance with 565 spaces located in the Zoo's main and overflow parking lots and 335 spaces in the Arboretum. A peak parking demand survey conducted in July of 1995[6] determined that peak hour for parking at the Zoo occurred at 2:00 p.m. and that peak demand was for 480 parking spaces.

Using the same growth factor approach (two percent per year) as for the attendance and traffic projections, the peak parking demand would increase to 530 spaces in year 2000 and to 660 spaces in year 2010. The existing parking supply would accommodate peak season, peak hour parking demand to the year 2010.

Source: East Bay Zoological Society, *The Oakland Zoo in Knowland Park Master Plan*, October 1996.
ESA, *Oakland Zoo Master Plan Update Preliminary Circulation and Parking Analysis Technical Report*, September 1, 1995.
Site visits January 13 and 24, 1996.
Naval Medical Center Oakland and City of Oakland, *Draft EIS/EIR for the Disposal and Reuse of Naval Medical Center Oakland*, September 1996.
Oakland Zoo Attendance Figures: 1992-1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
27. Alterations to present patterns of circulation or movement of people and/or goods, or alterations to waterborne, rail or air traffic?	☐	☐	☒	☐

Comment

The proposed project would alter the existing patterns of vehicle access and circulation at the site. Zoo Drive, which currently is one-way, would be widened to 30 feet to accommodate two-way traffic and a bicycle/pedestrian lane. The construction of the Center for Science and Environmental Education would introduce vehicle and pedestrian activity to a new location. The project access and circulation measures are described and evaluated below.

Access Improvement

Existing access to the Park is off of Golf Links Road along a one-way road (Zoo Drive) which serves the Arboretum, Snow Building and the Zoo's main parking lot. The project proposes to widen Zoo Drive and make the road and the Golf Links entry a two-way facility. The existing exit road which connects to 106th Avenue and I-580 would remain a one-way (exit only) facility.

[6] ESA survey conducted on Sunday, July 2,1995 from 10:00 a.m. to 5:00 p.m.

Circulation Improvements

As described above, circulation to the Park entryway off of Golf Links Road would be improved to accommodate two-way traffic. This circulation pattern would improve conditions for the residential areas located in the vicinity of the current Park exit. The opportunity for Park traffic to exit via Golf Links Road would reduce vehicle volumes at the 106th Avenue exit. The new two-way entrance would allow traffic at the Arboretum to exit onto Golf Links Road rather than go up Zoo Drive and exit onto 106th Avenue. Additionally, internal circulation for Park staff would be improved, since they could now drive down Zoo Drive to access Park facilities at the Arboretum rather than what they presently do which is to leave the Park, exit onto 106th Avenue, and then drive north to reenter the Park at Golf Links. Traffic leaving the Zoo parking lots, however, would continue to be directed to exit onto 106th Avenue.

The proposed Center for Science and Environmental Education would be accessed via a loop road off of Zoo Drive. The loop road would be located approximately 600 feet from the Park entry and would provide paved aprons at the Center to serve as bus loading zones. According to Park staff, bus activity ranges between seven to 12 buses per day. Buses would remain parked on the loop road near the Center or would park in the nearby parking lots and pick-up passengers at pre arranged times at the Center. Bus circulation and loading at the main entrance would continue to occur at the north side of the main parking lot, closest to the entrance.

As part of the California 1820 Exhibit area, a shuttle system is proposed for an existing unpaved fire road on the eastern side of the Park. The proposal would improve the existing fire road to a paved 15-foot wide shuttle route. The paved Shuttle Road would access a number of planned exhibit sites and would not be open to private vehicles. An additional benefit of the roadway upgrade would be enhanced fire and service vehicle access as well as faster emergency response times to this area of the Park.

Neighborhood Traffic Concerns

Residents of neighborhoods located in the vicinity of the Park exit at 106th Avenue, Peralta Oaks Drive and Malcolm Avenue have in the past voiced concerns about potentially unsafe traffic conditions caused by excessive vehicle speeds along Malcolm Avenue. While exiting Park traffic is not likely to be traveling at excessive speeds, local concern is focused on the intersection at 106th Avenue, Peralta Oaks and the Park exit road. Vehicles headed west (down hill) on Malcolm Avenue at high speeds are perceived to pose a greater risk of collision with Park and other traffic at this intersection.

The access and circulation improvements proposed for the project would result in a decrease in vehicles using the existing site exit. The problem of excessive vehicle speeds on Malcolm Avenue is an enforcement issue which can best be addressed by the City of Oakland.

Mitigation Measure

27a) To prevent traffic from the Zoo parking lots from exiting onto Golf Links Road via Zoo Drive, appropriate traffic barriers and signage shall be installed.

Significance after Mitigation: Less than significant.

Source: Public meeting on Draft Master Plan, October 3, 1996.
City of Oakland, Memorandum dated August 1, 1996; Re: Traffic Issues on Malcolm Ave.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
28. Have a substantial impact on existing transportation systems or circulation patterns?	☐	☐	☒	☐

Comment

See Comment #26, and #27 above.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Public Services and Utilities. Will the project have an effect upon, or result in a need for new or altered public services in any of the following areas:				
29. Impose a burden on public services or facilities including fire, solid waste disposal, police, schools, or parks?	☐	☐	☒	☐

Comment

Access to the hilly terrain in the Upper Knowland Park area for fire protection is a significant concern of the Oakland Fire Department. The Shuttle Road has been designed in coordination with the City's Fire Marshall and would provide improved access to this part of the Park property. The Shuttle Road would provide all-weather access and be designed to support a fire truck with proposed grades of two to 20 percent. An additional leg to the fire road network on the Park property would link with the existing Snowden Avenue fire access road to mitigate the 20 percent grades. The Fire Marshall has indicated that this would provide adequate access to the development for fire protection purposes.

The Park maintains a 24-hour security force on the premises. Estimated increases in attendance are not expected to result in significant impacts on police services.

The Park provides its own trash collection and compaction. A compacting truck transports the trash to the Altamont Landfill on a weekly basis. Recyclables, including glass, paper, cardboard, and aluminum cans are separated and picked up once a week by an outside service. Implementation of the Master Plan is not expected to result in a significant increase in trash. Animal waste is composted on site. There would be an increase in the number of animals with the implementation of the Master Plan, and consequently the amount of animal

waste also would increase. A new composting system would be installed that will contain the waste material in air- and water-tight plastic bags that speed decomposition. This new system would be capable of efficiently accommodating additional animal waste on site.

The Zoo presently offers environmental education programs for Oakland school children and would offer additional programs with implementation of the Master Plan. This represents a benefit to the Oakland School District.

Source: Meeting with Jerry Blueford, Fire Marshall, December 19, 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
30. Impose a burden on existing utilities including roads, electricity, gas, water and sewers?	☐	☐	☒	☐

Comment

Water and sewer service are provided by East Bay Municipal Utility District (EBMUD). The expansion of facilities and animal exhibits would result in an increase in water consumption and wastewater generation. The proposed River Exhibit would require approximately 60,000 gallons of water which would be recirculated within the exhibit, and replaced on a quarterly basis, resulting in a demand of 240,000 gallons per year. The Center for Science and Environmental Education and new food service and restroom facilities would result in additional water demand. The installation of state-mandated water conserving plumbing fixtures at the these new facilities (low-flow plumbing and drinking fountains with self-closing valves) would have the potential of reducing the water demand for these facilities.

The project would not require the extension of any public utility lines to the site. Existing access to the Park is adequate and would not require improvement. Construction of new utility lines would be limited to on-site improvements and would not result in any new construction off site. An EBMUD right-of-way runs across Park property and contains 16-inch and 30-inch transmission water mains. Construction proposed by the Master Plan would comply with EBMUD's request that a minimum vertical and horizontal clearance of one foot and three feet, respectively, be maintained from other underground utilities/improvements and a pipeline cover of between three and one-half and six feet be maintained.

Source: Dr. Joel Parrott, Executive Director, Oakland Zoo,
EBMUD letter dated October 8, 1996.

Cultural Resources. Will the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
31. Destroy, deface or alter a structure, object, natural feature or site of prehistoric, architectural, archaeological or aesthetic significance?	☐	☐	☐	☒

Comment

A literature review and archaeological field inspection on the site has been completed. The literature review revealed there are no recorded prehistoric or historic sites on the Zoo property. The results of the field inspection concluded there is no evidence of aboriginal use and/or occupation of the proposed are of development or the general vicinity. The report concluded that earthmoving activities associated with implementation of the Master Plan would have no effect on prehistoric cultural resources.

Although not a recorded site, the Historical Park and Arboretum includes tree which are the remnants from the Frederick Talbot estate. Additionally, a caretakers house is located in the Historical Park. The age of this structure is unknown. Under the proposed Master Plan, the Historical Park and Arboretum would continue in their present role and would not be adversely affected by the Master Plan. The caretakers house would remain on site and would continue to be occupied by Zoo staff.

Source: Holman & Associates, *Literature Review and Archaeological Field Inspection of the Proposed Oakland Zoo Master Plan Expansion Area, Oakland, Alameda County, California*, June 11, 1996.
East Bay Zoological Society, *The Oakland Zoo in Knowland Park Master Plan*, October 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
32. Result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	☐	☐	☐	☒

Comment

See Comment #31 above.

Aesthetics. Will the project result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
33. Involve an increase of 100 feet or more in the height of any structure over any previously existing adjacent structure?	☐	☐	☐	☒

Comment

Development proposed under the Master Plan would not result in the construction of any structure with an increase in height of 100 feet or more over adjacent structures on or off-site.

Source: East Bay Zoological Society, *The Oakland Zoo in Knowland Park Master Plan*, October 1996.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
34. The obstruction of any scenic vista or view open to the public?	☐	☐	☐	☒

Comment

Development proposed by the Master Plan would be sited to minimize visibility from adjacent properties and would not result in the obstruction of any scenic vistas or view open to the public.

Source: East Bay Zoological Society, *The Oakland Zoo in Knowland Park Master Plan*, October 1996

Energy. Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
35. Use or encourage use of substantial quantities of fuel or energy?	☐	☐	☐	☒

Comment

The proposed Center for Science and Environmental Education would be required to comply with the Title 24 Energy Conservation requirements of the Uniform Building Code. In addition, the scale of the proposed development and types of use activities is within the capacity of fuel and energy resources, both existing and planned, by Pacific Gas & Electric Company.

Source: Project Application for the Oakland Zoo in Knowland Park Master Plan, November 12, 1996.

IX. MANDATORY FINDINGS OF SIGNIFICANCE

a.	Does the project have the **potential to degrade** the quality of the environment, substantially reduce the habitat of an aquatic or wildlife species, cause a aquatic or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant of animal species, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b.	Does the project have the potential to achieve **short-term**, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one that occurs in a relatively brief, definitive period of time, while long-term impacts will endure well into the future.)	☐	☒	☐	☐
c.	Does the project have impacts that are individually limited, but **cumulatively** considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	☐	☐	☒	☐
d.	Does the project have environmental effects that would cause **substantial adverse effects** on human beings, either directly or indirectly?	☐	☐	☐	☒

X. DETERMINATION

On the basis of this initial environmental evaluation:

☐ I find that the proposed project *will not* have a significant effect on the environment, and a **Negative Declaration** will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the attached *mitigation measures* have been incorporated into the project. Therefore, a **Mitigated Negative Declaration** will be prepared.

☐ I find that the proposed project *may* have a significant effect on the environment, and an **Environmental Impact Report** is required to assess the effects on the environment.

Name ERIN GIBSON Date 3-28-97

Title Planner II