INFORMATION HANDOUT

For Contract No. 04-294944

At 04-Ala,CC-24-5.3/6.2
0.0/1.3

Identified by
Project ID 0412000634

PERMITS

U.S. Fish and Wildlife Service, Biological Opinion on the Effects of the Proposed Caldecott Improvement Project, dated August 8, 2007, and Amendments, dated August 17, 2007 and January 31, 2008 (Service File No. 1-1-07-F-0292 and 1-1-07-F-0309)

US Fish and Wildlife Service, Biological Opinion Seasonal Extension Work Window (April 15-October15) Email Notification dated December 4, 2013.

Department of Fish and Game, Incidental Take Permit, 2081-2008-018-03, dated December 15, 2008, and Amendment dated December 27, 2013.

AGREEMENTS

Paleontological Mitigation Plan Caldecott Improvement Project, Contract Agreement No. 04A1394, Task 04, dated November 2007

04-294944
04-Ala,CC-24-5.3/6.2
0.0/1.3
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MATERIALS INFORMATION

California Code of Regulations (CCR), 3 CA ADC § R4500 "Noxious Weed Species."

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
1-1-07-F-0292

August 8, 2007

Mr. James B. Richards
California Department of Transportation
P.O Box 23660
Oakland, Ca 94623-0660

Subject: Biological Opinion on the Effects of the Proposed Caldecott Improvement Project on State Route 24 in Contra Costa and Alameda Counties, California (EA 294900) on the Threatened California Red-Legged Frog, the Threatened Alameda Whipsnake, and Designated Critical Habitat for the Alameda Whipsnake.

Dear Mr. Richards:

This is in response to the March 6, 2007, and April 17, 2007, requests from the Federal Highway Administration for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Caldecott Improvement Project on State Route 24 in Contra Costa and Alameda counties, California. The proposed project consists of a fourth bore of the Caldecott Tunnel, intersection realignment, and associated construction activities to incorporate the new lanes into the existing roadway. The requests were received in this Field Office on March 8, 2007 and April 19, 2007, respectively. This document represents the Service's biological opinion on the effects of the project on the threatened California red-legged frog (*Rana aurora draytonii*), and the threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*) and its critical habitat. This document is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

This biological opinion is based on: (1) a letter from the Federal Highway Administration (FHWA) to the Service dated March 6, 2007; (2) *Biological Assessment for the Caldecott Improvement Project on State Route 24 (EA 294900)* dated February 2007; (3) an April 19, 2007 letter from FHWA to the Service ; (4) a May 17, 2007, site visit by the Service and the California Department of Transportation (Caltrans); (5) a map of the action area on the west side of the tunnel provided by Caltrans via electronic mail on June 14, 2007; (6) an August 7, 2007,

TAKE PRIDE IN AMERICA

electronic mail message from Caltrans describing proposed habitat compensation proposals to include in the project description of the biological opinion, (7) a meeting between the Service, Caltrans, Contra Costa Transportation Agency, and Bill Gray on July 31, 2007; (8) a site visit on August 2, 2007, to a potential compensation site by the Service, Caltrans, and East Bay Regional Parks District; (9) electronic mail and telephone conversations between Caltrans and the Service; and (10) other information available to the Service.

CONSULTATION HISTORY

May 15, 2006	The Service received a letter from Caltrans to the Service dated May 10, 2006, and the *Draft Environmental Assessment/Environmental Impact report for the Caldecott Improvement Project on State Route 24 (EA 294900)* dated May 2006.
March 8, 2007:	The Service received a request from FHWA for formal consultation for the effects of the project o the Alameda whipsnake. FHWA also requested concurrence with Caltrans' determination that the proposed project is not likely to adversely affect the California red-legged frog.
April 10, 2007:	During a telephone discussion with the Service, Caltrans requested a cursory review the Caldecott Improvement Project Biological Assessment ahead of the other projects that according their list have a higher priority.
April 10, 2007:	The Service contacted Caltrans via telephone and electronic mail regarding the results of the requested preliminary review of the Biological Assessment. Formal consultation was advised that formal consultation should be initiated for the effects of he project on the California red-legged frog and the Alameda whipsnake.
April 19, 2007:	The Service received a letter from FHWA requested written rationale for the Service's preliminary determination that the proposed project is likely to adversely affect the California red-legged frog. The letter asked for clarification why the project may affect as much as 24 acres of listed species habitat. They also requested initiation of formal consultation on the California red-legged frog as well as a draft biological opinion for their review in June 2007.
May 6, 2007	The Service received a draft biological opinion which had been prepared by Caltrans.
May 17, 2007	The Service visited the proposed project site with Caltrans to review the wetlands on the east portal and discuss remaining issues.

June 11, 2007	The Service sent Caltrans a request for clarification on various project description issues via electronic mail.
June 13, 2007	Caltrans provided the Service with responses via electronic mail for the June 11, 2007 request for additional information.
June 13, 2007	The Service sent an electronic message to Caltrans regarding section 7 and the proposed project. The Service also requested a map of the project action area for the west side of the tunnel.
June 14, 2007	Caltrans provided the Service with a figure depicting the action area on the west side of the tunnel via electronic mail.
June 15, 2007	Caltrans provided the Service with information via electronic mail regarding the 2.08 acre (0.84 hectare) strip of action area on the west side of the tunnel, between the east bound Gateway Boulevard off-ramp and an existing ditch as an area where there would be temporary effects to the California red-legged frog.
June 15, 2007	The Service requested clarification from Caltrans via electronic mail on Exhibit A figure provided earlier on June 15, 2007.
June 22, 2007	The Service submitted the draft biological opinion for the proposed project to FHWA and Caltrans.
July 31, 2007	The Service met with Caltrans and the Contra Costa Transportation Authority (CCTA) to discuss the draft biological opinion and compensation for loss of habitat for the Alameda whipsnake and the California red-legged frog.
August 2, 2007	The Service, East Bay Regional Park District (EBRPD), and Caltrans visited a potential compensation site. The potential site is located within Alameda whipsnake critical habitat and it includes a likely California red-legged frog breeding pond and appropriate upland habitat for the listed frog.
August 7, 2007	The Service received revised compensation language via electronic mail from Caltrans that included the option of participating in the EBRPD purchase of the potential compensation site or purchasing credits at the Ohlone Conservation Bank. Caltrans would either purchase 36 acres of shared Alameda whipsnake and California red-legged frog habitat at the potential compensation site at $5,000/acre or at the Ohlone Conservation Bank at $15,000/acre.

BIOLOGICAL OPINION

Description of Proposed Action

Caltrans and FHWA, in cooperation with the Metropolitan Transportation Commission (MTC), Alameda County Congestion Management Agency (ACCMA), and CCTA, propose to reduce traffic congestion and improve safety along State Route 24 by constructing a forth bore of the Caldecott Tunnel between Alameda and Contra Costa Counties, California. The project limits extend from the State Route 24/State Route 13 Interchange in Alameda County to the State Route 24/Gateway Boulevard Interchange in Contra Costa County.

State Route 24 is a major east/west connector between Interstates 980 and 580 in Oakland (Alameda County) and Interstate 680 in Walnut Creek (Contra Costa County). It is a principal connector route for people and goods between the San Francisco Bay Area and the Central Valley.

The proposed project is intended to alleviate congestion along the State Route 24 corridor near the Caldecott Tunnel. Additional passenger capacity is needed at the Caldecott Tunnel to handle weekday and weekend non-peak direction traffic on State Route 24 between Oakland and Berkeley in Alameda County, and Orinda and Walnut Creek in Contra Costa County. Geometric improvements are also needed at the tunnel to improve the flow of traffic in the corridor and reduce the potential for congestion-related accidents at the non-peak direction queues that form at the tunnel approaches.

General Overview

The Caldecott Tunnel consists of two bores constructed in 1937 and a third bore, north of the original two, built in 1964. The tunnel bores connect Alameda County and Contra Costa County via State Route 24.

Caltrans proposes to construct a forth bore with two westbound through lanes north of the existing third bore. The typical cross-section of the proposed tunnel will be a total width of 41.25 feet and a tunnel length of 3,389 feet. This includes two 12-foot lanes, south 2-foot shoulder, north 10-foot shoulder, north minimum 1.97-foot curb, and south minimum 3.28-foot emergency walkway. On the west side of the tunnel, in Alameda County, traffic exiting the new bores will pass underneath the existing maintenance access bridge and conform to the existing freeway grade approximately 591 feet west of the existing tunnel portal. The Caldecott Lane off-ramp will be widened at the freeway exit to accommodate the proposed forth bore. Additionally, the connector from the westbound State Route 24 to northbound State Route 13 will be moved to provide increased westbound State Route 24 weaving distance from 296 feet to 1,267 feet between the Caldecott Lane on-ramp and the State Route 13 north connector. The eastbound mainline will be realigned just west of bores one and two to smooth out the proposed eastbound-only horizontal alignment. A minor widening at the intersection of Caldecott Lane and the Kay

Overcrossing will provide a right-only turn lane to the Kay Overcrossing from eastbound Caldecott Lane.

At the east portal of the Caldecott Tunnel in Contra Costa County, the ramps on the north side of State Route 24 at Fish Ranch Road will be slightly realigned to accommodate the proposed forth bore.

The proposed tunnel includes approximately 72 to 82 feet of cut and cover type tunnel at the west portal in Alameda County and at the east portal in Contra Costa County electrical substations and ventilation systems. Noise barriers will also be constructed on the west side of the tunnel in Alameda County.

Utilities

According to the Draft Environmental Assessment/Environmental Impact Report (Caltrans 2006), the utilities within the Caldecott Improvement Project area include electrical, telephone, sanitary sewer and water. The Draft Environmental Assessment/Environmental Impact Report also states that although the majority of the utilities within the project area do not present conflicts, some utilities have been identified for relocation for the project (Caltrans 2006). According to Caltrans these, relocations would be undertaken in advance of project construction where feasible (Caltrans 2006).

According to June 13, 2007 communication, Caltrans biologists are working closely with Caltrans Engineers to identify and quantify any additional activities associated with utility relocation outside of the stated action area. This additional information will be provided to the Service and Caltrans will request an amendment to this biological opinion if the utility relocation activities extend beyond the action area described in the February 2007 Biological Assessment.

Retaining Walls

The proposed project will require the construction of six permanent retaining walls along State Route 24. Retaining wall number 1A at the north side of the west portal cut in Alameda County will be about 45 feet long with a maximum height of approximately 18 feet from finish grade. Retaining wall1B at the north side of the west portal cut in Alameda County will be about 91 feet long with a maximum height of approximately 42 feet from finish grade. Retaining wall 2 at the south side of the west portal cut in Alameda County will be around 66 feet long with a maximum height of about 26 feet from finish grade. Retaining wall 3A at the north side of the east portal cut in Contra Costa County will be approximately 939 feet long with a maximum height of around 25 feet from finish grade. Retaining wall 3B on the east portal in Contra Costa County adjacent to Fish Ranch Road will be about 275 feet long with a maximum height of approximately 5 feet from finish grade. Retaining wall 4 at the south side of the east portal in Contra Costa County cut will be around 44 feet long with a maximum height of 25 feet from finish grade.

Emergency Passages

Emergency cross passages or emergency exits as required by the National Fire Protection Association will be included. It is proposed to provide five to seven cross-passages between the new bore and the third bore spaced at 394-foot intervals. This will also upgrade emergency egress facilities for the third bore. Connections of the cross-passages into the third bore will create traffic staging issues and possible lane closures.

Portal Structure and Other Buildings

While the current portal structures house ventilation equipment and/or systems control, the new portal structures for the forth bore will not need to house ventilation equipment or system control since the ventilation system for the new bore will consist of jet fans located within the tunnel, and the control and monitoring systems will be connect to the existing or new control room. The portal will be used as a visual screen to hide a new electrical equipment building and substation on the west side in Alameda County and another substation on the east side in Contra Costa County.

The portal structure on the west side in Alameda County will be constructed on the cut and cover portion of the new tunnel. It will consist of a west wall that will be architecturally treated and a north and south retaining wall. An access road will be constructed to connect the portal structure to the existing road along the west side of the existing Operations Maintenance and Control building. The portal structure at the east side in Contra Costa County will also be constructed on cut and cover portion of the tunnel.

A new Operations Maintenance and Control building will be built to replace the existing Operations and Maintenance building, which does not meet seismic building code.

Right-of-way

At the time the existing third bore was completed in 1964, the right-of-way for a proposed two-lane northern forth bore was acquired. Thus, no new right of way is anticipated to be needed; however, 14 parcels would require underground easements.

- Lifeline Route

Caltrans has designated State Route 24 as an emergency lifeline route to be used in disaster response activities. Under Caltrans criteria, a lifeline transportation route:

1. Allows emergency relief access to and through the affected region;
2. Connects major population centers within the affected region;
3. Serves as the most effective of several routes for emergency relief access;
4. Provides direct or nearby access to and from major emergency supply centers;

5. Link various modes of transportation; and
6. Provides access to major traffic distribution centers.

Lifeline routes require project-specific design criteria for each component along the route that are consistent with the performance requirements of the specific lifeline route, and thus the proposed project will be designed to meet the performance criteria for a lifeline route.

Impervious Surface

The proposed project will include approximately 1.7 acres of impervious material. This equates to approximately 2.2 cubic feet per second of added surface water run-off using a 25-year storm event, 10-minute storm duration.

According to Caltrans' National Pollution Discharge Elimination System (NPDES) permit and the Construction General Permit under Section 402 of the Clean Water Act, best management practices (BMPs) will be incorporated into this project to reduce the discharge of pollutants during and post-construction to the maximum extent practicable. These BMPs include temporary construction site BMPs, and design pollution prevention BMPs.

Construction Site BMPs

Temporary BMPs will be implemented during construction activities to reduce pollution in stormwater discharges throughout construction. One critical construction activity, dewatering, will be necessary for this project because of the likelihood of encountering groundwater during tunnel excavation. Groundwater will be treated and discharged into the sanitary sewer inlet of East Bay Municpal Utility District (EBMUD) under permit agreements. Dewatering BMPs and temporary holding devices such as Baker Tanks will be included in the special contract to meet the dewatering requirements.

Grading of existing slopes will be required. However, the used of retaining walls, especially in excavation areas, will minimize the amount of grading required. Temporary fences, construction entrance/exit gates, and temporary soil stabilizers are some of the temporary erosion and water pollution control measures that will be utilized in combination to prevent and minimize soil erosion and sediment discharges during construction.

Project Construction

Project construction is scheduled to begin in summer 2009 and is expected to be completed in winter 2013. Tunnel construction is expected to begin in fall 2009. Once begun, tunneling will continue for approximately 3 years.

Staging Locations

Staging locations have been identified at each portal. The west portal staging area is proposed adjacent to the west portal in Alameda County in the relatively flat area bounded by State Route 24 and Caldecott Lane. The east portal staging area is located adjacent to the east portal in Contra Costa County in two relatively narrow parcels. The parcels are separated by an on-ramp to State Route 24 from Fish Ranch Road. A third parcel, bounded on either side by State Route 24 immediately north of the second and third bore portals, will also be made available to contractors.

The staging areas will be used for temporary storage of heavy construction equipment (e.g., a roadheader, hydraulic excavator or backhoe, rubber tired dump trucks, front-end loader, load-haul-dump, drill jumbo, ect.) and other various construction needs, such as shotcrete (a mixture of concrete, fine aggregate, and water blown pneumatically through a hose) batch plants, groundwater retention facilities, warehouses, equipment maintenance shops, muck handling and stockpile areas, and field offices. The staging areas must also accommodate other temporary ancillary facilities such as ventilation equipment to assure an adequate supply of fresh air in the tunnel.

Construction Stages

Construction will be done in three stages. Stage 1 involves:

1. Constructing staging areas at the east and west portals;
2. Grading for the portal cuts;
3. Construction retaining walls at each portal;
4. Installing additional slope support as required;
5. Constructing a temporary soundwall along Caldecott Lane;
6. Relocating the westbound State Route 24 to northbound State Route 13 connector ramp; and
7. Constructing the right turn lane from eastbound Caldecott Lane to the Kay Overcrossing (summer 2009 to fall 2009).

Stage 2 will occur in two phases.

Stage 2, Phase 1 involves:

1. Excavating tunnel and cross passages;
2. Constructing final tunnel lining;
3. Constructing ventilation;
4. Installing lighting and control systems;
5. Constructing portals and electrical substations; and

6. Constructing the eastbound and westbound on-ramps at Fish Ranch Road (fall 2009 to fall 2012).

Stage 2, Phase 2 involves:

1. Finalizing the retaining walls and portals;
2. Constructing the soundwall and berm at Caldecott Lane;
3. Preparing the portal roadway approaches; and
4. Widening the westbound Caldecott Lane off-ramp to accommodate the forth bore alignment (fall 2009 to winter 2009).

Stage 3 involves:

1. Opening the fourth bore to traffic;
2. Constructing the median concrete barrier on both sides of the tunnel;
3. Providing pavement overlay of the Caldecott Lane on- and off-ramps; and
4. Realigning, paving and striping the eastbound approach to the second bore (fall 2009 to winter 2009).

Roadway

Roadway excavation will be conducted using a front-end loader and motor grader to excavate the area to be paved to the required grade. Most of the material excavated will be hauled off-site using dump trucks; the location and type of disposal will be determined by the contractor. The contractor will be required to obtain any necessary environmental clearances associated with the disposal or reuse of the material. Once the roadway has been excavated, the soil will be rolled and vibrated with a sheepsfoot or drum roller to 95 percent relative compaction.

Structural Section
The layers making up the structural section of the roadway will be placed in short lifts of less than 6 inches. The material will be hauled in, dumped, spread with a motor grader or asphalt-paving machine, and compacted.

Overlay
The existing asphalt concrete will be cold planed down 1.2 inches. The surface will be cleaned, and then an asphalt binder will be applied. The asphalt concrete overlay will then be dumped and spread using an asphalt-paving machine, and then rolled with a steel-tired compactor.

Concrete Barrier
A concrete barrier will separate the two directions of traffic. To construct the barrier, the centerline of the barrier will be staked and reinforcing steel will be set in place. Concrete will then be dumped into a slip form to shape the barrier.

Water Quality

The fourth bore of the Caldecott Tunnel is considered a major reconstruction project with an estimated disturbed soil area over 3 acres. Caltrans evaluated permanent treatment BMPs. For this project, biofiltration systems will be implemented; a brief description of each is discussed below. Caltrans has identified the location and construction envelope (2.1 acres) in which permanent treatment BMPs will be located.

On the west side of the Caldecott Tunnel in Alameda County, stormwater run-off is diverted into an approximately 108-inch structural steel plate pipe culvert that follows the path of Temescal Creek (but is in a separate system than Temescal Creek) and discharges into the San Francisco Bay (the culvert will most likely change diameter and shape numerous times as it drains into the Bay). A biofiltration system is being considered for the west side of the tunnel in Alameda County in the vicinity of the State Route 24/State Route 13 Interchange. Biofiltration systems include biofiltration swales and strips; biofiltration swales are vegetated channels that receive directed flow and convey stormwater, and biofiltration strips are vegetated sections of land over which stormwater flows as overland sheet flow. Both biofiltration swales and strips are effective for removing total suspended solids (TSS), particulate metals, and litter.

Preliminary investigations on the west side of the Caldecott Tunnel in Alameda County show that media filter permanent treatment BMPs may be feasible in the vicinity of the State Route 24/State Route 13 Interchange. Media filter permanent treatment BMPs primarily remove TSS, particulate metals, dissolved metals, and litter from run-off by sedimentation and filtration. There are two media filter designs: Austin Vault Sand Filter (AVSF), and Deleware Filter. The AVSF may be further classified as either a structural or earthen section. For this project, a structural AVSF is being considered. An AVSF is open and at-grade, but does not have a permanent water pool. An AVSF may be suitable for proper treatment, considering the following site characteristics:

1. There is a good-sized tributary area;
2. There is available area within Caltrans right-of-way; and
3. The hydraulic head at the proposed site is greater than 3 to 6 feet.

If the bottom of the filter is at, or below, seasonally high groundwater, verification shall be sought that uplift will not occur.

On the east side of the tunnel in Contra Costa County, stormwater run-off is directed to a culverted section of San Pablo Creek, which runs into San Pablo Reservoir. In comparison with the overall watershed of San Pablo Creek, the increase in flow volume and velocity from the proposed highway improvements are minimal, and therefore, these are anticipated to have negligible increase to existing water quality effects for both the Creek and Reservoir. The net effect of these changes on water quality and pollutant loading will be minimized with the use of temporary construction site BMPs, permanent design pollution BMPs, and permanent treatment

BMPs. As part of the proposed project, biofiltration systems are being considered in the vicinity of the Gateway Boulevard off-ramp.

Permanent Design Pollution Prevention BMPs

Design pollution prevention BMPs are permanent measures to improve stormwater quality by reducing erosion, stabilizing disturbed soil areas, and maximizing vegetated surfaces. Erosion control measures will be provided on all disturbed soil areas.

Erosion control measures will utilize a combination of source and sediment control measures to prevent and minimize erosion from disturbed areas. Source controls will utilize erosion control netting in combination with hydroseeding. Caltrans plans to use erosion control netting that is 100% spun coir netting which is biodegradable and has openings large enough to prevent wildlife entanglement. According to Caltrans, they no longer uses erosion control blankets, which have the single strand plastic filament, due to the risk of snakes and frogs getting caught or trapped.

Permanent Removal of Roadway and Habitat Restoration

Roadway will be removed in three locations, totaling approximately 0.99 acres. The restoration will begin by stabilizing the area with erosion control measures such as fiber rolls, compost, stabilizing emulsion, and straw. Then, these areas will be seeded with a native seed mix including *Lotus purshianus*, *Bromus carinatus*, *Elymus glaucus 'Berkeley'*, *Nassella pulchra*, *Nassella lepida*, *Festuca rubra 'Molate'*, and *Poa secunda*. Once these areas are seeded and established, they will serve as grassland habitat, improving habitat conditions for wildlife (including special-status species).

Berm and Soundwall

The fill for the natural berm will be dumped, spread, and compacted in layers most likely using a front-end loader, motor grader, and vibratory compactor. After the berm has been completed, a drill rig will drill holes for piles. A reinforcing system will be lowered into the drill holes, and concrete will be pumped to ground level using a concrete pump truck. Once the piles have cured, forms and reinforcement for a pile cap will be put in place. Concrete will be pumped into the forms allowed to cure. The masonry blocks and reinforced steel comprising the soundwall will then be erected.

Retaining Walls 1-4

The four retaining walls will consist of one or more combinations of the following types of earth retaining systems:

Soldier Pile Wall with Tiebacks: Soldier pile walls with tiebacks will be constructed in a top-down manner. First a 3.3 to 5.9- foot (1 to 1.8-meter) high bench will be cut along the layout

line of the retaining wall with a bulldozer. Next a track-mounted drill rig will be set up on the bench to drill holes for the soldier piles (H-shaped beams). After each hold has been drilled, a crane will hoist the beams vertically into place in the center of the hole. Concrete will then be pumped into the hole up to the level of the bottom of the wall with a concrete pump truck. Once all the soldier piles are in place, treated timber, known as lagging, will be placed between them. Horizontal holes will then be drilled and the tiebacks, which consist of steel strand cables, will be placed in the holes. The tieback cables are inserted through an opening in the pile and are secured in the earth by grouting the hole. After grout has set up, a strand-gripping device is placed over the cables. A hydraulic tensioning jack is used to tighten the cables. When the jack releases the cables, the gripping device holds them and maintains the required tension against the pile. A steel plate is secured in place to hold the tension. The above process is continued to the bottom of the wall.

After all the lagging and tiebacks are in place, reinforcing steel will be placed and forms erected so that a smooth, decorative exterior wall will cover the soldier pile wall and tieback system.

Soil Nail Wall: Soil nail walls will also be constructed from the top down. After the first bench is cut using a backhoe or loader, a track-mounted drill rig will drill horizontal holes into the cut. Large epoxy-coated rebar (the "nails") will be inserted into the holes and grouted in place. Drainage fabric and reinforcement will be placed along the cut, and will then be covered in shotcrete. This process continues to the bottom of the wall. After all the nails and shotcrete are in place, reinforcing steel will be placed and forms erected so that a smooth, decorative wall will cover the soil nail system.

Cast-in-Place Wall: The area will be excavated with an excavator and front-end loader to the bottom of the wall with a safe slope cut back up the hill. The ground will then be compacted with a vibratory compactor. After that, reinforcing steel will be placed and forms erected. Concrete is then pumped into the forms using concrete pump truck. Once the concrete has cured, the forms are removed and backfill material is placed and compacted in layers behind the wall.

Tunneling

The Caldecott Tunnel is classified as a weak rock tunnel based on the presence of generally very weak, weathered and fractured rock along most of the tunnel alignment. The tunneling method requires that work be performed at a minimum of a 24-hour per day, five-day per week basis to maintain stability of the excavation. Due to the variable geology, the initial ground support is expected to comprise varying amounts of pneumatically applied concrete (shotcrete), steel arches (lattice girders), rock anchors, and rock pre-support members (spilling and canopy tubes).

Since the decisions on which types of ground support will be required are made in the fields as excavation proceeds, it is necessary to maintain an adequate supply of initial ground support elements on hand for safety reasons and to minimize schedule delays to tunnel construction. Because of the large amount of shotcrete will be batched onsite to assure that shotcrete is

available and can be transported into the tunnel on demand and in a timely manner 24 hours per day.

The tunnel will be constructed using the New Austrian Tunneling Method (NATM), also known as the Sequential Excavation Method. It involves the excavation and support of several horizontal, underground openings (within the tunnel perimeter) known as drifts and benches in a specific order. As the excavation progresses, a layer of shotcrete is immediately sprayed on the interior surface of the tunnel, and rock bolts are installed.

NATM allows excavation of a stable opening in small increments. The excavation is supported in sequential fashion, which limits exposure to rock instability or fallout. When performed with the requisite instrumentation and continuous interpretation of rock movements, NATM allows the support system to be tailored to actual field conditions and provides continuous feedback on the opening's stability.

Excavation is mainly expected to be done using a roadheader. The cutting head will be moved over the tunnel face to create a profile of any desired shape or size. The walls and roof exposed by the roadheader excavation will be inspected at regular intervals to analyze its condition and determine any additional support required. The spoil will be loaded onto a conveyor within the machine, discharging to a truck for removal to the surface.

Cut and Cover

Cut and cover tunnel sections will be required adjacent to both the east and west portals due to the shallow cover at each end of the tunnel alignment. The cut and cover structure will be approximately 72 to 82 feet long at both the west and east portals.

The first step in constructing the cut and cover structures will be the installation of temporary excavation support measures, which will be done in conjunction with the staging area development and construction of the adjacent retaining walls at the beginning of the project. The temporary support walls will be pile supported with tiebacks or soil nail walls. During the majority of the fourth bore construction, the cut and cover zones will be used for portal access and staging into the mined tunnel reach of the new fourth bore. After the final lining is installed in the entire mined tunnel, the permanent cut and cover structures will be built.

The cut and cover structures will consist of cast-in-place concrete walls, and re-cast concrete T-beams will be placed on top of the support walls to provide primary roof support for the cut and cover structures. A final concrete roof pad will be cast in place to tie-in the T-beams and provide additional support for the electrical substation and service areas on the roof. The cut and cover structure will also be integrated into the final portal structures and facades.

After completion of the final portal walls above the cut and cover structure, the area around the portal will be restored by minor grading and Revegetation. The roof area above each cut and

cover structure will house small buildings that will contain substation and electrical switchgear. A small access ramp will be built from the current access ways in front of the third bore on both the east (Contra Costa County) and west (Alameda County) sides of the tunnel. These electrical buildings will be completely surrounded by retaining wall structures above the cut and cover tunnel and will not be visible from the roadways.

Disposals

The proposed project will produce approximately 296,905 cubic yards of excavated material. The disposal of excavated material will be left up to the contractor. The contractor will be able to explore potential beneficial uses for the excavated material and disposal sites.

Numerous commercial landfills are available within a 25-mile radius of the tunnel site that could be considered as possible disposal sites. It is expected that the material resulting from the tunnel excavation will be free of anthropogenic contamination, thereby making it a very likely candidate for unrestricted reused at other developments in need of imported fill. There is a chance that a small percentage of the excavation spoils will be affected by the naturally occurring hydrocarbons (e.g., tar) observed in the geologic formation during the boring of earlier tunnels. The excavation spoils will be screened for the presence of hydrocarbons and other chemicals (e.g., metals) to fully characterize the spoils' constituents and determine suitability for types of reuse.

Whether the spoils are reused as imported fill or disposed of at a landfill, the material will be handled at the contractor's discretion in accordance with all applicable local, state, and federal laws. For example, landfill waste characterization will be governed by Title 22 of the California Code of Regulations and the federal parameters defined under the Resource Conservation and Recovery Act (RCRA); additionally, reuse as imported fill should satisfy guidelines established by, amongst others, the State Water Resources Control Board (SWRCB) acting through its Regional Water Quality Control Boards (RWQCB).

Disposal locations should be provided to the Service and Caltrans should request an amendment to this biological opinion if the disposal location and activities are to occur outside an existing disposal site.

Restoration of Temporarily Affected Areas

After the completion of construction, areas of temporary effects will be stabilized with the use of erosion control measures such as fiber rolls, compost, stabilizing emulsion and straw. These areas will also be seeded with a native seed mix including *Lotus purshianus*, *Bromus carinatus*, *Elymus glaucus* '*Berkeley*', *Nassella pulchra*, *Nassella lepida*, *Festuca rubra* '*Molate*', and *Poa secunda*. By replacing annual grasslands with a native seed mix, it is expected that the vegetative community in the temporarily affected areas will be improved.

Trees removed during construction will be replaced and planted in areas of temporary effect; the majority of the trees are landscaping trees planted by Caltrans within its right-of-way. According to Caltrans the tree species to be removed do not provide prime habitat for California red-legged frog or the Alameda whipsnake and include the following:

1. Madrone (*Arbutus menziesii*)
2. American creek dogwood (*Cornus sericea* ssp. *Sericea*)
3. Monterey pine (*Pinus radiata*)
4. Western sycamore (*Platanus racemosa*)
5. Coast live oak (*Quercus agrifolia*)
6. Valley oak (*Quercus lobata*)
7. Pacific willow (*Salix lucia* ssp.)
8. Blue elderberry (*Sambucus mexicana*)
9. Peruvian pepper tree (*Schinus molle*)
10. Coast redwood (*Sequoia sempervirens*)
11. California bay laurel (*Umbellularia californica*)
12. California walnut (*Juglans californica*)

Native oak trees will be replaced pursuant to California Senate Concurrent Resolution (CSCR) 17 – Oak Woodlands. This measure requests state agencies to preserve and protect native oak woodlands to the maximum extent feasible or provide replacement plantings where designated oak specimens are removed from oak woodlands. The ratio of native oak tree replacement will be between 3:1 and 5:1, with the final ratio determined in consultation with the California Department of Fish and Game. Tree replacement will occur on-site, space permitting. The remaining tree replacement, if any, will occur off-site. A qualified biologist shall be retained to monitor restoration success for 3 years to provide an 80 percent survival rate at the end of the third year.

In addition, as a near-term measure to compensate for delays in providing mature replacement habitat, the California bay and coast live oak forests and other adjacent areas of the project will be enhanced through removal of exotic plant species. These enhancement measures will immediately improve existing forest quality.

If off-site locations are being selected for replacement plantings this additional information should be provided to the Service and Caltrans should request an amendment to this biological opinion.

Avoidance and Conservation Measures

According to the February 2007 Biological Assessment, Caltrans proposes to avoid, minimize, and compensate for effects to listed species by implementing the following measures:

1. The effects to 12.07 acres of California red-legged frog habitat shall be compensated at 3:1 (36.21 acres) with occupied California red-legged frog habitat. The permanent affects to 12.07 acres of Alameda whipsnake habitat shall be compensated at 3:1 (36.21 acres) with occupied Alameda whipsnake habitat.

   Caltrans will contribute to the purchase of habitat acquisition or purchase mitigation bank credits, which will compensate for the permanent effects to California red-legged frog and Alameda whipsnake if the habitat is appropriate for both species.

   Caltrans will compensate for effects to both species through one of the options listed below:

   a) Participate in the purchase with East Bay Regional Parks of 36 acres of Tyler Ranch property in Sunol, California, which provides habitat for both California red-legged frog and Alameda whipsnake (exact location of the 36 acres of proposed habitat for both species within the Tyler Ranch property to be determined later in cooperation with USFWS). The per acre price would be $5,000 per acre for a total purchase price of $180,000.00

   OR

   b) Purchase 36 acres (credits) of occupied area for both species from Ohlone Conservation Bank at $15,000 per acre/credit for a total purchase price of $543,150.00

   The first option would be an in lieu fee program that must comply with Federal Highway Administration policy for Federal aid participation

2. Employee Education. All personnel working near the Gateway Boulevard east off-ramp will attend an employee education program. The program will consist, at minimum, of the following: a description of the status and life history of California red-legged frog and Alameda whipsnake; the specific measures that are being implemented to conserve the California red-legged frog and Alameda whipsnake for the current project; the boundaries within which the project may be accomplished; and information regarding the procedure to follow should an individual California red-legged frog or Alameda whipsnake be observed.

3. Pre-Construction Surveys. Forty-eight (48) hours prior to construction activities, a pre-construction search for the California red-legged frog at the Gateway Boulevard east off ramp willow riparian wetland will be made by a Service-approved biologist. If any life stage of the California red-legged frog is found and these individuals are likely to be killed or injured by work activities, work activities will be stopped immediately and the Service will be consulted.

4. During the first warm spring period of each year prior to the start of the project, visual surveys for Alameda whipsnake will be conducted by a qualified herpetologist in the upland ravines north of State Route 24 near the Gateway Boulevard and Fish Ranch Road off-ramp. Two surveys will be conducted, during which the herpetologist will slowly move through all rock outcrop areas during the morning hours, while scanning the area ahead with binoculars. Areas supporting populations of western fence lizard (*Sceloporus occidentalis*) will be observed continuously during the early to mid-morning period. Observers will be looking for both individual Alameda whipsnake and shed snake skins during these surveys.

   It is expected that these annual surveys will occur in years 2008 and 2009 prior to the summer 2009 construction start date. If neither individual Alameda whipsnake nor Alameda whipsnake shed skins are detected during these surveys, the chance of a wandering Alameda whipsnake from one of the distant sites entering the action area will be considered very remote, and no additional protective measures will be taken. If individual Alameda whipsnake or Alameda whipsnake shed skins are detected during the annual pre-construction surveys, then the protective measures outlined in Measure 3 shall be taken.

   If one or more Alameda whipsnake, or its shed skin, is found during the annual pre-construction surveys, then a possibility exists that an Alameda whipsnake may engage in foraging movements, which could bring it into the action area north of State Route 24 near the Gateway Boulevard and Fish Ranch Road off-ramps. If Alameda whipsnake or Alameda whipsnake skins are detected, the following measures shall be implemented:

5. The Service-approved herpetologist will conduct weekly inspections of any sites within or near the Gateway Boulevard and Fish Ranch Road off-ramps where construction materials are being stored and that may provide potential retreat sites for wandering Alameda whipsnake.

6. Alameda whipsnake exclusion fences will be installed at the most likely areas where a snake may enter an action area; these areas include the east side of the Caldecott Tunnel in Contra Costa County and along the northern side of State Route 24. The exclusionary fencing, consisting of 4 × 8 feet stand board or plywood panels set lengthwise, supported by metal fence posts, and buried 6 inches below grade, or sealed in a like manner to prevent incursion under the fence. This fencing will be installed at an angle of 15 to 20 degrees away from the interior work area to prevent snakes from entering the construction zone. The exclusion fencing will be placed immediately outside the Environmental study area fencing.

Laurie confirmed that the intention was to fence the entire boundary, but that in the end only two sections were fenced.

Immediately prior to installation of the exclusion fence, a Service-approved herpetologist will survey the area for Alameda whipsnake. Should Alameda whipsnake be observed, the herpetologist will capture the individual to remove it from the construction zone. The herpetologist will then release the Alameda whipsnake in the closest suitable habitat outside the construction zone at the end of the day.

7. Environmental Study Area Fencing. Environmental study area fencing will be installed along the northern and southern boundaries of the Service-designated critical habitat on the east side of the Caldecott Tunnel in Contra Costa County.

8. Construction Activities Conducted During Summer Months. Construction related activities within the immediate Gateway Boulevard east off-ramp exit area will be limited to the summer months, between June 1 and October 30.

9. Construction Surveys for Project Construction Activities Conducted Between October 15 and April 15. Weekly searches for California red-legged frog will be made at the Gateway Boulevard east off-ramp willow riparian wetland by a Service-approved biologist throughout the October 15th to April 15th construction period. During this winter time period, it may be more likely that a California red-legged frog would attempt to disperse from distant locations to within the project limits, and utilize the Gateway Boulevard east off-ramp willow riparian wetland area.

10. Equipment Refueling, Maintenance, and Staging Controls. All refueling, maintenance, and staging of equipment and vehicles will occur at least 50 feet from riparian habitat or water bodies and not in a location from where a spill would drain directly toward aquatic habitat. The monitor will make sure contamination of aquatic habitat does not occur during such operations. Prior to the onset of work, a plan will be developed for prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

11. Sediment Control. Caltrans Storm Water Pollution Prevention Plans (SWPPPs) and erosion control BMPs will be used to minimize any wind- or water-related erosion. The SWRCB has issued a NPDES Statewide Storm Water Permit to Caltrans to regulate stormwater and non-stormwater discharges from Caltrans facilities. A SWPPP will be developed for the project, as one is required for all projects that have at least one acre of soil disturbance. The SWPPP will comply with the Caltrans Storm Water Management Plan (SWMP); it will include guidance for Caltrans to include provisions in construction contracts to include measures to protect sensitive areas and to prevent and minimize stormwater and non-stormwater discharges.

The SWPPP is referenced to the Caltrans Construction Site BMPs Manual. This manual is comprehensive and includes many other protective measures and guidance to prevent and minimize pollutant discharges, and can be found at the following website location: http://www.dot.ca.gov/hg/constuc/stormwater/manuals.htm. Protective measures will be included in the contract, including, at a minimum:

Concrete wastes are collected in washouts and water from curing operation is collected and disposed of and not allowed into water courses;

Dust control will be implemented, including use of water trucks and tackifiers to control dust in excavation and fill areas, rocking temporary access road entrances and exits, and covering temporary stockpiles when weather conditions require; Coir rolls will be installed along or at the base of slopes during construction to capture sediment; and

Protection of graded areas from erosion using a combination of silt fences, fiber rolls along toe of slopes or along edges of designated staging areas, and erosion-control netting (such as jut or coir) as appropriate on sloped areas.

12. Trash and Debris Control. During project activities, trash that may attract California red-legged frog or Alameda whipsnake predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from the work areas.

13. Pet Control. No project-staff pets will be permitted on the project site.

14. Site Revegetation. All areas that are temporarily affected during construction or where removed roadway is restored will be revegetated with an assemblage of native grass, shrub, and tree species. Although not intended as compensatory mitigation for California red-legged frog or Alameda whipsnake, the site revegetation may result in the restoration of potential habitat for California red-legged frog and Alameda whipsnake. Invasive, exotic plants will be controlled within the project site to the maximum extent practicable, pursuant to Executive Order 13112 (Caltrans 2007).

STATUS OF SPECIES/ENVIRONMENTAL BASELINE

California Red-Legged Frog

The red-legged frog was listed as a threatened species on May 23, 1996 (Service 1996). Please refer to the final rule and the *Recovery Plan for the California Red-Legged Frog (Rana aurora draytonii)* (Service 2002b) for additional information on this species.

This species is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background. The California red-legged frog has dorsal spots that usually have lighter centers (Stebbins 2003) and they also have distinctive dorsolateral folds that start near the eye and run the length of their body. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, with a dark brown body with yellow with darker spots (Storer 1925). Red-legged frogs have paired vocal sacs and vocalize in air (Hayes and Krempels 1986).

Red-legged frogs typically breed from November through March, although there are earlier breeding records reported for the southern localities (Storer 1925). Individuals occurring in coastal drainages are active year-round (Jennings *et al.* 1992), whereas those found in interior sites are normally less active during the cold season. Female frogs deposit egg masses on emergent vegetation, allowing the eggs to float on the surface of the water (Hayes and Miyamoto 1984).

The historic range of the red-legged frog once extended coastally from the vicinity of Elk Creek in Mendocino County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The red-legged frog was historically documented in 46 counties but the taxa is now thought to remain in 238 streams or drainages within 23 counties. This represents a loss of approximately 70 percent of its former range (Service 2002b). Red-legged frogs are still locally, and relatively, abundant within portions of the San Francisco Bay area and the Central Coast. Within the remaining distribution of the species, only isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFG 2007).

Adult red-legged frogs prefer dense, shrubby or emergent riparian vegetation, closely associated with deep (>2.3 feet), still, or slow-moving water (Hayes and Jennings 1988). However, this species also have been found in ephemeral creeks and drainages and in ponds that may or may not have associated riparian vegetation. The largest densities of red-legged frogs are currently associated with deep pools with dense stands of overhanging willows (*Salix* species) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). Red-legged frogs disperse upstream and downstream of their breeding habitat to forage and seek sheltering habitat.

During other parts of the year, California red-legged frog habitat includes nearly any area that stays moist and cool through the summer within 1-2 miles of a breeding site (Fellers 2005). According to Fellers (2005), this can include vegetated areas with coyote bush (*Baccharis pilularis*), California blackberry thickets (*Rubus ursinus*), and root masses associated with willow (*Salix* species) and California bay trees (*Umbellularis californica*). Sometimes the non-breeding habitat used by red-legged frogs is extremely limited in size. For example, non-

breeding red-legged frogs have been found in a 6-foot wide coyote bush thicket growing along a tiny intermittent creek surrounded by heavily grazed grassland (Fellers 2005). Sheltering habitat for red-legged frogs is potentially all aquatic, riparian, and upland areas within the range of the species. This includes any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Sheltering red-legged frogs have also been found in agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks. Incised stream channels sections narrower and deeper than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

Red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adult frogs are often associated with permanent bodies of water. Some frogs remain at breeding sites all year while others disperse. Dispersal distances are typically less than 0.5 mile, however some individuals have been known to move up to 2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005). In one study, dispersing frogs in northern Santa Cruz County were found to travel distances from 0.25 miles to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

Egg masses typically consist of 2,000 to 5,000 moderate sized (0.08 to 0.11 inches in diameter), dark reddish-brown eggs and are typically attached to vertical emergent vegetation, such as bulrushes (*Scirpus* species) or cattails (Jennings *et al.* 1992). Red-legged frogs are often prolific breeders, and typically lay their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Eggs typically hatch in 6 to 14 days (Jennings 1988). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Exposure to salinity levels greater than 4.5 parts per thousand results in 100 percent egg mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3.5 to 7 months after hatching (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1990). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). Sexual maturity normally is reached at 3 to 4 years of age (Storer 1925; Jennings and Hayes 1985). Red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations of red-legged frogs fluctuate from year to year. When conditions are favorable red-legged frogs can experience extremely high rates of reproduction and thus produce large numbers of dispersing young, as well as a concomitant increase in the number of occupied sites. In contrast, red-legged frogs may temporarily disappear from an area when conditions are stressful (*e.g.*, drought).

The diet of red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food items. According to their data, vertebrates, such as Pacific tree frogs (*Pseudacris regilla*) and California mice (*Peromyscus californicus*) represented over half the

prey mass eaten by larger frogs (Hayes and Tennant 1985). Hayes and Tennant (1985) found juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. Feeding activity probably occurs primarily along the shoreline and on the surface of the water (Hayes and Tennant 1985). The diet of red-legged frogs is not well studied, but their diet is likely similar to other ranid frogs that feed on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b).

Several researchers in central California have noted the decline and eventual disappearance of red-legged frog populations once bullfrogs (*Rana catesbeiana*) became established at the same site (L. Hunt, in litt. 1993; S. Barry, in litt. 1992; S. Sweet, in litt. 1993). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs (*Rana aurora aurora*), and suggested that bullfrogs could prey on subadult northern red-legged frogs as well. Bullfrogs may also have a competitive advantage over red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Further more, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with red-legged frog reproduction. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; M. Jennings, in litt.1993; R. Stebbins in litt. 1993). Thus bullfrogs are able to prey upon and out-compete red-legged frogs, especially in sub-optimal habitat. Other species such as red swamp crayfish (*Procambarus clarkii*), signal crayfish (*Pacifastacus leniusculus*), and several species of warm water fish including sunfish (*Lepomis* species), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and mosquitofish may also contribute to the decline of red-legged frog populations (L. Hunt, in litt. 1993; S. Barry, in litt. 1992; S. Sweet, in litt. 1993).

The urbanization of land within and adjacent to red-legged frog habitat has also adversely affected red-legged frogs. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks red-legged frog dispersal, conversion and isolation of perennial pool habitats, and the introduction of predatory fishes and bullfrogs.

The California red-legged frog may be susceptible to many of the same pathogens, fungi, water mold, bacteria, and viruses have been known to adversely other amphibian species. Chytridiomycosis and ranaviruses may be a particular developing concern for California red-legged frog populations. Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also present in sympatric three-spined sticklebacks (*Gasterosteus aculeatus*) in northwestern California. Ingles (1932a, 1932b, and 1933 cited in Fellers 2005) reported four species of trematodes from red-legged frogs, but he later synonymized two of them (found them to be the same as the other two). Nonnative species, such as bullfrogs, are located within the range of the California red-legged frog and have been identified as potential carriers of these diseases. Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers

themselves (i.e. contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in red-legged frogs being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small, fragmented remaining California red-legged frog breeding sites; the many stresses on these sites due to habitat losses and alterations; and the many other potential disease-enhancing anthropogenic changes which have occurred both inside and outside the species' range.

The recovery plan for red-legged frogs identifies eight Recovery Units (Service 2002b). The establishment of these Recovery Units is based on the Recovery Team's determination that various regional areas of the species' range are essential to its survival and recovery. The status of the red-legged frog will be considered within the smaller scale of Recovery Units as opposed to the overall range. These Recovery Units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog. The goal of the draft recovery plan is to protect the long-term viability of all extant populations within each Recovery Unit. Within each Recovery Unit, core areas have been delineated and represent contiguous areas of moderate to high red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy will allow for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of red-legged frogs.

The California Natural Diversity Database (CNDDB) includes a single reported record of a California red-legged frog within one mile of the proposed project (Caltrans 2007). Caltrans stated that this 1997 record indicates a location approximately 0.8 mile east of the Gateway Boulevard exit in an unnamed tributary to Brookside Creek. They also stated that an additional California red-legged frog was observed during construction activities at the Montanera Housing Project in Gateway Valley, adjacent to the Gateway Boulevard east off-ramp area of the Caldecott Tunnel project, in the summer of 2006. Sam McGinnis also advised Caltrans that he believed he observed a California red-legged frog in the project vicinity of Fish Ranch Road on the east portal side of Caldecott Tunnel in 1992.

The California red-legged frog may disperse into habitats within and adjacent to the proposed action area. Both the north and south sides of State Route 24 at the Caldecott Tunnel are adjacent to a contiguous expanse of suitable grassland, woodland, scrub, and riparian communities. The north and south sides are bridged by the protected habitat over the Caldecott Tunnel. The recent records are within documented dispersal distance of the listed amphibian. Given the current conditions of the on-site and surrounding habitat, the biology and ecology of the species, and the nearby records of this listed species, the Service has concluded it is likely the California red-legged frog forages, rests, moves through, and conducts other essential behaviors within the action area.

Alameda Whipsnake

The Alameda whipsnake was federally listed as threatened on December 5, 1997, (Service 1997). The animal was listed as threatened by the State of California in 1971. Approximately 406,598 acres of critical habitat was designated for the Alameda whipsnake within Contra Costa, Alameda, Santa Clara, and San Joaquin counties on October 3, 2000 (Service 2000). The critical habitat was vacated and remanded on May 9, 2003; proposed again on October 18, 2005; and designated on October 2, 2006 (Service 2006). A draft Alameda whipsnake recovery plan was included in the *Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California*, issued in November 2002 (Service 2002a).

The Alameda whipsnake is a slender, fast-moving, diurnal snake with a narrow neck and a relatively broad head with large eyes. The snake's dorsal surface is sooty black with distinct yellow-orange stripes along each side. The coloration of the snake's ventral surface varies along its length: the anterior portion is orange-rufous; the midsection is cream colored; and the posterior and tail are pinkish. Adults range in length from 3 to 4 feet (Service 1997).

The Alameda whipsnake is one of two subspecies of California whipsnake (*Masticophis lateralis*). The Alameda whipsnake is distinguished from the other subspecies, the chaparral whipsnake (*M. l. lateralis*), by its sooty black dorsum; wider lateral yellow-orange stripes; the lack of a dark line across the rostral; an uninterrupted light stripe between the rostral and eye; and the virtual absence of spotting on the venter of the head and neck.

The Alameda whipsnake inhabits the inner Coast Ranges in western and central Contra Costa and Alameda counties (Jennings 1983; McGinnis 1992; Swaim 1994) where it is found in a variety of vegetation communities including chamise-redshank chaparral, mixed chaparral, coastal scrub, annual grassland, blue oak-foothill pine, blue oak woodland, coastal oak woodland, valley oak woodland, eucalyptus, redwood, and riparian (CDFG 2006).

Scrub and chaparral communities are the primary habitat types essential for providing space, food, and cover necessary to sustain all life stages of the Alameda whipsnake. Associated scrub habitat typically consists of Diablan sage scrub, coyote bush scrub, and chamise chaparral (Swaim 1994), and is also classified as coastal scrub, mixed chaparral, and chamise-redshank chaparral (CDFG 2006). Swaim (1994) found that core scrub habitat areas (areas of concentrated use by Alameda whipsnakes, based on telemetry and trapping data) tended to occur on east, southeast, south or southwest facing slopes and were within 500 feet of open or partially-open canopy or grassland habitat. Alameda whipsnakes have also been found in open chaparral stands with a northern exposure (K. Swaim, Swaim Biological Consulting, personal communication with the Service 2004). As a result of incidental observations and trapping surveys, Alameda whipsnakes have been discovered greater than 600 feet and as much as 21,600 feet from primary scrub and chaparral habitat (K. Swaim, Swaim Biological Consulting, personal communication with the Service 2004).

Alameda whipsnakes are also known to use other habitat types adjacent to their primary scrub and chaparral habitat. McGinnis (1992) has documented Alameda whipsnakes using oak woodland/grassland habitat as a corridor between stands of northern coastal scrub. Grassland habitats appear to be used extensively by male Alameda whipsnakes during the spring mating season (Swaim 1994). Females appear to use these grassland areas more extensively after mating (Swaim 1994), possibly looking for suitable egg-laying sites or for dispersing to other scrub habitat (K. Swaim, Swaim Biological Consulting, personal communication with the Service, 2002). Egg-laying sites have been found close to scrub communities in grasslands with scattered shrubs (Swaim 1994) and in true scrub communities (K. Swaim, Swaim Biological Consulting, personal communication with the Service, 2002). These other habitat areas may be important in the early life history stages of hatchling whipsnakes (Swaim 1994). Rock outcrops, talus, and burrows (mating habitats) need to be within dispersal range of scrub and grassland habitat (egg-laying habitats). Swaim (1994) also observed Alameda whipsnakes mating in rock outcrops.

Alameda whipsnakes require plant canopy covers that supply a suitable range of temperatures, corridors of plant cover and retreats (including rock outcrops) sufficient to provide dispersal pathways between areas of habitat, and plant community patches of sufficient size to prevent the deleterious effects of isolation, such as inbreeding or the loss of a subpopulation due to a catastrophic event. Specific habitat features used by Alameda whipsnakes include, but are not limited to, small mammal burrows, rock outcrops, talus, soil crevices, debris piles, and other forms of cover to provide temperature regulation, shelter from predators, egg-laying sites, and winter hibernaculum (Swaim 1994). Adequate insect populations are also necessary to sustain their primary lizard prey populations.

Survey data suggests that the Alameda whipsnake exhibits a bimodal season activity pattern with peak activity in the spring and late summer/early fall (Swaim 1994). Male Alameda whipsnakes appear to be more active than females in the spring, which is likely attributed to breeding season behavior (Swaim 1994). The breeding season is thought to be between March and June, and mating appears to typically occur near the female's hibernacula (Swaim 1994). During the mating season, females likely remain near their retreat sites while males disperse throughout their home ranges. In one study, Swaim (1994) estimated a mean individual home range size for four males was 13.6 acres, and 8.4 acresfor two females. Gravid female Alameda whipsnakes likely lay eggs between May and July (Stebbins 2003). Clutch sizes are typically between 6 to 11 eggs and the young hatch and emerge in the late-summer to early-fall (Swaim 1994). Male and female snakes appear to exhibit similar movement and activity patterns following the breeding season (Swaim 1994). Increases in late summer/early fall activity may be attributed to emergence of hatchling whipsnakes and the increased availability of hatchling lizard prey (Swaim 1994). Alameda whipsnakes typically retreat into winter hibernacula in November and emerge in March.

Alameda whipsnake above-ground activity cycles appear to be highly temperature dependent. Alameda whipsnakes have the highest documented mean active body temperature (92.1 degrees Fahrenheit) and degree of body temperature stability (stenothermy) than other snake species under natural conditions (Swaim 1994). Maintenance of such a high body temperature likely

enables the snake to capture its characteristically fast-moving prey (Swaim 1994). Open and partially open and/or low growing shrub communities provide a mosaic of sunny and shady areas that apparently allow the snake to effectively maintain sufficient body temperature while providing cover from potential predators (Swaim 1994).

The Alameda whipsnake is an active diurnal predator and hunts by holding its head high off the ground to peer over vegetation or rocks for potential prey. This foraging strategy corresponds with the open habitat with which this species is typically associated with (Swaim 1994). Its diet includes lizards, skinks, frogs, small mammals, snakes, nesting birds, and insects. Features such as small mammal burrows, rock outcrops, and talus provide important habitat components such as shelter from predators, egg-laying sites, over-night retreats, and winter hibernacula (Swaim 1994). Their lizard prey is often abundant in these areas as well. Lizards, especially the western fence lizard, appear to be the Alameda whipsnake's primary prey item (Stebbins 2003; Swaim 1994).

Urban development has fragmented the once contiguous range of the Alameda whipsnake into the following five population centers: (1) the Tilden-Briones population (Sobrante Ridge, Tilden/Wildcat Regional Parks to the Briones Hills, in Contra Costa County); (2) the Oakland-Las Trampas population (Oakland Hills, Anthony Chabot area to Las Trampas Ridge, in Contra Costa County); (3) the Hayward-Pleasanton Ridge population (Hayward Hills, Palomares area to Pleasanton Ridge, in Alameda County); (4) the Mount Diablo-Black Hills population (Mount Diablo vicinity and the Black Hills, in Contra Costa County); and (5) the Sunol-Cedar Mountain population, (Wauhab Ridge, Del Valle area to the Cedar Mountain Ridge) (Service 1997). Habitat fragmentation appears to have resulted in little to no gene flow or interchange between the five populations. Interchange between the Tilden-Briones, Oakland-Las Trampas, and Hayward-Pleasanton Ridge populations appears to depend on dispersal over the Caldecott Tunnel in Contra Costa County; under State Route 580 in Alameda County (at the Eden Canyon interchange); under the Dublin Boulevard undercrossing; or where San Lorenzo Creek passes under the highway (Service 1997). Interchange between the Hayward-Pleasanton Ridge and Sunol-Cedar Mountain populations depends on dispersal along Alameda Creek in Alameda County; crossing under I-680 (where the creek passes under the highway); or crossing under the highway at Scott's Corner along Vallecitos Creek, or where two unnamed tributaries to Arroyo de la Laguna cross under I-680 north of Scott's Corner (Service 1997). The Mount Diablo-Black Hills population appears to be completely isolated from the other populations (Service 1997).

Habitat fragmentation makes some Alameda whipsnake populations more vulnerable to extinction. Habitat patches with high edge to interior ratios are known to provide less value for some species than round or square patches (Jimerson and Hoover 1991; Saunders *et al.* 1991). In general, the species most prone to extinction in fragmented habitats are those that depend on native vegetation; require combinations of different habitat types; require large territories; and exist at low densities (Saunders *et al.* 1991). Alameda whipsnakes have been associated with a variety of habitats for different natural history functions. They are primarily associated with native Diablan sage scrub, but are known to forage in adjacent grasslands, and migrate along

riparian corridors. Consistent low trap success and high recapture rates suggests Alameda whipsnakes may be sparse, even in suitable habitat (Swaim 1994). The combination of these factors may cause the Alameda whipsnake to be more vulnerable to extinction in small habitat patches resulting from habitat fragmentation.

Small populations with limited breeding partners are prone to inbreeding which often results in problems associated with the lack of genetic diversity (Frankham and Ralls1998). Populations with less genetic variability or more deleterious genetic material are typically less able to successfully respond to environmental stresses or adapt to even relatively minor changes in environmental conditions. These factors influence the survivability of smaller, genetically isolated populations.

The Alameda whipsnake has a variety of potential native and exotic predators including California kingsnake (*Lampropeltis getula californiae*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis virginianus*), coyote (*Canis latrans*), gray fox (*Vulpes cinereoargenteus*), red fox (*V. vulpes*), and red-tailed hawk (*Buteo jamaicensis*). Urbanization often facilitates the introduction or spread of non-native predators (Goodrich and Buskirk 1995). Increased predatory pressure may become excessive in situations where Alameda whipsnake habitat is fragmented, isolated, and otherwise degraded by human activities. This may be especially true where alien species, such as rats, feral pigs (*Sus scrofa*), and feral and domestic cats (*Felis domesticus*) and dogs (*Canis familiaris*) are present. These additional threats become particularly acute where urban development immediately adjacent to Alameda whipsnake habitat. A growing movement to maintain feral cats in parklands, such as those managed by East Bay Regional Park District, is a potential threat to a variety of wildlife species (Coleman *et al.* in litt. 1997; Roberto 1995; DelVecchio 1997). Little is known about the predation of Alameda whipsnakes, but feral cats are known to prey on reptiles, including the yellow racer (*Coluber mormon*), a fast, diurnal snake similar to the Alameda whipsnake (Hubbs 1951; Stebbins 2003). The threat of predation and harassment from domestic and feral cats and other non-native species increases as human disturbance from recreational use on regional and state parks, and urban development encroaches into the current open space buffers between existing developments and Alameda whipsnake habitat on public lands (Coleman *et al.* in litt. 1997).

McGinnis (1992) has suggested that grazing has impacted Alameda whipsnake habitat in many areas east of the Coast Range. Livestock grazing that significantly reduces or eliminates shrub and grass cover can be detrimental to this snake. Many snake species, including the Alameda whipsnake, likely avoid such open areas due to increased danger from predators and lack of prey (McGinnis 1992). Removed native vegetation is often replaced by non-native plant species that significantly degrade habitat values or even replace entire plant communities such that it no longer provides appropriate habitat for the Alameda whipsnake. For instance, radio telemetry data indicates that Alameda whipsnakes tend to avoid dense stands of eucalyptus (Swaim 1994).

The Alameda whipsnake is directly and indirectly threatened by the effects of fire suppression. Fire suppression results in a buildup of fuel (underbrush, thatch, and woody debris). This exacerbates the effects of wildfires by creating conditions for hot, slow-moving fires. The development of a closed scrub canopy also results in a buildup of flammable fuels over time (Parker 1987; Rundel *et al.* 1987). Fire suppression can also result in the spread and proliferation of non-native vegetation, further increasing flammable fuel loads in and around Alameda whipsnake habitat. The threat of wildfire is typically highest in the summer and early fall when accumulated fuel is abundant and dry. This "fire season" coincides with the primary above-ground activity period for hatchling and adult Alameda whipsnakes (Swaim 1994). Therefore, populations are likely to sustain heavy losses from fires during this period.

Changes in the vegetation structure typically results in changes to the micro-climate temperature regime important in maintaining the Alameda whipsnake's high optimal body temperature. For instance, fire suppression may result in increased canopy closure and shading (Parker 1987) from plant species such as poison oak (*Toxicodendron diversilobum*) and coyote brush (*Baccharis pilularis*). Increased vegetative cover can result in ground temperatures that are less than optimal for the Alameda whipsnake. Survey data suggests that Alameda whipsnakes are less likely to be found in areas of scrub habitat with a closed canopy (Swaim 1994).

Encroaching urban development has lead to the implementation of rigorous fire suppression practices in and around adjacent suitable Alameda whipsnake habitat. Frequent fire events are important in maintaining the scrub habitat associated with the Alameda whipsnake. Many native coastal scrub and chaparral plant species require periodic fires to stimulate new sprouting, seedling recruitment, and seed dispersal (Parker 1987; Keeley 1987; Keeley 1992). The optimal frequency of fire events is often disputed but likely ranges from every 10 to 30 years (Keeley 1987; Rundel *et al.* 1987). Depending on the rate of fuel accumulation, any prescribed burn program should take place every 10 to 30 years (J. Ferreira, California Department of Parks and Recreation, personal communication with the Service 1996).

All five remaining populations of the Alameda whipsnake are threatened by a variety of factors. Each of these populations consists of several to numerous subpopulations with varying degrees of connectivity between them. In the western portion of the species' range, the Tilden-Briones population is threatened by a high potential for catastrophic wildfire and urban development. However, the remaining habitat, regional parklands, and municipal watersheds within this area overlap to the extent that a regional preserve may be possible. The Oakland-Las Trampas population is threatened by a high potential for catastrophic wildfire and the negative effects associated with habitat fragmentation and urban development. The Hayward-Pleasanton Ridge population may be the most susceptible to extirpation. This population is scattered in distribution and is, therefore, more vulnerable to the effects of development and subsequent habitat fragmentation. The Mount Diablo-Black Hills population, in the eastern portion of the species' range, is threatened by a high potential for catastrophic wildfire, development and its associated impacts, and inappropriate grazing practices. If threats associated with urbanization can be controlled, this population is a good candidate for recovery, due to the inclusion of public

lands and the potential for improved fire and grazing management on parklands. The Sunol-Cedar Mountain population is threatened by development and inappropriate grazing practices. Overall, the Oakland-Las Trampas and Hayward-Pleasanton Ridge populations are the most immediately imperiled with habitat fragmentation becoming prevalent enough to compromise its long-term viability.

Seven recovery units have been identified for the Alameda whipsnake (Service 2002a). The Caldecott Tunnel project is located within the Caldecott Tunnel Corridor Unit (Unit 6). This unit is bisected by State Route 24 and the Caldecott Tunnel and is an important link between Recovery Unit 1 to the north and Recovery Unity 2 to the south. This corridor includes open space lands owned by the University of California, Berkeley; Lawrence Berkeley National Laboratory (within the University lands); East Bay Regional Park District's Claremont Canyon Regional Park, Sibley Volcanic Preserve, and Huckleberry Botanic Preserve; and East Bay Municipal Utility District's Siesta Valley Watershed and Gateway Watershed. However, private lands in the Caldecott Tunnel area provide essential connectivity between Recovery Units 1 and 2. The recovery plans recommends that landowners within Unit 6 implement plans to address human activity impacts including the encroachment of native plants into chaparral/scrub habitats, increased predation, and fuels management. The recovery plan states that FHWA and Caltrans should participate in a region-wide planning process to address the cumulative effects of their highway projects and specifically mentions future plans to bore another tunnel through the Caldecott corridor. The recovery plan also specifies the importance of habitat restoration, including return of fire as a natural disturbance regime, removal of nonnatives or vegetation that overtops chaparral/scrub, and providing rock outcrops or other forms of retreat or hibernacula as being a priority within the Caldecott Tunnel Corridor.

The California Natural Diversity Database (California Department of Fish and Game 2007a, 2007b)) includes three records of Alameda whipsnake observations within 1 mile and seven within 2 miles of the action area (Caltrans 2007). The closest of the three observations is approximately 0.7 miles west of the east Caldecott Tunnel portal in Contra Costa County. Another is located approximately 0.8 miles northwest of the eastern segment of the proposed project, near the border of Tilden Regional Park. The third record within 1 mile of the action area is located approximately 1 mile east of the eastern segment of the proposed project. Based on the habitat located within and adjacent to the action area, the biology and ecology of the Alameda whipsnake, including its dispersal behavior, and the nearby records of the listed species, the Service has concluded it is likely this listed animal utilizes the action area for foraging, resting, mating, and other essential behaviors.

Alameda Whipsnake Critical Habitat

On October 2, 2006, the final rule determining critical habitat for the Alameda whipsnake was published in the **Federal Register** (Service 2006). The rule identifies approximately 154,834 acres within six critical habitat units based on but not limited to the following three primary constituent elements: (1) Space for individual and population growth and for normal behavior;

food, water, air, light, minerals, or other nutritional or physiological requirements; (2) cover or shelter; sites for breeding, reproduction, and rearing (or development) of offspring; and (3) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. The critical habitat is located in Alameda, Contra Costa, Santa Clara, and San Joaquin counties, California.

When designating critical habitat, the Service is required to list the known primary constituent elements essential to the conservation of the species, and that may require special management considerations and protection (50 CFR § 424.14).. Such physical and biological features include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing (or development) of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species (Service 2006).

The primary constituent elements for the Alameda whipsnake are based on the current knowledge of the life history, biology, and ecology of the species and the requirements of the habitat necessary to sustain the essential life history functions of the subspecies. The three identified primary constituent elements are defined as: (1) scrub/shrub communities with a mosaic of open and closed canopy; (2) woodland or annual grassland plant communities contiguous to lands containing primary constituent element 1; and (3) lands containing rock outcrops, talus, and small mammal burrows. These three elements are further described as follows.

<u>Primary Constituent Element 1: Scrub/shrub communities with a mosaic of open and closed canopy</u>

This element is defined by scrub/shrub vegetation dominated by low- to medium-stature woody shrubs with a mosaic of open and closed canopy, as characterized by the chamise, chamise-eastwood manzanita, chaparral whitethorn, and interior live oak shrub vegetation series occurring at elevations from sea level to approximately 3,850 feet as identified in the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), A Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988), and California Wildlife Habitat Relationship System (California department of Fish and Game 1998). Such scrub/shrub vegetation within these series form a pattern of open and closed canopy used by the Alameda whipsnake for shelter from predators; temperature regulation, because it provides sunny and shady locations; prey-viewing opportunities; and nesting habitat and substrate. These features contribute to support a prey base consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds.

Primary Constituent Element 2: Woodland or annual grassland plant communities contiguous to lands containing primary constituent element 1

The vegetation series of this element are comprised of one or more of the following: blue oak, coast live oak, California bay, California buckeye (*Aesculus californica*), and California annual grassland vegetation series (as identified in the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), A Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988), and California Wildlife Habitat Relationship System (CDFG 2006). This mosaic of vegetation supports a prey base consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds and provides opportunities for: (1) Foraging by allowing snakes to come in contact with and visualize, track, and capture prey (especially western fence lizards along with other prey such as skinks, frogs, birds); (2) short and long distance dispersal within, between, or to adjacent to areas containing essential features (i.e., primary constituent elements 1 or 3); and (3) contact with other Alameda whipsnakes for mating and reproduction.

Primary Constituent Element 3: Lands containing rock outcrops, talus, and small mammal burrows

The areas within this element are used for retreats (shelter), hibernacula, foraging, dispersal, and provide additional prey population support functions.

There is no firm information on the actual population of Alameda whipsnake. In addition, there has been no analysis of the minimum viable population size necessary to maintain a stable or increasing population of Alameda whipsnake. However, to provide necessary conservation, a critical habitat unit needs to be large enough to incorporate enough breeding females to maintain a viable population and enough connectivity to assure genetic exchange, avoid low population suppression effects, and recolonization of disturbed habitat. Expert opinion is that the subspecies persists in relatively low numbers throughout its range (McGinnis 1992) and habitat units may therefore need to consist of large blocks of continues habitat to incorporate enough breeding females for a sustainable population.

During the mating season females remain near the retreat sites while males disperse throughout their home ranges (Swaim 1994). Swaim (1994) found that core areas (i.e., areas of concentrated use by Alameda whipsnakes, based on telemetry and trapping data) were predominantly located on east, southeast, south, or southwest facing slopes and were characterized by open or partially-open canopy or grassland within 500 feet of scrub. Additional trapping data has shown the maximum distance between Alameda whipsnake observations from the nearest scrub is much larger, up to 4.5 miles, than either the home range diameter or average movements, suggesting more extensive use of grassland for either foraging or corridor movement (Swaim 2005a). In addition, very recent trapping data in two of the six proposed units has shown several instances of snakes residing in and moving through predominantly north-facing slopes which have denser closed canopy (Swaim 2005b; Swaim 2005c). Closed-canopy areas are therefore considered

essential because they provide avenues of dispersal and interaction between sub-populations, and movement through such closed-canopy areas has been documented.

Protecting the ability of Alameda whipsnake to move freely across the landscape in search of habitats is therefore essential for: (1) sustaining populations by providing opportunity for movement and establishment of home ranges by juvenile recruits; (2) maintaining gene flow by the movement of both juveniles and adults between subpopulations; and (3) allowing recolonization of habitat after fires or other natural events that have resulted in local extirpations. Other vegetation (e.g., annual grassland, blue oak-foothill pine, blue oak woodland, coastal oak woodland, valley oak woodland, eucalyptus, redwood, and riparian communities) adjacent to scrub habitat is therefore considered a feature essential to the conservation of the Alameda whipsnake. Thus, it is important that critical habitat units contain enough core areas (i.e. breeding females) to maintain a viable population and that these areas are connected by suitable contiguous dispersal habitat relatively uninterrupted by roads, structures, or other development, that provide for interchange and interaction among individuals and subpopulations within the limited distribution of Alameda whipsnake.

The irretrievable loss of occupied Alameda whipsnake habitat due to recent urban development is significant in areas adjacent to several of the critical habitat units. This loss of habitat has has likely resulted in a commensurate reduction in population size for the Alameda whipsnake. Accordingly, the general pattern of habitat loss and fragmentation was taken into consideration in the designation of critical habitat.

Connectivity has been applied as a criterion to those areas where designation of critical habitat would result in a relatively high potential for dispersal between and within units of critical habitat. The need for special management considerations was assessed where such management may be essential to enhance the connectivity or the integrity of high quality habitat within a unit.

The designated critical habitat is being proposed on lands that were determined to be occupied at the time of listing and contain the features, or primary constituent elements, found to be essential to the conservation of the Alameda whipsnake. Within the boundaries of critical habitat, land that contains developed areas such as buildings, paved areas, and other structures has been excluded from this designation.

The action area is within Critical Habitat Unit 6 (otherwise know as the Caldecott Tunnel Unit). This unit comprises 4,151 acres within Contra Costa and Alameda Counties of which includes approximately 265 acres within East Bay Regional Park lands, 720 acres of State lands, and 3,166 acres in private lands. The unit is connects critical habitat units 1 and 2.

The unit is bounded by dense urban development to the east and west. However, the vegetation and soil types that are known to support Alameda whipsnake are dominant throughout the unit (primary constituent elements 1, 2, 3). About eight Alameda whipsnake records are known from the unit between 1990 and 2002 (Service 2006). Special management considerations in this unit

include possible consolidation of existing roads, or limiting additional road construction in order to preserve a corridor function in this unit as a consequence of the restricted width of the unit and the current presence of a moderate number of roads. Prescribed burns may also be required to maintain the habitat mosaic considered essential. The unit is included in designated critical habitat because it contains features essential to the conservation of the Alameda whipsnake, is currently occupied, and represents the last remaining habitat connecting Unit 1 and Unit 2, which are two of the five population centers for the subspecies. Maintaining connectivity between units allows for dispersal between units for the subspecies and allows for genetic exchange among all three units.

The action area vicinity is relatively undeveloped and includes a network of protected open space, but includes State Route 24 and clusters of existing and planned residential development. The surrounding habitat includes several vegetation communities, including coast oak woodland, coastal scrub, and annual non-native grassland, as well as rocky outcrops. All undeveloped lands on and adjacent to the action area contain one or more of the constituent elements of proposed Alameda whipsnake critical habitat, including essential scrub/shrub communities with a mosaic of open and closed canopy; woodland or annual grassland plant communities contiguous to lands containing scrub/shrub habitat; and lands containing rock outcrops, talus, and small mammal burrows.

Effects of the Proposed Action

The proposed Caldecott Improvement Project likely will result in a number of adverse effects to the California red-legged frog and the Alameda whipsnake. There is a likelihood that the animals may be affected by being crushed; entombed in their burrows or cover sites; hit and injured or killed by vehicle strikes; shot; chased and injured or killed by domestic animals; poisoned by chemical agents; trapped in erosion control netting; or harassed by noise and vibration. The proposed project may also adversely affect the California red-legged frog and Alameda whipsnake by blocking movement corridors; interfering with foraging, mating, and/or movement; or by subjecting them to predation that otherwise would not occur. It is highly likely these two listed animals inhabit the action area and surrounding vicinity (for purposes of this biological opinion the surrounding vicinity is described as 1,000 feet outside and adjacent to the project footprint), and that they are likely to be subject to indirect effects including loss of habitat, pesticide or chemical poisoning, an influx of exotic predators, increased competition, the intrusion of non-native plants, disease, and a reduction in natural food sources as a result of habitat disturbance and loss.

The California red-legged frog would be affected by loss of wetland, grassland, and wooded habitats within the action area. The Alameda whipsnake would be affected by the loss of woodland, scrub, rocky outcrop, and grassland habitat within the action area. Given the proximity of these habitat types within the action area, it is likely that either species could occur throughout the approximately 11.51 acres of Alameda whipsnake habitat identified in the Biological Assesment on the eastern side of the Caldecott Tunnel. Based on the vegetation type

and connectivity with known occupied Alameda whipsnake habitat and designated Alameda whipsnake critical habitat within the Caldecott wildlife corridor, the approximately 0.56 acres work area immediately adjacent to the proposed west portal will permanently affect California red-legged frog and Alameda whipsnakes and their habitat. There are no physical barriers that would exclude either species from these habitat types, north and south of, but not in-between State Route 24. Both species may use a wide variety of habitat types for activities such as foraging and dispersal. Furthermore, either species may seek retreat in other areas when displaced by activity or disturbance within their more traditionally associated habitat. Therefore, the proposed action could affect the California red-legged frog and the Alameda whipsnake throughout the action area.

The proposed temporary effects described in the Biological Assessment that include the described access, workspace, and staging areas will be unavailable for use by the two listed species as foraging, breeding, resting, and other essential behaviors from summer 2009 to winter 2013, and are therefore, permanent effects. Thus, there are permanent effects to 12.07 acres as described in the above paragraph that provide habitat for the California red-legged frog and Alameda whipsnake

Temporary effects are project activities that temporarily remove one or more essential components of a listed species habitat, but can be restored to pre-project conditions of equal or greater habitat value. In order for the effects to be considered temporary, the affected habitat of the listed species must be totally restored within one season. Ground disturbance resulting from the proposed Caldecott Tunnel Project includes grading, excavating, fill, and equipment staging. Caltrans proposed temporary effects are permanent effects because the described access, workspace, and staging areas will be unavailable as listed species habitat from summer 2009 to winter 2013. Any ground disturbing work on the east side of the tunnel and within the approximately 0.56 acre area of habitat associated with the immediate construction of the west portal has potential to cause injury and mortality to individual California red-legged frogs and Alameda whipsnakes occupying the action area, and these areas likely will not be suitable for use as habitat for foraging, breeding, resting and other essential behaviors by these animals for a significant period of time, almost certainly longer than one season after the construction of the project is completed. Additional harm could be sustained by entanglement with erosion control features, capture or intentional harm by project personnel, or falling or entrapment in trenches or other project-related excavations. As part of the project description, Caltrans has stated upon completion of the project, they will re-contour temporally affected habitat areas if necessary, and revegetate them to promote restoration of the area to pre-project conditions. These areas may be occupied by the California red-legged frog and Alameda whipsnake following restoration.

The proposed Caldecott Tunnel Project involves the reclamation of approximately 0.05 acres of existing hardscape at the Fish Ranch Road off-ramp that Caltrans claims will be restored to Alameda whipsnake habitat within an island bordered by State Route 24, the off-ramp, and Fish Ranch Road. The restoration of this small segment of hardscape will not constitutes viable

Alameda whipsnake habitat following project construction due to the small size and being surrounded by areas of permanent effects.

California Red-legged Frog

Individual red-legged frogs may be directly injured, killed, harmed, and harassed by activities that disturb dispersal, and aestivation habitat. The proposed project will result in the permanent loss of approximately 12.07 acres of habitat for this listed species. The proposed project could (1) result in the death of an unknown number of red-legged frogs; (2) result in construction related harassment, including effects from lights used during nighttime activities, to the surviving red-legged frogs on the site; (3) impede the dispersal of red-legged frogs through the site while the action is in progress; (4) increase the likelihood of predation and the introduction of amphibian disease; and (5) fragment and reduce the amount of red-legged frog habitat.

Changes in light level may disrupt orientation in nocturnal animals. The range of anatomical adaptations to allow night vision is broad (Park 1940), and rapid increases in light can blind animals. For frogs, a quick increase in illumination causes a reduction in visual capability from which the recovery time may be minutes to hours (Buchanan 1993). After becoming adjusted to a light, frogs may be attracted to it as well (Jaeger and Hailman 1973). Laboratory experiments have demonstrated that dark-adapted frog species exposed to rapid increases in illumination may be temporarily "blinded" and unable to gather visual information on prey, predators, or conspecifics until their eyes adapt to the new illumination. Foraging may be facilitated in frog species that hunt around lights because the ambient illumination is increased to a level that allows the frogs to see prey or because lights attract relatively larger numbers of insects and other invertebrate prey. Experiments and anecdotal evidence indicates that both temporary and permanent changes to the night time illumination of an area may affect the reproduction, foraging, predator avoidance, and social interactions of frog species (Buchanan 2002). Artificial lighting may alter reproductive behaviors by inhibiting frog species that normally only reproduce at very low illuminations. For instance, female Tungara frogs (*Physalaemus pustulosus*) are less selective about mate choice when light levels are increased, evidently preferring to mate quickly and avoid the increased predation risk of mating activity (Rand *et al.* 1997). Longcore and Rich (2004) reported that frogs in an experimental enclosure stopped mating activity during night football games, when lights from a nearby stadium increased sky glow. Mating choruses only resumes when the enclosure was covered to shield the frogs from light. Increased illumination may allow predators to see frogs they otherwise would be unable to detect. Circadian rhythms, activity patterns, and intra-specific visual communication also may be affected by increased illuminations.

Summer cover and foraging habitat within the action area will be temporarily and permanently eliminated by the proposed project. Individual frogs occupying the affected habitat run the risk of being crushed or buried by earth moving activities. Those that do survive will suffer permanent and temporary loss of habitat, and harassment from increased human activity. Construction of an unspecified duration and location will occur at night and the associated

lighting may increase predation because frogs will lose the cover of darkness. Construction activities will likely impede the movement of adult frogs from unspecified breeding habitat to summer habitat within the action area, and visa versa. Temporary loss of dispersal habitat for the project duration increases intra-and inter-specific competition for food and living space for red-legged frogs in the action area vicinity.

The proposed action is likely to result in indirect effects to the red-legged frog that will extend beyond the completion of the proposed action. The action would (1) result in permanent and temporal loss of aestivation habitat; (2) reduce water quality in the action area; (3) result in higher mortality of red-legged frogs in the action area; and (4) increase fragmentation of remaining red-legged frog habitat over the longer term.

Removal of vegetation will likely increase exposure to introduced non-native and/or urban-adapted predators due to the permanent and temporary loss of cover for dispersing red-legged frogs.

Roads have been documented as barriers to movements by a diversity of species, and this effect varies with road size and traffic volume. Most of the available data is associated with large mammals such as mountain lions (*Felis concolor*) (Van Dyke *et al.* 1986) and black bears (*Ursus americanus*) (Brody and Pelton 1989). Amphibians, such as the California red-legged frog likely process and relate to their environment and perception of potential threats in much different ways than large mammals and other more well-studied taxa. Therefore, although red-legged frogs may exhibit less reluctance to cross a road than a lynx (*Lynx lynx*) (Barnum 1999), roads pose an increased risk of mortality for many species. Furthermore, traffic frequency and road expansion likely corresponds with increased mortality, decreased gene flow, and increased fragmentation of habitats and populations (Joly and Morand 1997).

Roads were found to be significant barriers to gene flow among common frogs (*Rana temporaria*) in Germany and have resulted in genetic differentiation among populations separated by roads (Reh and Seitz 1990). Similarly, significant genetic subdivision was detected in bank voles (*Clethrionomys glarelous*) populations separated by a 164 foot wide highway in Germany (Gerlach and Musolf 2000). In California, local extirpations of mountain lions has occurred when roads and other development fragmented habitat into small patches and blocked movement corridors, thereby isolating the patches and preventing recolonization (Beier 1993). Adequately sized culverts or undercrossings, with suitable habitat at each side of the passage, significantly increases the ability of animals to cross highways (Ng *et al.* 2004).

California red-legged frog mortality and injury occurs when the animals attempt to cross roads and are hit by cars, trucks, or motorcycles. The majority of strikes likely occur on rainy nights when the animals are most active. Driver visibility is also lower at night and in inclement weather, increasing the potential for strikes. Such strikes are usually fatal for an animal the size of a red-legged frog. Thus, vehicle strikes are a direct source of mortality for this listed amphibian. If vehicle strikes are sufficiently frequent in a given locality, they could result in

reduced California red-legged frog abundance. The death of animals during the breeding season could result in reduced reproductive success.

The local and range-wide effects of vehicle strikes on California red-legged frogs have not been adequately assessed. Vehicle strikes appear to occur most frequently where roads transverse areas where the animals are abundant. However, the linear quantity of roads in a given area may not be directly related to the number of associated vehicle strikes, as has been shown in endangered San Joaquin kit fox (*Vulpes macrotis mutica*) studies (Cypher *et al.* 2000; U.S. Department of Energy 1993; Spiegel and Disney 1996; Ralls and White 1995). The type of road (*e.g.*, number of lanes), traffic volume, and average speed of vehicles likely all influence the number of California red-legged frog/vehicle strikes. The number of strikes likely increases with road size, traffic volume, and average speed (Clevenger and Waltho 1999). Another factor influencing the number of vehicles striking this threatened amphibian, but for which little data is available, is the frequency with which the animals cross roads and are therefore at risk. The proportion of successful road crossings by these animals likely declines with increasing road size, traffic volume and density, and vehicle speeds. It is unlikely that California red-legged frogs are able to become more successful in crossing roads with increased experience.

Vehicle-related mortality has significantly affected other listed or rare species. Vehicles caused 49 percent of the mortality documented among endangered Florida panthers (*Felis concolor coryi*) (Maehr *et al.* 1991). With a small remaining population, the loss of any individuals to vehicles could constitute a significant population effect. Similarly, at least 15 percent of the remaining 250-300 key deer (*Odocileus virginianus clavium*) are killed annually by vehicles (Tubak 1999), and this mortality is considered to be a limiting factor in the recovery of this endangered species (Service 1985). Mortality from vehicles was the primary source of mortality for endangered ocelots (*Felis pardalis*) in Texas (Tubak 1999), and also contributed to the failure of a lynx reintroduction project in New York (Aubrey *et al.* 1999). Rudolph *et al.* (1999) estimated that road-associated mortality may have depressed populations of Louisiana pine snakes (*Pituophis ruthveni*) and timber rattlesnakes (*Crotalus horridus*) by over 50 percent in eastern Texas, and this mortality may be a primary factor in local extirpations of timber rattlesnakes (Rudolph *et al.* 1998). Mortality from vehicles is also contributing to the reduction in the status of the prairie garter snake (*Thamnophis radix radix*) in Ohio (Dalrymple and Reichenbach 1984), and was a limiting factor in the recovery of the endangered American crocodile (*Crocodylus acutus*) in Florida (Kushland 1988). In Florida, threatened Florida scrub-jays (*Aphelocoma coerulescens*) suffered higher mortality in territories near roads, as well as reduced productivity due to vehicle strikes of both young and breeding adults (Mumme *et al.* 1999).

The presence of roads in an area could result in the local introduction of chemical contaminants. Contaminants could be introduced in several ways. Substances used in road building materials or to recondition roads can leach out or wash off roads into adjacent habitat. Vehicle exhaust emissions include hazardous substances which may become concentrated in road-side soils. Heavy metals such as lead, aluminum, iron, cadmium, copper, manganese, titanium, nickel, zinc,

and boron are all emitted in vehicle exhaust (Trombulak and Frissell 2000). Concentrations of organic pollutants (e.g., dioxins, polychlorinated biphenyls) are higher in soils along roads (Benfenati *et al.* 1992) and ozone levels are higher in the air near roads (Trombulak and Frissell 2000). Vehicles may leak hazardous substances such as motor oil and antifreeze. Although the quantity leaked by a given vehicle may be minute, these substances can accumulate on roads and then get washed into the adjacent environment by storm water runoff. An immense variety of substances could be introduced during accidental materials spills. Such spills can result from small containers falling off passing vehicles to large material spills from traffic accidents. Depending on the substance, large spills may be partially or completely mitigated with clean-up efforts.

California red-legged frogs could be exposed to contaminants if using habitat adjacent to roads or downstream of associated stormwater runoff. Exposure pathways could include inhalation, dermal contact, direct ingestion, ingestion of contaminated soil or plants, or consumption of contaminated prey. Exposure to contaminants could cause short- or long-term morbidity, possibly resulting in reduced productivity or mortality. Carcinogenic substances could cause genetic damage resulting in sterility, reduced productivity, or reduced fitness among progeny. Contaminants may also have a negative effect on red-legged frog prey species. This could result in reduced prey abundance and diminished local carrying capacity for the red-legged frog.

Construction of roads can facilitate the invasion and establishment of non-native species. Disturbance and alteration of habitat adjacent to roads may create favorable conditions for non-native plants and animals. These exotic species can spread along roadsides and then into adjacent habitat. Modified road-side habitat may be more conducive to the dispersal of non-native species into red-legged frog habitat. Non-native wildlife could compete with red-legged frogs for resources such as food, or cause direct injury or frog mortality. Non-native plants and animals may also reduce habitat quality for the listed amphibian or their prey, and reduce the productivity or the local carrying capacity for the threatened species. As has been shown for San Joaquin kit foxes, introductions of non-native species could cause California red-legged frogs to alter behavioral patterns by avoiding or abandoning areas near roads (Cypher 2000).

Negative effects to wildlife populations from roads may extend some distance from the actual road. The phenomenon can result from any of the effects already described in this biological opinion (e.g., vehicle-related mortality, habitat degradation, invasive exotic species, *etc.*). Forman and Deblinger (1998) described the area affected as the "road effect" zone. Along a 4-lane road in Massachusetts, they determined that this zone extend for an average of approximately 980 feet to either side of the road for an average total zone width of approximately 1970 feet. However, in places they detected an effect greater than 0.6 mile from the road. Rudolph *et al.* (1999) detected reduced snake abundance up to 2790 feet from roads in Texas. Extrapolating to a landscape scale, they concluded that roads likely have a significant effect on Texas snake populations, given that approximately 79 percent of the state is within 1640 feet of a road "road-zone" effects can be subtle. Van der Zandt *et al.* (1980) reported that lapwings (*Vanellus vanellus*) and black-tailed godwits (*Limosa limosa*) feeding at 1575-6560 feet

from roads were disturbed by passing vehicles. The heart rate, metabolic rate and energy expenditure of female bighorn sheep (*Ovis canadensis*) increases near roads (MacArthur *et al.* 1979). Trombulak and Frossell (2000) described another type of "road-zone' effect. Heavy metal concentrations from vehicle exhaust were greatest within 66 feet of roads, and elevated levels of metals in both soil and plants were found at least 660 feet of roads. The "road-zone" apparently varies with habitat type and traffic volume. Based on bird responses, Forman and Alexander (2000) estimated primary road zones of 1,000 feet in woodlands, 1,197 feet in grasslands, and 2657 feet in natural lands near urban areas. The effect zone was 656 feet along secondary roads with lower traffic volumes.

Various other work activities associated with the proposed project also may adversely affect California red-legged frogs. Trash left during or after project activities could attract predators to work sites, which could subsequently harass or prey on the animals. For example, raccoons, crows, and ravens are attracted to trash and also prey opportunistically on amphibians. Construction equipment that has been used in different areas and with different species of amphibians, including the California red-legged frog, may transmit diseases by introducing contaminated soil and other foreign material brought in by equipment. There is also a possibility that people working on the site, particularly the onsite biologists could introduce amphibian disease to habitat used by California red-legged frogs. Recently, the probability of encountering and spreading a disease to previously unaffected amphibian populations has dramatically increased throughout the United States. It is possible that chytrid fungus may exacerbate the effects of other diseases on amphibians or increase the sensitivity of the amphibian to environmental changes (*e.g.*, water pH) that reduce normal immune response capabilities (Bosch *et al.* 2000).

Alameda Whipsnake

Individual Alameda whipsnakes may be directly injured or killed by activities that disturb feeding, sheltering, and dispersal habitat. According to our calculations the proposed project will result in the permanent loss of approximately 12.07 acres of habitat for this listed species. The proposed project could result in (1) result in the injury and death of an unknown number of Alameda whipsnakes; (2) result in construction-related harassment to the surviving Alameda whipsnakes in the area; (3) partially impede the dispersal of Alameda whipsnakes through the area while the action is in progress; (4) increase the likelihood of predation on Alameda whipsnakes; and (5) fragment and reduce the amount of Alameda whipsnake habitat.

Construction related activities may cause disruption of foraging, harassment from increased human activity, and permanent and temporary loss of shelter. Because Alameda whipsnakes are diurnal, they will be active while construction is performed. Individuals that avoid construction activities may become displaced into adjacent areas where they may be vulnerable to increased predation, exposure, starvation, or stress through disorientation, loss of shelter, and intraspecific and inter-specific aggression (Grigione 2002).

The proposed construction may temporarily affect Alameda whipsnake dispersal due to activities, such as blasting, that produce high levels of noise and vibration. The Caldecott Tunnel Project includes activities that cause barriers or deterrents to dispersal activities.

The addition of impermeable surfaces resulting from the widened roadway and realignment will likely be accompanied by an increase in chemical runoff, higher road-kill, and the introduced of non-native and/or introduction of non-native species. These factors may affect the Alameda whipsnake in ways similar to those discussed for the California red-legged frog.

Alameda Whipsnake Critical Habitat

This opinion on the critical habitat for the Alameda whipsnake does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR § 402.02. Instead, we have relied upon the statue and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U. S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to the critical habitat.

The proposed project will temporarily affect approximately 0.12 acres and permanently affect approximately 0.004 acres for a total of 0.124 acres of Alameda whipsnake critical habitat. The fraction of a percent loss is not expected to appreciably diminish the value of the critical habitat for the Alameda whipsnake, or prevent critical habitat from sustaining its role in the conservation and recovery of the species. Currently, there is an existing highway within the action area, and, due to adding an additional lane to well traveled highway is not expected to significantly interfere with the current capability of the critical habitat unit to satisfy essential requirements of the species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

From 1995 to 2020, the human population is projected to increase by 18 percent for the San Francisco Bay hydrologic region; while at the same time agricultural crop land use in the region is projected to remain around 65,000 acres (California Department of Water Resources 1998). According to the California Department of Forestry, from 2000 to 2020, the human population in the Bay Area region is expected to grow by 29 percent (5.3 million people to 6.8 million people), and by 60 percent from 2000 to 2040 (5.3 million people to 8.4 million people) (California Department of Forestry 1998). There will likely be many other development projects that occur during this timeframe due to increases in human population growth that will continue to imperil the California red-legged frog and the Alameda whipsnake.

Within this region of Alameda County, there is a continued demand for new commercial, housing, and recreation opportunities. Considering this, the remaining open space adjacent to the State Route 24, not within the existing preserves in the Caldecott Corridor is likely threatened by increased activity and habitat loss due to road, residential, and commercial development. The development of adjacent wildlife habitat will continue to result in the loss of not only breeding, resting, and foraging habitat, but the loss of dispersal corridors between breeding populations, thereby further isolating and fragmenting wildlife populations. Additionally, potential development of small reservoirs or water bodies, such as golf course hazards, and water diversions may pose further threats such as disruption of dispersal corridors for terrestrial species, and competition or predation from non-native species such as bullfrogs for aquatic species.

According to the Draft Environmental Assessment/Environmental Impact Report, based on the Association of Bay Area Government's Projections 2005, between 2000 and 2030, Alameda County is expected to gain an additional 154,034 households and Contra Costa County an additional 112,991 households. During the same period, the City of Oakland is projected to gain an additional 44,900 households and the City of Orinda an additional 734 households (Caltrans 2006).

According to the Draft Environmental Assessment/Environmental Impact Report, the City of Oakland General Plan anticipated increases of 600 housing units per year through 2015, as compared to annual increases of 400 units between 1980 and 1995, an increase of nearly 0.5 percent. Most of these new housing units would be located along the city's major transportation corridors, in Downtown, in Transit-Oriented Districts near BART stations, along the Waterfront, or as part of infill projects (Caltrans 2006).

According to the Draft Environmental Assessment/Environmental Impact Report, the City of Orinda General Plan, projected a total residential development capacity of approximately 7,429 housing units at full build-out (expected to occur in 2005), up from 6,001 in 1980 and 6,468 in 1990. Over the same period, the population was anticipated rise to 18,127 residents, up from 16,825 in 1980 and 17,751 in 1990. This reflects a very slow annual growth rate (about 0.5 percent) compared to that of the majority of Bay Area cities. Population was projected to be 2.44 persons per household in 2005 (Caltrans 2006).

According to the Draft Environmental Assessment/Environmental Impact Report (Caltrans 2006), the Caldecott Improvement Project is consistent with local planning goals and policies and would support planned growth but not induce unplanned growth in the area. The Draft Environmental Assessment/Environmental Impact Report also states that because the proposed project will increase mobility and reduce delays, access to parks and other public facilities within the project vicinity would be enhanced.

Additional threats resulting from urbanization include contamination, poisoning, increased predation, and competition from non-native species associated with human development. Small private actions that may impact listed species, such as conversion of land, ground squirrel reduction efforts, mosquito control, and residential development may occur without consultation with or authorization by the Service or the California Department of Fish and Game pursuant to their respectively Endangered Species Act.

Urban development results in increased numbers of pets. Both feral and domestic cats and dogs prey on aquatic and riparian species such as the California red-legged frog. People exploring creeks can harass, collect, and kill California red-legged frogs.

Many flood control projects replace natural streams with engineered channels and isolate them from their natural floodplains, disrupting natural hydrologic processes and degrading stream habitat. Flood channel maintenance often requires the removal of emergent aquatic and riparian vegetation, making these channels less suitable for California red-legged frogs.

Non-native species that prey upon, or compete with, listed species continue to be released into the environment. Releases are likely to increase with an increasing number of people living in an area. Bullfrogs, goldfish, mosquitofish, and warm water game fish species are all expected to continue to persist in the wild and degrade the quality of the habitat of the two listed amphibians. The introduced animals may also act as disease vectors and impact threatened/ endangered species.

The application of pesticides, herbicides, or fertilizers could degrade surface water quality in wetlands, including creeks and streams. Water quality may become impaired when pesticides/fertilizers or sediment enters the proposed project from the surrounding residential area.

Diseases may also pose a significant threat though the specific effects of disease on the California red-legged frog and Alameda whipsnakes are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat to the red-legged frog because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson *et al.* 2003; Lips *et al.* 2003). Non-native species, such as bullfrogs and non-native tiger salamanders, are located within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2006). Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e. contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in these two listed species being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small and fragmented remaining California red-legged frog breeding sites, the many stresses on these sites due to habitat losses and alterations, and the many other potential disease-enhancing anthropogenic changes that have occurred both inside and outside the species' range.

Increased access to aquatic habitat due to urbanization and associated road construction and improvements could facilitate or increase the spread of amphibian diseases within the range of the California red-legged frog. The global mass extinction of amphibians primarily due to chytrid fungus continues to be of significant concern (Norris 2007; Skerratt *et al.* 2007).

The global average temperature has risen by approximately 0.6 degrees C during the 20th Century (IFPC 2001, 2007; Adger *et al* 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (IFPC 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to manmade emissions of carbon dioxide and other greenhouse gases (Adger *et al.* 2007). Western North America's climate is predicted to change within the 21st century due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan *et al.* 2005, EPA Global Warming webpage http://yosemite.epa.gov). The impacts on California ecosystems from climate change are potentially large (Lenihan *et al.* 2003). Ongoing climate change (Anonymous 2007; Inkley *et al.* 2004; Adger *et al.* 2007; Kanter 2007) likely imperils the California red-legged frog, Alameda whipsnake, and the resources necessary for their survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of the California red-legged frog and the Alameda whipsnake; the environmental baseline for the action area; the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the proposed Caldecott Improvement Project is not likely to jeopardize the continued existence of these two listed species. No designated critical habitat for the California red-legged frog is located within the action area; therefore, none will be affected by the proposed project. Critical habitat for the Alameda whipsnake is located within the action area, however none will not be adversely modified or destroyed by the proposed project.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take

that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this incidental take statement.

The measures described below are non-discretionary, and California Department of Transportation must ensure that they become binding conditions of project authorization for the exemption under 7(o)(2) to apply. The California Department of Transportation has a continuing duty to regulate the activity that is covered by this incidental take statement. If the California Department of Transportation (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect because when this amphibian is not in their breeding ponds, it inhabits rodent burrows or inconspicuous cover sites, or may be difficult to locate due to their cryptic appearance and behavior; the sub-adult and adult animals may be located a distance from the breeding ponds; the migrations occur on a limited period during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of their relatively small body size. Losses of this species may also be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in water regime at their breeding ponds, or additional environmental disturbances. Therefore, the Service is estimating that all California red-legged frogs inhabiting the approximately 12.07 acres of California red-legged frog habitat will be subject to incidental take. Upon implementation of the Reasonable and Prudent Measures, incidental take associated with the proposed Caldecott Improvement Project in the form of harm, harassment, capture, injury, and death of the California red-legged frog caused by habitat loss and construction activities will become exempt from the prohibitions described under section 9 of the Act.

The Service expects that incidental take of the Alameda whipsnake will be difficult to detect or quantify because this animal may range over a large territory and the finding of an injured or dead individual is unlikely because of their relatively small body size and conspicuous coloration. Therefore, the Service is estimating that all of the Alameda whipsnakes inhabiting the approximately 12.07 acres of Alameda whipsnake habitat may be subject to incidental take. Upon implementation of the Reasonable and Prudent Measures, incidental take associated with the proposed Caldecott Improvement Project in the form of harm, harassment, capture, injury, and death of the Alameda whipsnake caused by habitat loss and construction activities will become exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the California red-legged frog or the Alameda whipsnake. Critical habitat for the Alameda whipsnake is located within the action area. However only a small amount will be adversely modified or destroyed based on the proposed restoration of the areas subject to temporary disturbance.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize the effects of the proposed Caldecott Improvement Project on the California red-legged frog and the Alameda whipsnake:

1. Caltrans shall implement the project as described in the February 2007 Biological Assessment and this biological opinion.

2. Caltrans shall minimze effects to the California red-legged frog and the Alameda whipsnake.

3. Caltrans shall ensure their compliance with this biological opinion.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the California Department of Transportation shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. The following Terms and Conditions implement Reasonable and Prudent Measure Number One (1):

    a. Caltrans shall minimize the potential for harm, harassment, or killing of federally listed wildlife species resulting from project related activities by implementation of the conservation measures as described in the February 2007 Biological Assessment, and appearing in the Project Description of this biological opinion.

    b. Caltrans shall make the terms and conditions in this biological opinion a required term in all contracts for the project that are issued by them to all contractors.

    c. The exemption from section 9 of the Act provided by this incidental take statement for the Alameda whipsnake does not provide an exemption from complying with State law. Therefore, Caltrans shall provide the Service with a hardcopy of the written concurrence or written authorization for the effects

of the project on the Alameda whipsnake from the California Department of Fish and Game at least twenty (20) working days prior to the date of initial ground breaking at the proposed project.

2. The following Terms and Conditions implement Reasonable and Prudent Measure Number Two (2):

   a. The Resident Engineer or their designee shall be responsible for implementing the conservation measures and Terms and Conditions of this biological opinion and shall be the point of contact for the project. The Resident Engineer or their designee shall maintain a copy of this biological opinion onsite whenever construction is taking place. Their name and telephone number shall be provided to the Service at least twenty (20) woeking days prior to groundbreaking at the project. Prior to ground breaking, the Resident Engineer must submit a letter to the Service verifying that they posses a copy of this biological opinion and have read the Terms and Conditions.

   b. A qualified biologist(s) shall be onsite during all activities that may result in the take of the California red-legged frog and/or the Alameda whipsnake. The qualifications of the biologist(s) must be presented to the Service for review and written approval prior to ground-breaking at the project site. Prior to approval, the biologist(s) must submit a letter to the Service verifying that they posses a copy of this biological opinion and understand its Terms and Conditions.

   c. The Caltrans biologist shall have oversight over implementation of all the Terms and Conditions in this biological opinion, and shall have the authority to stop project activities, through communication with the Resident Engineer or their designee, if any of the requirements associated with these Terms and Conditions are not being fulfilled. If biologist/construction liaison has requested a stop work due to take of any of the listed species the Service and the California Department of Fish and Game will be notified within one (1) working day via email or telephone. The Service contact is Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Program at the Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

   d. Prior to any ground disturbance, pre-construction surveys shall be conducted by a Service-approved biologist for the California red-legged frog and the Alameda whipsnake. These surveys shall consist of walking surveys of the project limits and adjacent areas accessible to the public to determine presence of the species.

   e. Biologists shall take precautions to prevent introduction of amphibian diseases to the action area by disinfecting equipment and clothing as directed in the recommended equipment decontamination procedures within the Service's California Red-Legged Frog Survey Guidance. This document is available at the Service's Sacramento office website (http://www.fws.gov/sacramento/es/protocol.htm). Disinfecting equipment

and clothing is especially important when biologists are coming to the action area to handle frogs after working in other aquatic habitats.

f. Project employees shall be provided with written guidance governing vehicle use, speed limits on unpaved roads, fire prevention, and other hazards.

g. Permanent disturbances and other types of project-related disturbance to the habitats of the California red-legged frog and the Alameda whipsnake shall be minimized to the maximum extent practicable by Caltrans. To minimize disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas also should be included in pre-construction surveys and, to the maximum extent possible, should be established in locations disturbed by previous activities to prevent further adverse effects.

h. To prevent inadvertent entrapment of California red-legged frogs and Alameda whipsnakes during construction, all excavated, steep-walled holes or trenches more than two (2) feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped listed animal is discovered, the on-site biologist should immediately place escape ramps or other appropriate structures to allow the animal to escape, or the Service and/or California Department of Fish and Game shall be contacted by telephone for guidance. The Service shall be notified of the incident by telephone and electronic mail within one working day.

i. Project-related vehicles shall observe a 20-mile per hour speed limit within construction areas, except on County roads, and State and Federal highways; this is particularly important at night when the California red-legged frog is most active. To the maximum extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas shall be prohibited.

j. Except when necessary for construction, driver or pedestrian safety, lighting of the proposed Caldecott Improvement Project site by artificial lighting during night time hours should be minimized to the maximum extent practicable.

k. All grindings and asphaltic-concrete waste shall be stored within previously disturbed areas absent of habitat and at a minimum of 150 feet from any culvert, or drainage feature.

l. To avoid injury or death of the California red-legged frog and/or Alameda whipsnake, no firearms shall be allowed on the project site except for those carried by authorized security personnel, or local, State, or Federal law enforcement officials.

m. To prevent harassment, injury or mortality of California red-legged frog and/or Alameda whipsnake or destruction of their refugia by dogs or cats, no canine or feline pets shall be permitted in the action area.

n. Use of rodenticides and herbicides on the proposed Caldecott Improvement Project shall be utilized in such a manner to prevent primary or secondary poisoning of listed species, and depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Pesticide Regulation, and other appropriate State and Federal regulations, as well as additional project-related restrictions deemed necessary by the Service or the California Department of Fish and Game.

o. Plastic mono-filament netting (erosion control matting) or similar material shall not be used at the project site because California red-legged frogs may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydro-seeding compounds.

p. The following Term and Condition shall be implemented should borrow sites be associated with the Caldecott Tunnel Improvement Project:

   i. As part of the construction contract, Caltrans shall require that all contractors comply with the Act in the performance of work necessary for project completion inside and outside the project right-of-way.

   ii. Caltrans shall require documentation from the contractor ensuring that aggregate, fill, or borrow material provided for the project was obtained in compliance with the Act. Evidence of compliance with the Act shall be demonstrated by providing the Resident Engineer any one of the following:

      (a). a letter from the Service stating use of the borrow pit area will not result in the incidental take of listed species;

      (b). an incidental take permit for contractor-related activities issued by the Service pursuant to section 10(a)(1)(B) of the Act;

      (c). a biological opinion or a letter concurring with a "not likely to adversely affect" determination issued by the Service to the Federal agency having jurisdiction over contractor-related activities;

      (d). letter from the Service concurring with the "no effect" determination for contractor-related activities; or

(e). Contractor submittal of information to the Caltrans Resident Engineer indicating compliance with the State Mining and Reclamation Act and provide the County land use permits and California Quality Act clearance.

iii If a borrow site that is in compliance with the Act is not available, Caltrans shall either:

(a). identify/select a site that the Service has concurred with the "no effect" determination, or;

(b). request reinitiation of formal consultation on the action considered herein based on new information.

B. The following Terms and Conditions implement Reasonable and Prudent Measure Number Three (3):

a. If requested, during or upon completion of construction activities, the Service and/or California Department of Fish and Game shall be given access to the proposed project to review the effects on the California red-legged frog, Alameda whipsnake, and their habitats.

b. Caltrans shall comply with the Reporting Requirements of this biological opinion.

Reporting Requirements

Injured California red-legged frogs and Alameda whipsnakes must be cared for by a licensed veterinarian or other qualified person such as the on-site biologist; dead individuals of any of these listed species shall be placed in a zip-lock® plastic bag containing a piece of paper with the date, time, and location where the animal was found, and who found it written in permanent ink, and the placed in a freezer located in a secure location. The Service and the California Department of Fish and Game must be notified within one (1) working day of the discovery of death or injury to a California red-legged frog or an Alameda whipsnake that occurs due to project related activities or is observed at the project site. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Program at the Sacramento Fish and Wildlife Office (916) 414-6600, and Scott Heard, Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660. The California Department of Fish and Game contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, California 95814, (916) 654-4262.

Caltrans shall submit a post-construction compliance report prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within sixty (60) calendar days after the date of the completion of construction activity. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the California red-legged frog and the Alameda whipsnake, if any; (v) occurrences of incidental take of any of these listed species, if any; (vi) documentation of employee environmental education; and (vii) other pertinent information.

CONSERVATION RECOMMENDATIONS

Section 7(a) (1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to implement recovery actions, to help implement recovery plans, to develop information, or otherwise further the purposes of the Act.

The Service requests notification of the implementation of any conservation recommendations in order to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats. We propose the following conservation recommendations:

1. Caltrans should assist the Service in implementing recovery actions identified in the *Recovery Plan for the California red-legged Frog* (Service 2002b).

2. Caltrans should assist the Service in developing and implementing recovery actions identified in the *Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California* (Service 2002a).

3. Caltrans should incorporate culverts, tunnels, or bridges on highways and other roadways that allow safe passage for the California red-legged frogs, Alameda whipsnake, other listed animals, and native wildlife. Caltrans should include photographs, plans, and other information in their biological assessments if they incorporate "wildlife friendly" crossings into their projects.

4. Caltrans should consider participating in the planning for a regional habitat conservation plan for the California red-legged frog, Alameda whipsnake, and other listed or otherwise special-status species.

5. Caltrans should consider establishing functioning preservation and creation conservation banking systems to further the conservation of the California red-legged frog, Alameda whipsnake, and other appropriate species. Such banking systems also could be utilized for other required mitigation (*i.e.*, seasonal wetlands, riparian habitats, *etc.*) where appropriate. In particular, Caltrans should consider preserving Alameda whipsnake

habitat within Recovery Unit 6 to compensate for affects to the species in the vicinity of the Caldecott Tunnel.

6. Sightings of any listed or sensitive animal species should be reported to the California Natural Diversity Database of the California Department of Fish and Game. A copy of the reporting form and a topographic map, clearly marked with the location the animals were observed, should also be provided to the Service.

7. Caltrans should provide habitat for bats, including surfaces for bat roosts on the underside of bridges and other structures whenever possible.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the Caldecott Improvement Project in Contra Costa and Alameda counties, California. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion on the Caldecott Improvement Project on State Route 24, please contact John Cleckler or Chris Nagano at the letterhead address or at telephone (916) 414-6625.

Sincerely,

Cay C. Goude
Acting Field Supervisor

cc:
Jean Hart, Alameda County Congestion Management Agency, Oakland, California
William R. Gray, Gray Bowen, Walnut Creek, California
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Marcia Grefsrud, California Department of Fish and Game, Yountville, California
Janice Gan, California Department of Fish and Game, Yountville, California
Scott Wilson, California Department of Fish and Game, Yountville, California
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Literature Cited

Adger, N., P.Aggarwal, S. Agrawala, J.Alcamo, A. Allali, O. Anisimov, N. Arnell, M. Boko, O.Canziani, T. Carter, G. Cassa, U. Confalonieri, R. Cruz, E.de Alba Alcaraz, W. Eastreling, C. Field, A. Fischlin, B. Fitzharris, C.G. Garcia, C. Hanson, H. Harasawa, K. Hennessy, S.Huq, R. Jones, L. K. Bogataj, D. Karoly, R. Kliein, Z. Kundzewicz, M. Lal, R. Lasco, G. Love, X. Lu, G. Magrin, L.J. Mata, R. McLean, B. Menne, G. Midgley, N. Mimura, M.Q. Mirza, J. Moreno, L. Mortsch, I. Niang-Diop, R. Nichols, B. Novaky, L. Nurse, A. Nyon, M. Oppenheimer, J. Palutikof, M. Parry, A. Patwardhan, P. R. Lankao, C. Rosenzweig, S. Schneider, S. Semenov, J. Smith, J. Stone, J van Ypersele, D. Vaughan, C. Vogel, T. Wilbanks, P.Wong, S. Wu, and G. Yohe. 2007. Working Group II Contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report. Climate Change 2007: Climate change impacts, adaptation and vulnerability. Brussels, Belgium.

Anonymous. 2007. Global warming is changing the World. Science 316:188-190.

Aubrey, K.B., G.M. Koehler, and J. R. Squires. 1999. Ecology of Canada lynx in southern boreal forests. *In* L.F. Ruggiero, K.B. Aubrey, S.W. Buskirk, G. Koehler, C. Krebs, K. McKelvey, and J. Squires (editors). The scientific basis for lynx conservation. General Technical Report RMRS-GTR-30, U.S.D.A. Forest Service, Ogden, Utah.

Barnum, S. 1999. A programmatic agreement to minimize highway project impacts on Canada lynx (*Lynx canadensis*) in Colorado. Pages 67-74 *in* G.L. Evink, P. Garrett, and D. Ziegler (editors). Proceedings of the third international conference on wildlife ecology and transportation. FL-ER-73-99. Florida Department of Transportation, Tallahassee, Florida.

Barton, C. and K. Kinkead. 2005. Do erosion control and snakes mesh? Journal of Soil and Water Conservation 60(2): 34A-35A.

Benfenati, E., S. Valzacchi, G. Maniani, L. Airoldi, and R. Farnelli. 1992. PCDD, PCDF, PCB, PAH, cadmium, and lead in roadside soil: relationship between road distance and concentration. Chemosphere 24:1077-1083.

Beier, P. 1993. Determining minimum habitat areas and habitat corridors for cougars. Conservation Biology, 7 (1), 94-108.

Bosch, J., I. Martinez-Solano and M. Garcia-Paris. 2000. Evidence of a chytrid fungus infection involved in the decline of the common midwife toad (*Alytes obstetricanus*) in protected areas of central Spain. Biological Conservation 97: 331-337.

Brody, A.J. and M.R. Pelton. 1989. The effects of roads on black bear movements in western North Carolina. Wildlife Society Bulletin 17:5-10.

Buchanan, B. W. 1993. Effects of enhanced lighting on the behaviour of nocturnal frogs. Animal Behavior. 45: 89-899.

_____ 2002. Observed and potential effects of artificial light on the behavior, ecology, and evolution of nocturnal frogs. Paper presented at the Urban Wildlands Group's Ecological Consequences of Artificial Night Lighting. February 23-24, 2002. University of California, Los Angeles, California.

Bulger, J. B., Scott, Jr., N. J., Seymore, R. B. 2003. Terrestrial activity and conservation of adult California red-legged frogs (*Rana aurora draytonii*) in coastal forests and grasslands. Biological Conservation 110: 85-95.

Bury, R.B., and J.A. Whelan. 1984. Ecology and management of the bullfrog. U.S. Fish and Wildlife Service Resource Publication 155.

California Department of Fish and Game (CDFG). 2006. California wildlife habitat relationships. Wildlife and Habitat Data Analysis Branch. California Department of Fish and Game, State of California. Website: http://www.dfg.ca.gov/whdab/html/wildlife_habitats.html. Sacramento, California.

California Department of Fish and Game (CDFG). 2007a. RAREFIND. Natural Heritage Division, Sacramento, California.

_____ 2007b. BIOSIS. Natural Heritage Division, Sacramento, California.

California Department of Transportation (Caltrans). 2006. Draft Environmental Assesment/Environmental Impact Report, Caldecott Improvement Project on State Route 24 in Contra Costa and Alameda Counties. EA 294900. Office of Biological Sciences and Permits, District 4. May 2006. Oakland, California. Available online at http://www.dot.ca.gov/dist4/caldecott/draft_ea_eir.htm.

_____ 2007. Biological Assessment, Caldecott Improvement Project on State Route 24 in Contra Costa and Alameda Counties. Office of Biological Sciences and Permits, District 4. February 2007. Oakland, California.

Clevenger, A.P. and N. Waltho. 1999. Dry culvert use and design considerations for small- and medium-sized mammal movement across a major transportation corridor. Pages 263-178 *in* G. L. Evink, P. Garrett, and D. Zeigler (editors). Proceedings of the third international conference on wildlife ecology and transportation. FL-ER-73-99, Florida Department of Transportation. Tallahassee, Florida.

Coleman, J.S., S.A. Temple, and S.R. Craven. 1997. cats and wildlife: a conservation dilemma. Cooperative Extension Publication. Madison, Wisconsin.

Cypher, B. L., G. D. Warrick, M. R. M. Otten, T. P. O'Farrell, W. H. Berry, E. C. Harris, T. T. Kato, P. M. McCue, J. H. Scrivner, and B. W. Zoellick. 2000. Population dynamics of San Joaquin kit foxes at the Naval Petroleum Reserve in California. Wildlife Monographs 145.

DelVecchio, R. 1997. Truce in fight over feral cats. San Francisco Chronicle. April 2, 1997. Page A-15.

Dalrymple, G.H. and N.G. Reichenbach. 1984. Management of an endangered species of snake in Ohio, USA. Biological Conservation 30:195-200.

Emlen, S.T. 1977. "Double clutching" and its possible significance in the bullfrog. Copeia 1977(4):749-751.

Fellers, G. M. 2005. California red-legged frog, *Rana draytonii* Baird and Girard. Pages 198-201 *in* Laurence L. C. Jones, William P. Leonard, and Deanna H. Olson (editors). Amphibians of the Pacific Northwest. xxii+227.

Forman, R. T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual review of Ecology and Systematics 29:207-231.

Forman, R. T. T. and R. D. Deblinger. 2000. The ecological road-effect zone of a Massachusetts (USA) suburban highway. Conservation Biology 14: 36-46.

Frankham, R. and K. Ralls. 1998. Inbreeding leads to extinction. Nature 241:441-442.

Gerlach, G. and K. Musolf. 2000. Fragmentation of landscapes as a cause for genetic subdivision in bank voles. Conservation Biology 14:1066-1074.

Goodrich, J.M. and S.W. Buskirk. 1995. Control of abundant native vertebrates for conservation of endangered species. Conservation Biology 9:1357-1364.

Grigione, M.M. 2002. Turning night into day: the artificial effects of artificial night lighting on endangered and other mammal species. Paper presented at the Urban Wildlands Group's Ecological Consequences of Artificial Night Lighting. February 23-24, 2002. University of California, Los Angeles, California.

Hayes, M.P. and M.R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): Implications for management. Pages 144-158 *in* R. Sarzo, K. E. Severson, and D. R. Patton (technical coordinators). Proceedings of the Symposium on the Management of Amphibians, Reptiles, and Small Mammals in North America. U.S.D.A. Forest Service General Technical Report RM-166.

Hayes, M.P. and D.M. Krempels. 1986. Vocal sac variation among frogs of the genus, *Rana* from western North America. Copeia 1986(4):927-936.

Hayes, M.P. and M.M. Miyamoto. 1984. Biochemical, behavioral and body size differences between *Rana aurora aurora* and *R. a. draytonii*. Copeia 1984(4):1018-1022.

Hayes, M. P. and M. R. Tennant 1985. Diet and feeding behavior of the California red-legged frog, *Rana aurora draytonii* (Ranidae). Southwestern Naturalist 30(4):601-605.

Hubbs, E.L. 1951. Food habits of feral house cats in the Sacramento Valley. California Department of Fish and Game. 37:177-189.

IFPC 2001. Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T., Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, X. Dai, K. Maskell, and C.A. Johnson (editors)]. Cambridge University Press, Cambridge, United Kingdom and New York, New York. 881 pp. Available at http://www.ipcc.ch/.

_____ 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Alley, R., T. Berntsen, N.L. Bindoff, Z. Chen, A. Chidthaisong, P. Friedlingstein, J. Gregory, G. Hegerl, M. Heimann, B. Hewitson, B. Hoskins, F. Joos, J. Jouzel, V. Kattsov, U. Lohmann, M. Manning, T. Matsuno, M. Molina, N. Nicholls, J. Overpeck, D. Qin, G. Raga, V. Ramaswamy, J. Ren, M. Rusticucci, S. Solomon, R. Somerville, T.F. Stocker, P. Stott, R.F. Stouffer, P. Whetton, R.A. Wood, D. Wratt. 21 pp. Available at http://www.ipcc.ch/.

Inkley, D.B., M.G. Anderson, A.R. Blaustein,V.R. Burkett, B. Felzer, B. Griffith, J. Price and T.L. Root. 2004. Global Climate Change andWildlife in North America. Technical Review 04-2, The Wildlife Society, Bethesda, Maryland.

Jaeger, R.G. and J.P. Hailman. 1973. Effects of intensity on the phototactic responses of adult anuran amphibians: a comparative survey. Zeit. Tierpsychol. 33:352-407.

Jennings, M.R. 1983. *Masticophis lateralis*. Catalogue of American Amphibians and Reptiles: 341:1-2.

Jennings, M.R. 1988. Natural history and decline of native ranids in California. Pages 61-72 *in* H.F. DeLisle, P.R. Brown, B. Kaufman, and B.M. McGurty (editors). Proceedings of the conference on California Herpetology Southwestern Herpetologists Society Special Publication 4:1-143.

Jennings, M.R., M.P. Hayes, and D.C. Holland. 1992. A petition to the U.S. Fish and Wildlife Service to place the California red-legged frog (*Rana aurora draytonii*) and the western pond turtle (*Clemmys marmorata*) on the list of endangered and threatened wildlife and plants. 21 pages.

Jennings, M.R. and M.P. Hayes. 1985. Pre-1900 overharvest of California red-legged frog (*Rana aurora draytonii*): The inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetological Review 31:94-103.

_____ 1990. Final report of the status of the California red-legged frog (*Rana aurora draytonii*) in the Pescadero Marsh Natural Preserve. Prepared for the California Department of Parks and Recreation under contract No. 4-823-9018 with the California Academy of Sciences. 56 pages.

Joly, P. and A. Morand. 1997. Amphibian diversity and land-water ecotones. Pages 161-182 *in* J.P. Bravard and R. Juge (editors). Biodiversity in land-water ecotones. Man and Biosphere series volume 18. United Nations Educational, Scientific, and Cultural Organization, Paris, France.

Keeley, J.E. 1987. Role of fire in seed germination of woody taxa in California chaparral. Ecology 68(2):434-443.

Keeley, J.E. 1992. Demographic structure of California chaparral in the long-term absence of fire. Journal of Vegetation Science 3: 79–90.

Kruse, K. C. and M. G. Francis. 1977. A predation deterrent in larvae of the bullfrog, *Rana catesbeiana*. Transactions of the American Fisheries Society. 106(3): 248-252.

Kupferberg, S.J. 1996a. The ecology of native tadpoles (*Rana boylii* and *Hyla regilla*) and the impacts of invading bullfrogs (*Rana catesbeiana*) in a northern California river. Ph.D. dissertation, University of California, Berkeley, California.

_____ 1996b. Hydrologic and geomorphic factors affecting conservation of a river-breeding frog (*Rana boylii*). Ecological Applications, 6(4): 1332-1344.

Kushlan, J.A. 1988. Conservation and management of the American crocodile. Environmental Management 12:777-790.

Lenihan, J., R. Drapek, D. Bachelet, and R. Neilson. 2003. Climate change effects on vegetation distribution, carbon, and fire in California. Ecological Applications. 13(6) 1667-1681.

Lips, K. R. J. D. Reeve, L. R. Witters. 2003. Ecological Traits Predicting Amphibian Population Declines in Central America. Conservation Biology 17 (4), 1078–1088.

Longcore, T. and C. Rich. 2004. Ecological light pollution. Front. Ecol. Environ. 2(4):191-198.

Maehr, D.S., E.D. Land, and M.E. Roelke. 1991. Mortality patterns of panthers in southwest Florida. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 45:201-207.

MacArthur, R.A., R.H. Johnston, and V. Geist. 1979. Factors influencing heart rate in free ranging bighorn sheep: a physiological approach to the study of wildlife harrassment. Canadian Journal of Zoology 57:2010-2021.

Mao, J., D. E. Green, G. M. Fellers, and V. G. Chincar. 1999. Molecular characterization of iridoviruses isolated from sympatric amphibians and fish. Virus Research 6: 45-52. California Department of Fish and Game, Sacramento, California.

Mayer, K. E., and W. F. Laudenslayer. 1988. A guide to wildlife habitats of california. California Department of Forestry and Fire Protection. Sacramento, California. 166 pages.

McGinnis, S.M. 1992. Habitat requirements, distribution, and current status of the Alameda whipsnake (*Masticophis lateralis euryxanthus*). California State University, Hayward, California. 27 pages.

Mumme, R.L., S.J. Schoech, G.E. Woolfenden, and J.W. Fitzpatrick. 1999. Life and death in the fast lane: demographic consequences of road mortality in the Florida scrub jay. Conservation Biology 14:501-512.

Ng, S.J., J.W. Doyle, R.M. Sauvajot, S.P.D. Riley, and T. Valone. 2004. Use of highway undercrossings by wildlife in southern California. Biological Conservation 115:499-507.

Park, O. 1940. Nocturnalism – the development of a problem. Ecological Monographs 10:485-536.

Parker, V.T. 1987. Can native flora survive prescribed burns? Fremontia 14(4):3-6.

Ralls, K. and P. J. White. 1995. Predation on San Joaquin kit foxes by larger canids. Journal of Mammalogy 76:723-729.

Rand, A.S., M.E. Bridarolli, L. Dries, and M.J. Ryan. 1997. Light levels influence female choice in Tungara frogs: predation risk assessment? Copeia 1997:447-450.

Reh, W. and A. Seitz. 1990. The influences of land use on the genetic structure of populations of the common frog *Rana temporaria*. Biological Conservation 54:239-249.

Roberto, P. 1995. The cat rescue movement vs. wildlife defenders. California Coast and Ocean 11(2):31-40.

Rudolph, D.C., S.J. Burgdorf, R.N.Conner, and J. Dickson. 1998. The impact of roads on the timber rattlesnake (*Crotalus horridus*) in eastern Texas. Pages 236-240 *in* G.L. Evink, P. Garrett, D. Ziegler, and J. Berry (editors). Proceedings of the international conference on wildlife ecology and transportation. FL-ER-69-98. Florida Department of Transportation. Tallahassee, Florida.

Rudolph, D.C., S.J. Burgdorf, R.N. Conner, and R.R. Schaefer. 1999. Preliminary evaluation of the impact of roads and associated vehicular traffic on snake populations in eastern Texas. Pages 129-136 *in* G.L. Evink, P. Garrett, and D. Zeigler (editors). Proceedings of the third international conference on wildlife ecology and transportation. FL-ER-73-99. Florida Department of Transportation. Tallahassee, Florida.

Rundel, P. W., G. A. Baker, D. J. Parsons, and T. J. Stohlgren. 1987. Postfire demography of resprouting and seedling establishment by *Adenostoma fasciculatum* in the California chaparral. In J. D. Tenhunen, F. M. Catarino, P. L. Lange, and W. C. Oechel, W.C. [eds.], Plant response to stress, 575–596. Springer-Verlag, Berlin.

Saunders, D.A., R.J. Hobbs, and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: a review. Conservation Biology 5:18-32.

Sawyer, J. O., and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society. Sacramento, California.

Skerratt, L.E., Lee Berger, R. Speare, S. Cashins, K. R. McDonald, A. D. Phillott, H. B. Hines, and N. Kenyon. 2007. Spread of Chytridiomycosis Has Caused the Rapid Global Decline and Extinction of Frogs. EcoHealth Online, www.springerlink.com.

Spiegel, L. K. and M. Disney. 1996. Mortality sources and survival rates of San Joaquin kit foxes in oil-developed and undeveloped lands of southwestern Kern County, California. Pages 71-92 *in* L.K. Spiegel (editor). Studies of the San Joaquin kit fox in undeveloped and oil-developed areas. California Energy Commission, Sacramento, California.

Stebbins, R.C. 2003. A field guide to western reptiles and amphibians. Houghton Mifflin Company, Boston, Massachusetts.

Storer, T. I. 1925. A synopsis of the amphibia of California. University of California Publications in Zooogy.27:1-1-342.

_____ 1933. Frogs and their commercial uses. Journal of the California Fish and Game, 19(3): 203-13.

Swaim, K.E. 1994. Aspects of the ecology of the Alameda whipsnake, *Masticophis lateralis euryxanthus*. Masters Thesis, California State University, Hayward, California. 140 pages.

_____ 2005a. 2004 Annual report results of baseline and post-burn trapping surveys for the California Whipsnake (*Masticophis lateralis*) at Lawrence Livermore National Laboratory, Site 300 Experimental Test Facility, Alameda and San Joaquin Counties, California. 25 pages.

_____ 2005b. Results of baseline trapping survey for the Alameda whipsnake (*Masticophis lateralis euryxanthus*) Mount. Diablo State Park, Contra Costa County, California. 29 pages.

_____ 2005c. Results of 2004 baseline trapping survey (Pre-burn) for the Alameda whipsnake (*Masticophis lateralis euryxanthus*) at Mallory Ridge, Los Vaqueros Reservior Watershed, Contra Costa county, California. 35 pages.

Trombulak, S.C. and C.A. Frissell. 2000. The ecological effects of roads on terrestrial and aquatic communities: a review. Conservation Biology 14:18-30.

Turbak, G. 1999. Can American motorists yield the right-of-way to wild creatures? National Wildlife 37(6):66-68.

Twedt, B. 1993. A comparative ecology of *Rana aurora* Baird and Girard and *Rana catesbeiana* Shaw at Freshwater Lagoon, Humboldt County, California. Master of Science thesis. Humboldt State University, Arcata, California. 53 pages + appendix.

U. S. Department of Energy. 1993. Petroleum production at maximum efficiency rate, Naval Petroleum Reserve number 1 (Elk Hills), Kern County, California: supplement to the 1979 final environmental impact statement. Naval Petroleum Reserve, Tupman, California.

U. S. Fish and Wildlife Service (Service). 1985. Revised Florida Key Deer Recovery Plan. U.S. Fish and Wildlife Service, Atlanta, Georgia. 46 pages.

_____ 1996. Endangered and threatened wildlife and plants; determination of threatened status for the California Red-Legged Frog. **Federal Register** 61:25813-25833.

_____ 1997. Endangered and threatened wildlife and plants; determination of endangered status for the callippe silverspot butterfly and the Behren's silverspot butterfly and threatened status for the Alameda whipsnake. **Federal Register** 62(234):64306-64320.

_____ 2000. Endangered and threatened wildlife and plants; final determination of critical habitat for the Alameda whipsnake (*Masticophis lateralis euryxanthus*). **Federal Register** 62(192):58933-58962.

_____ 2002a. Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California. Region 1, Portland, Oregon. xvi + 306 pages.

_____ 2002b. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). Portland, Oregon. viii + 173 pages.

_____ 2004. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the California Red-legged Frog (*Rana aurora draytonii*) Proposed Rule. **Federal Register** 69:19620-19642.

_____ 2006. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Alameda Whipsnake; Final Rule. **Federal Register** 71:58176-58231.

Van der Zande, A.N., W.J. der Keurs, and W.J. Van der Weijden. 1980. The impact of roads on the densities of four bird species in an open field habitat - evidence of a long-distance effect. Biological Conservation 18: 299-321.

Van Dyke, G.D., R.H. Brocke, and H.G. Shaw. 1986. Use of road track counts as indices of mountain lion presence. Journal of Wildlife Management 50:102-109.

Wright, A.H. and A.A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Comstock Publishing Company, Inc., Ithaca, New York. xii + 640 pages.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
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In reply refer to:
81420-2008-F-0775

JAN 31 2008

Mr. Gene Fong
Federal Highway Administration
U. S. Department of Transportation
650 Capitol Mall, Suite 4-100
Sacramento, California 95814

Subject: Amendment to the Biological Opinion on the Effects of the Proposed Caldecott Tunnel Improvement Project on State Route 24 in Contra Costa and Alameda Counties, California on the Threatened California Red-Legged Frog, the Threatened Alameda Whipsnake, and Designated Critical Habitat for the Alameda Whipsnake (Caltrans EA 294900 and Service File No. 1-1-07-F-0292 and 1-1-07-F-0309)

Dear Mr. Fong:

This document amends the U. S. Fish and Wildlife Service's (Service) August 8, 2007, *Biological Opinion on the Effects of the Proposed Caldecott Improvement Project on State Route 24 in Contra Costa and Alameda Counties, California (EA 294900) on the Threatened California Red-Legged Frog, the Threatened Alameda Whipsnake, and Designated Critical Habitat for the Alameda Whipsnake (Service File Number: 1-1-07-F-0292)* for the effects of tunneling project on State Route 24 on the threatened California red-legged frog (*Rana aurora draytonii*) and the threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*). The August 8, 2007, biological opinion was also amended on August 17, 2007 (Service File Number: 1-1-07-F-0309). This amendment is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

On November 5, 2007, an Alameda whipsnake was observed actively foraging or possibly searching for a suitable rodent burrow in which to hibernate directly within the construction area of the proposed Nail Wall on the Fish Ramp Road Offramp Westbound State Route 24 in Contra Costa County, California. The Service issued a biological opinion to Caltrans on November 8, 2007, that authorized incidental take of this threatened species (81420-2008-F-0291).

The following changes are made to the August 8, 2007, biological opinion:

TAKE PRIDE IN AMERICA

1. Add the following to the Term and Condition section as 2q.

   In order to minimize the effects of the action on the Alameda whipsnake, the measures following Measure 4 in the Avoidance and Conservation Measure section of this biological opinion shall be implemented even if an individual Alameda whipsnake or shed skin of this listed animal is not observed during the surveys described in Measure 4.

This concludes the amendment to the formal consultation on the Caldecott Improvement Project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions regarding this amendment to the biological opinion for the Caldecott Improvement Project, please contact John Cleckler or Chris Nagano of my staff at (916) 414-6625.

Sincerely,

Chris Nagano

for Cay C. Goude
Assistant Field Supervisor

cc:
William R. Gray, Gray Bowen, Walnut Creek, California
Paul Maxwell, Contra Costa Transportation Authority, Pleasant Hill, California
Marcia Grefsrud, California Department of Fish and Game, Yountville, California
Janice Gan, California Department of Fish and Game, Yountville, California
Scott Wilson, California Department of Fish and Game, Yountville, California
Joe DiDonato, East Bay Regional Parks District, Oakland, California
Cheryl Davis, Margaret Gabil, California Department of Transportation, Oakland, California
Dale Jones, California Department of Transportation, Sacramento, California

STATE OF CALIFORNIA THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR
DEPARTMENT OF FISH AND GAME
BAY DELTA REGION
(707) 944-5520
Mailing address:
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
Street address:
7329 SILVERADO TRAIL
NAPA, CALIFORNIA 94558

Notification Number: 1600-2008-0339-3
Unnamed drainage, Contra Costa County

California Department of Transportation
Attn: Christina Ferraz
111 Grand Ave.
Oakland, CA 94623

PROJECT DESCRIPTION and PROJECT CONDITIONS

Description

The California Department of Transportation (Caltrans) proposes to construct a fourth bore of the State Route (SR) 24 Caldecott Tunnel located between Alameda and Contra Costa counties. The fourth bore would be located north of the existing three tunnels. This Streambed Alteration Agreement (Agreement) issued by the California Department of Fish and Game (the Department) authorizes work within an unnamed drainage on the east side of the tunnel at the location of the fourth bore. This drainage appears to be fed by groundwater seeps and supports riparian vegetation including willows and dogwood. The seep drainage and its associated 450 square feet (15 feet wide by 30 feet long) (.01 acre) of riparian vegetation will be permanently impacted by excavation and installation of a cut and cover tunnel. Construction is expected to occur between summer 2009 and February 2014.

Prior to riparian impacts, Caltrans will submit to the Department for approval, a riparian mitigation, monitoring and reporting plan to compensate for the loss of the seep and the riparian corridor that will occur as a result of the fourth bore construction.

Conditions

1. Each native or non-native riparian tree greater than 4 inches diameter-at-breast height that is removed or damaged, shall be replaced with native trees in a riparian area at a minimum 3:1 ratio. Temporarily impacted riparian understory shall be replaced at a 1:1 ratio.

2. Prior to riparian impacts, Caltrans shall submit to the Department for approval, a riparian mitigation, monitoring and reporting plan. The plan shall mitigate riparian impacts within the same watershed. The plan shall include a 5 year monitoring period with monitoring reports due on December 31, 2015 and December 31, 2017, and a final report due no later than December 31, 2018. If after five years the mitigation planting does not provide at least the same percent

cover as the impacted riparian vegetation, Caltrans shall submit for approval by the Department a new mitigation, monitoring, and reporting plan by December 31st 2018.

3. Environmentally Sensitive Area (ESA) fencing shall be installed to delineate the construction area and protect the soils and vegetation adjacent to the construction area.

KJM

4. If earthwork, clearing and grubbing, or vegetation trimming is scheduled during bird nesting season, February 15 ~~and~~ through August 15, pre-construction surveys shall be conducted by a qualified biologist for active bird nests. The surveys shall take place within 3 days prior to the commencement of work. If nesting birds are found a 50-foot radius buffer should be established around the nest, a 300-foot radius buffer in the case of hawks or owls. If a lapse in project-related work of 15 days or longer occurs, another survey will be required before project work can be reinitiated.

5. Erosion control measures shall be utilized throughout all phases of operation where sediment runoff from exposed slopes threatens to enter waterways. At no time shall silt laden runoff be allowed to enter the drainage or directed to where it may enter the drainage. Erosion control structures shall be monitored for effectiveness and shall be repaired or replaced as needed. Build up of soil behind the fence shall be removed promptly and any breaches or undermined areas repaired at once.

6. All exposed/disturbed areas and access points within the riparian zone left barren of vegetation as a result of the construction activities shall be restored by seeding with a blend of native and non-native erosion control grass seeds. Seeded areas shall be mulched. Erosion control with monofilament shall not be used.

7. The contractor shall not dump any litter or construction debris within the riparian zone. All such debris and waste shall be picked up daily and properly disposed of at an appropriate site.

8. This Agreement does not authorize the take of any state or federally listed species. Liability for any take or incidental take of such listed species remains the responsibility of Caltrans for the duration of the project. Any unauthorized take of such listed species may result in prosecution and nullification of the agreement.

9. In the event that the project scope, nature, or environmental impact is altered by the imposition of subsequent permit conditions by any local, state or federal regulatory authority Caltrans shall notify the Department of any imposed project modifications that interfere with compliance to Department conditions.

If Caltrans needs more time to complete the authorized activity, the work period may be extended on a day-to-day basis by contacting Melissa Escaron at (707) 339-0334 or the Yountville office at (707) 944-5520.

A copy of this Agreement must be provided to the contractor and all subcontractors who work within the stream zone and must be in their possession at the work site.

Department personnel or its agents may inspect the work site at any time.

Caltrans is liable for compliance with the terms of this Agreement, including violations committed by the contractors and/or subcontractors. The Department reserves the right to suspend construction activity described in this Agreement if the Department determines any of the following has occurred:

A). Failure to comply with any of the conditions of this Agreement

B). Information provided in support of the Agreement is determined by the Department to be inaccurate.

C). Information becomes available to the Department that was not known when preparing the original conditions of this Agreement (including, but not limited to, the occurrence of state or federally listed species in the area or risk to resources not previously observed)

D).The project as described in the Agreement has changed or conditions affecting fish and wildlife resources change.

Any violation of the terms of this Agreement may result in the project being stopped, a citation being issued, or charges being filed with the District Attorney. Contractors and subcontractors may also be liable for violating the conditions of this agreement.

Amendments and Extensions

Caltrans shall notify the Department before any modifications are made in the project plans submitted to the Department. Project modifications may require an amendment or a new notification.

This Agreement is transferable to subsequent owners of the project property by requesting an amendment.

To extend the Agreement beyond the expiration date, a written request or completed "Request to Extend Lake or Streambed Alteration Agreement" form, with an appropriate fee, must be submitted to the Department (1600 Program, Post Office Box 47, Yountville, California 94599) for consideration at least 30 days before the Agreement expiration date. An extension requires a fee. The Fee Schedule and Extension form can be obtained at HYPERLINK "http://www.dfg.ca.gov/habcon/1600/Forms.html" www.dfg.ca.gov/habcon/1600/Forms.html or by phone at (707) 944-5520. Extensions of the original Agreement are issued at the discretion of the Department.

To modify the project, a written request for an amendment or a completed "Request to Amend Lake or Streambed Alteration Agreement" form, with an appropriate fee, must be submitted to the Department (1600 Program, Post Office Box 47, Yountville, California 94599). An amendment requires a fee. The Fee Schedule and Amendment form can be obtained at HYPERLINK "http://www.dfg.ca.gov/habcon/1600/Forms.html" www.dfg.ca.gov/habcon/1600/Forms.html or by phone at (707) 944-5520. Amendments to the original Agreement are issued at the discretion of the Department.tc \l2 "To modify the project, a written request for an amendment must be submitted to the Department (1600 Program, Post

Office Box 47, Yountville, California 94599). The fee for an amendment is one-half (½) of the original fee. Amendments to the original Agreement are issued at the discretion of the Department.

Please note that you may not proceed with construction until your proposed project has undergone CEQA review and the Department signs the Agreement.

I, the undersigned, state that the above is the final description of the project I am submitting to the Department for CEQA review, leading to an Agreement, and agree to implement the conditions above required by the Department as part of that project. I will not proceed with this project until the Department signs the Agreement. I also understand that the CEQA review may result in the addition of measures to the project to avoid, minimize, or compensate for significant environmental impacts:

Applicant's name (print): CRISTINA FERRAZ

Applicant's signature: [signature]

Signed the 31st **day of** July**, 2008**

California Department of Fish and Game
Bay Delta Region
P.O. Box 47
Yountville, Ca, 94599

California Endangered Species Act
Incidental Take Permit No. 2081-2008-018-03

California Department of Transportation
Caldecott Improvement Project, State Route 24

Authority: This California Endangered Species Act (CESA) Incidental Take Permit (ITP) is issued by the Department of Fish and Game (DFG) pursuant to Fish and Game Code sections 2081(b) and 2081(c), and California Code of Regulations, title 14, subdivision 3, chapter 6, article 1, commencing with section 783. CESA prohibits the take[1] of any species of wildlife designated as an endangered, threatened, or candidate species[2] by the Fish and Game Commission. DFG, however, may authorize the take of such species by permit if the conditions set forth in Fish and Game Code sections 2081(b) and 2081(c) are met. (See also Cal. Code Regs., tit. 14, § 783.4.)

Permittee:	**California Department of Transportation**
Name and title of principal officer:	**Jeffrey Jensen, District Office Chief**
Contact person:	**Margaret Gabil, (510) 286-6222**
Mailing address:	**California Department of Transportation** **111 Grand Ave, Oakland, Ca 94623**

Effective Date and Expiration Date of ITP:
This ITP shall be executed in duplicate original form and shall become effective once a duplicate original is acknowledged by signature of the Permittee on the last page of the ITP and returned to DFG's Habitat Conservation Planning Branch at the address listed in the Notices section of this ITP. Unless renewed by DFG, this ITP's authorization to take the Covered Species shall expire on **December 31, 2013.**

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[1] Pursuant to Fish and Game Code section 86, "'Take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill."

[2] "Candidate species" are species of wildlife that have not yet been placed on the list of endangered species or the list of threatened species, but which are under formal consideration for listing pursuant to Fish and Game Code section 2074.2.

Project Location:
The Project site is located on State Route (SR) 24 at Post Mile (PM) 5.3/6.2 in Alameda and Contra Costa Counties.

Project Description:
The California Department of Transportation (Permittee) proposes to construct a fourth bore hole for the Caldecott Tunnel (Project) in an effort to reduce traffic congestion and improve safety. The existing Caldecott Tunnel consists of two bores constructed in 1937 and a third bore, north of the original two, built in 1964. The tunnel bores connect Alameda and Contra Costa counties via SR 24. The Project limits extend from the SR 24/SR 13 interchange in Alameda County to the SR 24/Gateway Boulevard interchange in Contra Costa County. The fourth bore will be built to the north of the existing third bore. The new tunnel will be 3,389 feet long. The width of the typical cross-section of the new roadway is 41.25 feet, consisting of two westbound 12-foot lanes, a 2-foot south shoulder, a 10-foot north shoulder, a 1.97-foot north curb, and a 3.28-foot south emergency walkway. .

On the west side of the tunnel, in Alameda County, traffic exiting the new bore will pass underneath the existing maintenance access bridge and conform to the existing freeway grade approximately 591 feet west of the existing tunnel portal. The Caldecott Lane off-ramp will be widened at the SR 24 exit to accommodate the proposed fourth bore. Additionally, the connector from westbound SR 24 to northbound SR 13 will be moved to provide increased westbound SR 24 weaving distance from 296 feet to 1267 feet between the Caldecott Lane on-ramp and SR 13 north connector. The eastbound mainline will be realigned just west of bores one and two to smooth out the proposed eastbound-only horizontal alignment. A minor widening at the intersection of Caldecott Lane and the Kay Overcrossing will provide a right-only turn lane to the Kay Overcrossing from eastbound Caldecott Lane.

At the east portal of the Caldecott Tunnel in Contra Costa County, the ramps on the north side of SR 24 at Fish Ranch Road will be slightly realigned to accommodate the proposed fourth bore.

The construction includes approximately 82 feet of cut-and-cover type tunnel at the west portal in Alameda County and at the east portal in Contra Costa County, as well as electrical substations and ventilation systems throughout the new tunnel. Noise barriers will also be constructed on the west side of the new tunnel in Alameda County. Existing utilities along the corridor, such as electrical and storm drains, may be relocated.

The proposed Project will require the construction of six permanent retaining walls along SR 24. Retaining wall number 1A (RW-1A) at the north side of the west portal cut in Alameda County will be about 45 feet long with a maximum height of approximately 18 feet.

Retaining wall 1B (RW-1B) at the north side of the west portal cut in Alameda County will be about 91 feet long with a maximum height of approximately 42 feet. Retaining wall 2 (RW-2) at the south side of the west portal cut in Alameda County will be 66 feet long with a maximum height of 26 feet. Retaining wall 3A (RW-3A) at the north side of the east portal cut in Contra Cost County will be approximately 939 feet long with a maximum height of 25 feet. Retaining wall 3B (RW-3B) on the east portal in Contra Cost County adjacent to Fish Ranch Road will be about 275 feet long with a maximum height of approximately 5 feet. Retaining wall 4 (RW-4) at the south side of the east portal in Contra Costa County cut will be 44 feet long with a maximum height of 25 feet.

A portal structure on the west side in Alameda County will be constructed on the cut-and-cover portion of the new tunnel. The portal structure will consist of a west wall that will be architecturally treated and a north and south retaining wall. An access road will be constructed to connect the portal structure to the existing road along the west side of the existing Operation Maintenance and Control (OMC) building.

Tunneling

The Caldecott Tunnel is classified as a weak rock tunnel based on the presence of generally very weak, weathered and fractured rock along most of the tunnel alignment. The tunneling method requires that work be performed at a minimum of a 24-hour per day, five-day per week basis to maintain stability of the excavation. The tunnel will be constructed using the New Austrian Tunneling Method (NATM), also known as the Sequential Excavation Method. It involves the excavation and support of several horizontal, underground openings (within the tunnel perimeter), known as drifts and benches, in a specified order. As the excavation progresses, a layer of shotcrete is immediately sprayed on the interior surface of the tunnel, and rock bolts are installed. NATM allows excavation of a stable opening in small increments.

Excavation is expected to be done using a roadheader, a mechanical boring device. The cutting head will be moved over the tunnel face to create a profile of any desired shape or size, as appropriate for the Project. The walls and rock exposed by the roadheader excavation will be inspected at regular intervals to analyze its condition and determine any additional ground support required. The spoil will be loaded onto a conveyor within the machine, discharging to a truck for removal to the surface. The Project will produce approximately 296,905 cubic yards of excavated material.

Cut-and-Cover

Cut-and-cover tunnel sections will be required adjacent to both the east and west portals due to the shallow cover at each end of the tunnel alignment. The cut-and-cover structure will be approximately 82 feet long at both the west and east portals.

The first step in constructing the cut-and-cover structure will be the installation of the temporary excavation support measures, which will be done in conjunction with the staging area development and construction of the adjacent retaining walls at the beginning of the Project. The temporary support walls will be pile supported with tiebacks or soil nail walls. During the majority of the fourth bore construction, the cut-and-cover zones will be used for portal access and staging into the mined tunnel reach of the new fourth bore. After the final lining is installed in the entire mined tunnel, the permanent cut-and-cover structures will be built. After completion of the final portal walls above the cut-and-cover structure, the area around the portal will be restored by grading and revegetation.

Staging Locations

Staging locations have been identified at each portal of the new tunnel. The west portal staging area is proposed to be adjacent to the existing west portal in Alameda County in the relatively flat area bounded by SR 24 and Caldecott Lane. The east portal staging area is located adjacent to the east portal in Contra Costa County in two relatively narrow parcels. The parcels are separated by an on-ramp to the SR 24 from Fish Ranch Road. A third parcel, bounded on either side by SR 24 immediately north of the second and third bore portals, will also be made available to contractors. The staging areas will be used for temporary storage of heavy construction equipment (i.e. a roadheader, hydraulic excavator or backhoe, rubber tired dump trucks, front-end loader, load-haul-dump, drill jumbo, etc.) and other various construction needs, such as shotcrete, batch plants, groundwater retention facilities, warehouses, equipment maintenance shops, muck handling and stockpile areas, and field offices. The staging areas must also accommodate other temporary ancillary facilities such as ventilation equipment to assure an adequate supply of fresh air in the new tunnel.

Storm Water and Best Management Practices

On the west side of the Caldecott Tunnel in Alameda county, storm water run-off is diverted into a 108 inch structural steel plate pipe culvert that parallels Temescal Creek and discharges into the San Francisco Bay. A biofiltration system, including biofiltration swales and strips, is being considered for the west side of the tunnel in Alameda County in the vicinity of the SR 24/13 interchange. On the west side of the tunnel in Contra Costa County, storm water run-off is directed to a culverted section of San Pablo Creek, which runs into San Pablo Reservoir. The net effect of volume and velocity changes will be minimized with the use of temporary construction site Best Management Practices (BMPs), permanent design pollution BMPs, and permanent treatment BMPs. Biofiltration systems are proposed in the vicinity of the Gateway Boulevard off-ramp.

Grading of existing slopes will be required. However, the use of retaining walls, especially in excavation areas, will minimize the amount of grading required. Temporary fences, construction entrance/exit gates, and temporary soil stabilizers are some of the temporary erosion and water pollution control measures that will be utilized in combination to prevent and minimize soil erosion and sediment discharges during construction.

Restoration of Temporarily Affected Areas

After the completion of construction, temporarily affected areas will be stabilized with the use of erosion control measures such as fiber rolls, compost, stabilizing emulsion and straw. These areas will be seeded with native seed mix including Spanish clover (*Lotus purshianus*), California brome (*Bromus carinatus*), blue wildry (*Elymus glaucus*), purple needlegrass (*Nassella pulchra*), small flowered needlegrass (*Nassella lepida*), red fescue (*Festuca rubra*), and pine bluegrass (*Poa secunda*). Use of native seed mix to reseed areas with annual grasslands temporarily affected by Project related construction activities is expected to improve these vegetative communities.

Construction Stages

Construction will be done in three stages. Stage 1 involves:

- Constructing staging areas at the east and west portals
- Grading for the portal cuts
- Constructing retaining walls at each portal
- Installing additional slope support as required
- Constructing a temporary sound wall along Caldecott Lane
- Relocating the westbound SR 24 to northbound SR 13 connector ramp
- Constructing the right turn lane from eastbound Caldecott Lane to the Kay Overcrossing (summer 2009 to fall 2009)

Stage 2 will occur in two phases:

Stage 2, Phase 1 involves:

- Excavating tunnel and cross passages
- Constructing final tunnel lining
- Constructing ventilation
- Installing lighting and control systems
- Constructing portals and electrical substations
- Construction of the eastbound and westbound on-ramps at Fish Ranch Road (fall 2009 to fall 2012)

Stage 2, Phase 2 involves:

- Finalizing the retaining wall and portals

- Constructing the sound wall at Caldecott Lane
- Preparing the portal roadway approaches
- Widening the westbound Caldecott Lane off-ramp to accommodate the fourth bore alignment (fall 2009 to winter 2009)

Stage 3 involves:

- Opening the fourth bore to traffic
- Constructing the median concrete barrier on both sides of the tunnel
- Providing pavement overlay of the Caldecott Lane on- and off-ramps
- Realigning, paving, and striping the eastbound approach to the second bore

Project Schedule

Project construction is scheduled to begin in summer 2009 and is expected to be competed in winter 2013. Tunnel construction is expected to begin in fall 2009. Once begun, tunneling will continue for 3 years.

Covered Species:

This ITP covers the following species:

Name	**Status**[3]
Reptile	
1. Alameda whipsnake (*Masticophis lateralis*)	Threatened

This species and only this species is hereinafter referred to as "Covered Species."

Impacts to Covered Species:

Implementation of the Project will result in approximately 12.07 acres of permanent and temporary impacts to habitat that could support the Covered Species. The Covered Species may be incidentally taken as a result of capture and relocation of individuals, mortality due to ground- or vegetation-disturbing construction activities, Project-related vehicle traffic and staging activities, and crushing or entombment during excavation and fill activities. Impacts of the proposed taking on the Covered Species may also include adverse impacts to the Covered Species related to stress resulting from capture and relocation, temporal habitat losses, reduction of available dispersal and foraging habitat, and the Project's incremental contribution to cumulative impacts.

[3] Refers to status under CESA. Under CESA, a species may be on the list of endangered species, the list of threatened species, or the list of candidate species. All other species are "unlisted."

Incidental Take Authorization:
DFG authorizes the Permittee, its employees, contractors, and agents to take Covered Species incidentally in carrying out the Project, subject to the limitations described in this section and the Conditions of Approval identified below. This ITP does not authorize take of Covered Species from activities outside the scope of the Project as described above, take of Covered Species resulting from violation of this ITP, or intentional take of Covered Species, except for capture and relocation of Covered Species as authorized by this ITP.

Conditions of Approval:
Unless specified otherwise, the following measures shall pertain to all ground- or vegetation-disturbing activities within the Project construction boundaries, including areas used for ingress and egress routes during construction. DFG's issuance of this ITP and the Permittee's authorization to take the Covered Species are subject to the Permittee's compliance with and implementation of the following conditions of approval:

1. The Permittee shall comply with all applicable state, federal, and local laws in existence on the effective date of this ITP or adopted thereafter.

2. The Permittee shall implement and adhere to the mitigation measures in the Biological Resources section of the Environmental Impact Report (SCH # 2002112068) adopted on October 12, 2007 by the lead agency, California Department of Transportation, for the Caldecott Improvement Project.

3. The Permittee shall fully implement and adhere to the conditions of this ITP within the time frames set forth in Attachment 1, the Mitigation Monitoring and Reporting Program (MMRP).

4. **General Provisions:**

4.1. Before initiating ground- or vegetation-disturbing Project activities, the Permittee shall designate a representative (Designated Representative) responsible for communicating with DFG and overseeing compliance with this ITP. The Permittee shall notify DFG, in writing, prior to commencement of ground- or vegetation-disturbing activities, of the representative's name, business address, and contact information, and shall notify DFG in writing if a substitute representative is designated.

4.2. At least 30 days before initiating ground- or vegetation-disturbing activities, the Permittee shall submit to DFG for approval, in writing, the name, qualifications,

business address, and contact information for a biological monitor (Designated Biologist). The Designated Biologist shall be knowledgeable and experienced in the biology and natural history of the Covered Species and shall be responsible for monitoring construction and/or ground- or vegetation-disturbing activities in areas of Covered Species habitat to help avoid the take of individual animals and to minimize habitat disturbance. The Permittee shall obtain DFG approval of the Designated Biologist prior to the commencement of Project activities.

4.3. To ensure compliance with the Conditions of Approval of this ITP, the Designated Biologist shall have authority to immediately stop any activity that is not in compliance with this ITP, and/or order any reasonable measure to avoid the take of an individual of the Covered Species.

4.4. The Permittee shall conduct an education program for all persons employed on the Project prior to their performing work on-site. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species, information about the distribution and habitat needs of the Covered Species, sensitivity of the Covered Species to human activities, its status under CESA including legal protection, recovery efforts, penalties for violations and Project-specific protective measures described in this ITP. Interpretation shall be provided for non-English speaking workers, and the same instruction shall be provided for any new workers prior to their performing work on-site. Copies of this ITP shall be maintained at the worksite. The Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry on-site. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. These forms shall be filed at the worksite offices and be available to DFG upon request.

4.5. The Permittee shall initiate a trash abatement program during pre-construction phases of the Project and continue the program throughout the duration of the Project. Trash and food items shall be contained in closed (raven-proof) containers and removed regularly (at least once a week) to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.

4.6. The Permittee shall implement dust control measures during Project activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist.

4.7. The Permittee shall prohibit firearms and domestic dogs from the Project site and site access routes during construction and development of the Project, except those in the

possession of authorized security personnel or local, State, or Federal law enforcement officials.

4.8. To minimize the disturbance of Covered Species habitat, the Permittee shall clearly delineate potential Covered Species habitat, which is shown on Attachment 4, within the Project limits with high visibility Environmentally Sensitive Area (ESA) fencing..

4.9. The Permittee shall install exclusion fencing to exclude the Covered Species from construction areas within potential Covered Species habitat (see Attachment 4). The exclusion fencing shall consist of 4 x 8 foot stand board or plywood panels set lengthwise, supported by metal fence posts and buried 6 inches below grade. This fencing will be installed at an angle, 15 to 20 degrees away from the interior work area. The exclusion fencing will be placed immediately outside of the ESA fencing.

4.10. Project-related personnel shall access the Project site during construction and development activities using existing routes, and shall not cross Covered Species habitat outside of the Project site. Project-related vehicle traffic shall be restricted to established roads, staging, and parking areas. Vehicle speeds shall not exceed 20 mph in order to avoid Covered Species on or traversing the roads. If construction of off-site routes of travel will be required, the Permittee shall contact DFG prior to carrying out such an activity. DFG may require amendment of this ITP if additional take of Covered Species may result from Project modification.

4.11. The Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project site using, to the extent possible, previously disturbed areas. Additionally, the Permittee shall not use or cross Covered Species habitat outside of the marked Project boundaries unless specifically provided for in this ITP.

4.12. The Permittee shall immediately stop/repair and clean up any fuel or hazardous waste leaks or spills on the Project site during construction and development activities at the time of occurrence. The Permittee shall exclude the storage and handling of hazardous materials from the construction zone and shall properly contain and dispose of any unused or leftover hazardous products off-site.

4.13. The Permittee shall provide DFG staff with reasonable access to the Project site and mitigation lands under its control, and shall otherwise fully cooperate with DFG efforts to verify compliance with or effectiveness of mitigation measures set forth in the ITP. Neither the Designated Biologist nor DFG shall be liable for any costs incurred in complying with the Conditions of Approval, including cease-work orders

issued by DFG.

4.14. Use of erosion control materials potentially harmful to Covered Species, such as mono-filament netting (erosion control matting) or similar material, shall not be used in potential Covered Species' habitat.

4.15. Upon Project completion, the Permittee shall remove from the Project site and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.

4.16. Notwithstanding any expiration date on this ITP's take authorization, the Permittee's obligations under this ITP do not end until DFG accepts the Final Mitigation Report (described in Condition 5.6) as complete.

5. Monitoring, Notification and Reporting Provisions:

5.1. The Permittee shall notify DFG fourteen (14) calendar days before initiating ground- or vegetation-disturbing activities, and shall document compliance with all pre-Project Conditions of Approval before initiating ground- or vegetation-disturbing activities.

5.2. The Permittee shall immediately notify DFG in writing if it determines that it is not in compliance with any condition of approval of this ITP, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods indicated in this ITP and/or the MMRP. The Permittee shall report any non-compliance during the construction phase to DFG within 24 hours.

5.3. Monthly Report: The Designated Biologist shall be on-site weekly while construction and/or surface-disturbing activities are taking place to: 1) minimize take of the Covered Species, 2) check for compliance with all mitigation and avoidance measures, and 3) check all exclusion zones to ensure that ESA and exclusion fencing is intact and that human activities are restricted to outside of these protective zones. The Designated Biologist shall also inspect material storage areas that have potential to provide retreat sites for Covered Species. These inspections shall be compiled into Monthly Compliance Reports and submitted to DFG's Regional Office listed in the Notices section of this ITP or via e-mail to DFG's Regional Representative at mescaron@dfg.ca.gov. DFG may, at any time, increase the timing and number of compliance inspections and reports required under this provision, depending upon the results of previous compliance inspections (see Condition 5.4).

5.4. All observations of Covered Species and their sign, oversight activities, verifications, compliance inspections, surveys, monitoring, and records required by this ITP shall be reported in writing to DFG by the Project Representative or Designated Biologist. The Permittee shall submit reports of these activities to DFG in the next Monthly Compliance Report. DFG may change this condition at any time to require additional reports. If DFG determines the reporting schedule is inadequate, DFG will notify the Permittee by letter of the new reporting schedule.

5.5. Annual Report: The Permittee shall provide DFG with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of the ITP and continuing until DFG accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: 1) a general description of the status of the Project site and construction activities, including actual or projected completion dates, if known; 2) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; and 3) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and compensating for Project impacts.

5.6. Final Mitigation Report: No later than 45 days after completion of the Project, including completion of all mitigation measures, the Permittee shall provide DFG with a Final Mitigation Report. The Final Mitigation Report shall be prepared by the Designated Biologist and shall include, at a minimum: 1) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; 2) all available information about Project-related incidental take of the Covered Species; 3) information about other Project impacts on the Covered Species; 4) construction dates; 5) an assessment of the effectiveness of the ITP's Conditions of Approval in minimizing and compensating for Project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the Covered Species; and 7) any other pertinent information, including the level of take of the Covered Species associated with the Project.

5.7. If a Covered Species is killed by Project-related activities during construction, or if a Covered Species is otherwise found dead, the Designated Biologist shall immediately notify DFG Regional's Representative at (707) 339-0334, and provide information on the location, species, number of animals injured or killed, and the ITP Number. Following the initial notification, the Permittee shall send DFG a written report within two (2) calendar days. The report will include the date, time and location of the finding or incident, location of the carcass, and if possible provide a photograph, cause of

death, and any other pertinent information.

6. **Take Avoidance and Minimization Measures:**
Take avoidance is the first priority for Covered Species protection. The second priority is the relocation of Covered Species that are discovered within the work area, both prior to ground- or vegetation-disturbing activities and throughout the Project construction period. The following conditions describe activities that are intended to minimize take of Covered Species:

6.1. If a Covered Species is found on the Project site the Designated Biologist will capture the individual and remove it from the construction zone for immediate release in the closest suitable habitat. The Designated Representative shall notify DFG of the incident immediately, or no later than noon on the next business day if the incident occurs outside of normal business hours. Notification to DFG shall be via telephone or email, followed by a written incident report. Notification shall include the date, time, location and circumstances of the incident, the name of the party that actually relocated the animal, and the location (including GPS coordinates) where the individual was moved.

6.2. If a Covered Species is injured as a result of Project-related activities, it shall be immediately taken to a DFG approved wildlife rehabilitation or veterinary facility. The Permittee shall identify the facility prior to the start of ground- or vegetation-disturbing activities. The Permittee shall bear any costs associated with the care or treatment of such injured Covered Species. The Permittee shall notify DFG immediately unless the incident occurs outside of normal business hours, in which case the Permittee shall notify DFG no later than noon on the next business day. Notification to DFG shall be via telephone or email, followed by a written incident report. Notification shall include the date, time, location and circumstances of the incident, and the name of the facility where the animal was taken.

6.3. The Designated Biologist shall monitor for and clear the area of Covered Species during the installation of the ESA and exclusion fencing.

Compensation for Take:

7. **Habitat Management Land Acquisition and Funding Assurances:**
Based on an analysis of the available Project-related information, DFG has determined permanent protection of compensatory habitat is a necessary to fully mitigate the impacts of the taking on the Covered Species caused by the Project. The required compensation identified in this condition is based on factors including an assessment of the quality of the

habitat at the Project site, the effect of loss of use in the temporarily impacted areas, the anticipated effectiveness of this ITP's minimization measures, and DFG's estimate of the acreage required to provide for adequate biological carrying capacity at a replacement location. The Permittee shall satisfy this requirement by complying with *both* Conditions 7.1 and 7.2, as follows:

7.1. Prior to initiating ground- or vegetation-disturbing Project activities, or no later than 18 months from the start of ground- or vegetation-disturbing activities if funding assurances are provided in the form described in Condition 8 below, the Permittee shall acquire and permanently preserve 36 acres of Habitat Management Lands (HM Lands) for the Covered Species. The Permittee has purchased 36 credits at the Ohlone Preserve Conservation Bank in Alameda County as a means of satisfying this Condition; the proof of purchase of the credits is attached to this ITP (Attachment 5).

7.2. Prior to initiating ground- or vegetation-disturbing Project activities, or no later than 18 months from the start of ground- or vegetation-disturbing activities if funding assurances are provided in the form described in Condition 8 below, the Permittee shall acquire and permanently preserve 2.85 acres of HM Lands outside the Ohlone Preserve Conservation Bank. These HM Lands shall be located in Alameda or Contra Costa County north of SR 580, west of SR 680 and south of SR 4, or west of SR 680 and south of SR 580, or north of SR 580 and east of SR 680. A minimum of six months prior to acquisition of the HM Lands, the Permittee shall submit to DFG for approval a formal Proposed Lands for Acquisition Form (see Attachment 2B) identifying the land to be purchased as mitigation for the Project's impacts on Covered Species. As part of this condition, the Permittee shall:

7.2.1. Transfer fee title or a conservation easement to the HM Lands to DFG under terms approved by DFG. Alternatively, a DFG-approved third-party agency or non-profit organization, qualified pursuant to California Government Code section 65965, may hold fee title or a conservation easement over the HM Lands. In the event an approved third-party holds title, a conservation easement shall be recorded in favor of DFG in a form approved by DFG. In the event an approved third-party holds a conservation easement over the HM Lands, DFG shall be named third party beneficiary;

7.2.2. Provide a recent preliminary title report, initial hazardous materials survey report, and other necessary documents (see Attachment 2A and 2B). All documents conveying the HM Lands and all conditions of title are subject to the approval of DFG, the Wildlife Conservation Board and, if applicable, the Department of General Services;

7.2.3. Provide for the initial site protection and enhancement of HM Lands, as approved by DFG, once the Permittee identifies the HM Lands.

7.2.4. Prepare a Property Analysis Record (PAR), once the HM Lands have been identified, to determine the appropriate first year management costs and long-term endowment amount to fund the in-perpetuity management of the 2.85 acres of required HM Lands. The Permittee shall provide the required endowment to DFG after DFG reviews and approves the PAR. Interest from the endowment amount shall be available for: reinvestment in the principal, administrative fees, law enforcement measures, and the long-term operation, management, and protection of the HM Lands. Monies received by DFG pursuant to this Condition shall be deposited in a special deposit account established pursuant to Fish and Game Code section 13014. Alternatively, endowment funds may be held by a DFG-approved third-party endowment manager. DFG or the approved third-party may pool the endowment with other endowments for the operation, management and protection of HM Lands for local populations of the Covered Species;

7.2.5. Reimburse DFG for reasonable expenses incurred during title and documentation review, expenses incurred from other state agency reviews, and overhead related to transfer of HM Lands to DFG. DFG estimates that this Project will create an additional cost to DFG of no more than $3,000 for every fee title deed or easement processed.

8. Funding Assurance:

The Permittee may proceed with ground- or vegetation-disturbing activities before completing all of the required mitigation (including acquisition of HM Lands), monitoring, and reporting activities, only if it ensures funding to complete those activities. Ensuring funding means providing to DFG, prior to commencing ground- or vegetation disturbing activities or within 30 days after the effective date of this ITP, whichever occurs first, written documentation that the Permittee has allocated sufficient funds, acceptable to and approved by DFG, in the Expenditure Authorization for the Project, to ensure implementation of the Conditions of Approval of this ITP. Such written documentation shall identify that $175,000.00 has been allocated in the Expenditure Authorization for this purpose and shall display, in itemized form, at a minimum, the estimated costs of implementing the ITP's mitigation (including land acquisition, initial enhancement, and endowment), monitoring, and reporting requirements. The written documentation submitted by the Permittee to satisfy this Condition shall be on official letterhead, signed by both the District Deputy Director of Project Management and the District Deputy Director of Environmental Planning and Engineering, and shall include a statement that

the funds identified have been allocated specifically for the purpose of fulfilling the Permittee's mitigation obligations associated with this ITP, and that such funds will not be redirected for other Project purposes. Notwithstanding the provision of funding assurances described in this Condition, the Permittee must complete the required acquisition, protection, and transfer of all HM Lands no later than 18 months after the start of ground-disturbing activities.

Amendment:
This ITP may be amended, without the concurrence of the Permittee, if DFG determines that continued implementation of the Project under existing ITP conditions would jeopardize the continued existence of a Covered Species, or that Project changes or changed biological conditions necessitate an ITP amendment to ensure that impacts to the Covered Species are minimized and fully mitigated. DFG may also amend the ITP at any time without the concurrence of the Permittee as required by law.

Stop-Work Order:
DFG may issue the Permittee a written stop-work order to suspend any activity covered by this ITP for an initial period of up to 25 days to prevent or remedy a violation of ITP conditions (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The Permittee shall comply with the stop-work order immediately upon receipt thereof. DFG may extend a stop-work order under this provision for a period not to exceed 25 additional days, upon written notice to the Permittee. DFG shall commence the formal suspension process pursuant to California Code of Regulations, Title 14, section 783.7 within five working days of issuing a stop-work order.

Compliance with Other Laws:
This ITP contains DFG's requirements for the Project pursuant to CESA. This ITP does not necessarily create an entitlement to proceed with the Project. The Permittee is responsible for complying with all other applicable state, federal, and local laws.

Notices:
The Permittee shall deliver the fully executed duplicate original ITP by first class mail or overnight delivery to the following address:

Habitat Conservation Planning Branch
Attention: CESA Permitting Program
California Department of Fish and Game
1416 Ninth Street, Suite 1260
Sacramento, CA 95814

Written notices, reports and other communications relating to this ITP shall be delivered to DFG by first class mail at the following addresses, or at addresses DFG may subsequently provide the Permittee. Notices, reports, and other communications should reference the Project name, the Permittee, and the ITP Number (2081-2008-018-03) in a cover letter and on any other associated documents.

Original cover with attachment(s) to:

Charles Armor, Regional Manager
Bay Delta Region
California Department of Fish and Game
P.O Box 47
Yountville, Ca 94599
Telephone (707) 944-5500
Fax (707) 944-5563

Copy of cover without attachment(s) to:

Office of the General Counsel
California Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

And:

Habitat Conservation Planning Branch
California Department of Fish and Game
1416 Ninth Street, Suite 1260
Sacramento, CA 95814

Unless the Permittee is notified otherwise, DFG's Regional Representative for purposes of addressing issues that arise during implementation of ITP conditions is:

Melissa Escaron
California Department of Fish and Game
P.O. Box 47
Yountville, Ca 94599
Telephone (707) 339-0334
Fax (707) 944-5595

Compliance with the California Environmental Quality Act:
DFG's issuance of this ITP is subject to the California Environmental Quality Act, Public Resources Code, section 21000 et seq. (CEQA). DFG is a responsible agency under CEQA

with respect to this ITP because of prior environmental review of the Project by the Permittee as lead agency. (See generally Pub. Resources Code, §§ 21067, 21069.) The Permittee's prior lead agency review of the Project is set forth in the August 2007 EIR, which the Permittee certified on October 12, 2007, in connection with its approval of the Project. At the time the Permittee certified the EIR as lead agency and approved the Project, it also adopted all mitigation measures identified in the EIR as conditions of Project approval.

In fulfilling its obligations as a responsible agency, DFG's obligations under CEQA are more limited than the lead agency. (See CEQA Guidelines, § 15096, subds. (a), (f).)[4] DFG, in particular, is responsible for considering only the effects of those activities involved in the Project which it is required by law to carry out or approve, and mitigating or avoiding only the direct or indirect environmental effects of those parts of the Project which it decides to carry out, finance, or approve. (Pub. Resources Code, § 21002.1, subd. (d); CEQA Guidelines, §§ 15041, subd. (b), 15096, subds. (f)-(g).) Accordingly, because DFG's exercise of discretion is limited to issuance of the ITP, DFG is responsible for considering only the environmental effects that fall within its permitting authority under CESA.

This ITP, along with DFG's related CEQA findings, which are available as a separate document, document DFG's consideration of the Permittee's lead agency EIR for the Project and the environmental effects associated with issuance of this ITP. (CEQA Guidelines, § 15096, subd. (f).) DFG finds that issuance of this ITP will not result in any previously undisclosed potentially significant effects on the environment or a substantial increase in the severity of any potentially significant environmental effects previously disclosed by the lead agency. Furthermore, to the extent the potential for such effects exists, DFG finds adherence to and implementation of the Conditions of Project Approval adopted by the lead agency, as well as adherence to and implementation of the Conditions of Approval imposed by DFG through the issuance of this ITP, will avoid or reduce to below a level of significance any such potential effects. DFG consequently finds that issuance of this ITP will not result in any significant, adverse impacts on the environment.

CESA Findings:
These findings are intended to document DFG's compliance with the specific findings requirements set forth in CESA and related regulations. (Fish & G. Code, 2081, subs. (b)-(c); Cal. Code Regs., tit. 14, §§ 783.4, subds. (a)-(b), 783.5, subd. (c)(2).)

DFG finds that the issuance of this ITP complies and is consistent with the criteria governing the issuance of ITPs under CESA:

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[4] The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

(1) Take of Covered Species as defined in the ITP will be incidental to the otherwise lawful activities covered under the ITP;

(2) Impacts of the taking of the Covered Species will be minimized and fully mitigated through the implementation of measures required by this ITP and as described in the Mitigation Monitoring and Reporting Program (MMRP). Measures include: 1) Weekly biological monitoring 2) Monthly Compliance Reports; 3) establishment of exclusion areas; 4) worker education; and 5) permanent habitat protection. DFG evaluated the quality of the habitat on the Project site, the scope and extent of direct impacts, the scope and extent of indirect impacts, and other relevant information available to DFG or provided by the Permittee. Based on this evaluation, DFG determined that the protection and management in perpetuity of 38.85 acres of compensatory habitat, that is contiguous with other protected Covered Species habitat and/or is of higher quality than the habitat being destroyed by the Project, along with the minimization, monitoring, reporting, and funding requirements of this ITP, meet the CESA issuance criteria;

(3) The take avoidance and mitigation measures required pursuant to the conditions of this ITP and its attachments are roughly proportional in extent to the impact of the Permittee's take;

(4) The measures required by this ITP maintain the Permittee's objectives to the greatest extent possible;

(5) All required measures are capable of successful implementation;

(6) The ITP is consistent with any regulations adopted pursuant to Fish and Game Code sections 2112 and 2114;

(7) The Permittee has ensured adequate funding to implement the measures required by the ITP as well as for monitoring compliance with, and the effectiveness of, those measures for the Project; and

(8) Issuance of the ITP will not jeopardize the continued existence of the Covered Species based on the best scientific and other information reasonably available, and this finding includes consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of (a) known population trends; (b) known threats to the species; and (c) reasonably foreseeable impacts on the species from other related projects and activities. Moreover, DFG's finding is

based, in part, on DFG's express authority to amend the terms and conditions of the ITP without concurrence of the Permittee as necessary to avoid jeopardy and as required by law.

Attachments:

ATTACHMENT 1	Mitigation Monitoring and Reporting Program
ATTACHMENT 2A,2B	Habitat Management Lands Checklist; PLFAF Form
ATTACHMENT 3	Mitigation Payment Transmittal Form
ATTACHMENT 4	Potential Habitat Map
ATTACHMENT 5	Bill of Sale for Ohlone Preserve Conservation Bank

ISSUED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME

on DEC 1 5 2008.

Charles Armor, Regional Manager
BAY DELTA REGION

APPROVED AS TO FORM:

John H. Mattox, Senior Staff Counsel
Lead Counsel for CESA Permitting

ACKNOWLEDGMENT

The undersigned: 1) warrants that he or she is acting as a duly authorized representative of the Permittee, 2) acknowledges receipt of this ITP, and 3) agrees on behalf of the Permittee to comply with all terms and conditions of the ITP.

By: _____ Date: 12/23/08

Printed Name: Jeffrey G. Jensen Title: Office Chief

Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND GAME
MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)
CALIFORNIA ENDANGERED SPECIES ACT

INCIDENTAL TAKE PERMIT NO. 2081-2008-018-03

PERMITTEE: **California Department of Transportation**

PROJECT: **Caldecott Improvement Project**

PURPOSE OF THE MMRP

The purpose of the MMRP is to ensure that the impact minimization and mitigation measures required by the Department of Fish and Game (DFG) for the above-referenced Project are properly implemented, and thereby to ensure compliance with section 2081(b) of the Fish and Game Code and section 21081.6 of the Public Resources Code. A table summarizing the mitigation measures required by DFG is attached. This table is a tool for use in monitoring and reporting on implementation of mitigation measures, but the descriptions in the table do not supersede the mitigation measures set forth in the California Incidental Take Permit (ITP) and in attachments to the ITP, and the omission of a permit requirement from the attached table does not relieve the Permittee of the obligation to ensure the requirement is performed.

OBLIGATIONS OF PERMITTEE

Mitigation measures must be implemented within the time periods indicated in the table that appears below. Permittee has the primary responsibility for monitoring compliance of all mitigation measures and for reporting to DFG on the progress in implementing those measures. These monitoring and reporting requirements are set forth in the ITP itself and are summarized at the front of the attached table.

VERIFICATION OF COMPLIANCE, EFFECTIVENESS

DFG may, at its sole discretion, verify compliance with any mitigation measure or independently assess the effectiveness of any mitigation measure.

TABLE OF MITIGATION MEASURES

The following items are identified for each mitigation measure: Mitigation Measure, Source, Implementation Schedule, Responsible Party, and Status/Date/Initials. The Mitigation Measure column summarizes the mitigation requirements of the ITP. The Source column identifies the ITP document that sets forth the mitigation measure. The Implementation Schedule column shows the date or phase when each mitigation measure will be implemented. The Responsible Party column identifies the person or agency that is primarily responsible for implementing the mitigation measure. The Status/Date/Initials column shall be completed by the Permittee during preparation of each Status Report and the Final Mitigation Report, and must identify the implementation status of each mitigation measure, the date that status was determined, and the initials of the person determining the status.

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
BEFORE DISTURBING SOIL OR VEGETATION					
1	Before initiating ground- or vegetation-disturbing activities, Permittee shall designate a representative (Designated Representative) responsible for communications with DFG and overseeing compliance with this ITP. Permittee shall notify DFG in writing prior to commencement of ground- or vegetation-disturbing activities of the representative's name, business address, and contact information, and shall notify DFG in writing if a substitute representative is designated.	ITP Condition # 4.1	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
2	At least 30 days before initiating ground- or vegetation-disturbing activities, Permittee shall submit to DFG in writing the name, qualifications, business address, and contact information for a biological monitor (Designated Biologist). The Designated Biologist shall be knowledgeable and experienced in the biology and naturally history of the Covered Species and will be responsible for monitoring construction and/or ground- or vegetation-disturbing activities in areas of Covered Species' habitat to help avoid the take of individual animals and to minimize habitat disturbance. The Permittee must obtain DFG approval of the Designated Biologist prior to the commencement of Project activities.	ITP Condition # 4.2	Before commencing ground- or vegetation-disturbing activities	Permittee	
3	Permittee shall conduct an education program for all persons employed on the Project prior to their performing work on-site. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species, information about the distribution and habitat needs of the Covered Species, sensitivity of the Covered Species to human activities, its status under CESA including legal protection, recovery efforts, penalties for violations and Project-specific protective measures described in this ITP. Interpretation shall be provided for non-English speaking workers, and the same instruction shall be provided for any new workers prior to their performing work on-site. Copies of this ITP shall be maintained at the worksite. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry on-site. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. These forms shall be filed at the worksite offices and be available to DFG upon request.	ITP Condition # 4.4	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
4	Permittee shall initiate a trash abatement program during pre-construction phases of the Project and continue the program throughout the duration of the Project. Trash and food items shall be contained in closed (raven-proof) containers and removed regularly (at least once a week) to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.	ITP Condition # 4.5	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
5	Permittee shall implement dust control measures during Project activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist.	ITP Condition # 4.6	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
6	Permittee shall clearly delineate potential Covered Species habitat within the Project limits with high visibility Environmentally Sensitive Area (ESA) fencing to minimize the disturbance of Covered Species habitat.	ITP Condition # 4.8	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
7	Permittee shall install exclusion fencing to exclude the Covered Species from construction areas within potential Covered Species habitat (Attachment 4 of the ITP). The exclusion fencing shall consist of 4x8 foot stand board or plywood panels set lengthwise and supported by metal fence posts and buried 6 inches below grade. This fencing will be installed at an angle15 to 20 degrees away from the interior work area. The exclusion fencing will be placed immediately outside of the high visibility fencing.	ITP Condition # 4.9	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
8	Permittee shall notify DFG fourteen (14) calendar days before initiating ground- or vegetation-disturbing activities and shall document compliance with all pre-Project Conditions of Approval before initiating ground- or vegetation-disturbing activities.	ITP Condition # 5.1	Before commencing ground- or vegetation-disturbing activities	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
9	Prior to initiating ground- or vegetation-disturbing Project activities, or no later than 18 months from the start of ground- or vegetation-disturbing activities if funding assurances are provided in the form described in Condition 8 below, the Permittee shall acquire and permanently preserve 36 acres of Habitat Management Lands (HM Lands) for the Covered Species. The Permittee has purchased 36 credits at the Ohlone Preserve Conservation Bank in Alameda County as a means of satisfying this Condition; the proof of purchase of the credits is attached to this ITP (Attachment 5), AND Prior to initiating ground- or vegetation-disturbing Project activities, or no later than 18 months from the start of ground- or vegetation-disturbing activities if funding assurances are provided in the form described in Condition 8 below, the Permittee shall acquire and permanently preserve 2.85 acres of HM Lands outside the Ohlone Preserve Conservation Bank. These HM Lands shall be located in Alameda or Contra Costa County north of SR 580, west of SR 680 and south of SR 4, or west of SR 680 and south of SR 580, or north of SR 580 and east of SR 680. A minimum of six months prior to acquisition of the HM Lands, the Permittee shall submit to DFG for approval a formal Proposed Lands for Acquisition Form (see Attachment 2B of the ITP) identifying the land to be purchased as mitigation for the Project's impacts on Covered Species. HM lands shall be transferred to DFG in accordance with Condition 7.2 of the ITP.	ITP Conditions # 7.1, # 7.2	Before commencing ground- or vegetation-disturbing activities (or within 18 months of issuance of the ITP if Security is provided)	Permittee	
10	Permittee shall provide for the initial protection and enhancement of the HM Lands and shall provide an endowment for long-term management of the HM Lands in accordance with Condition 7.2.3 and 7.2.4 of the ITP.	ITP Conditions # 7.2.3, # 7.2.4	Before commencing ground- or vegetation-disturbing activities (or within 18 months of issuance of the ITP if Security is provided)	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
11	The Permittee may proceed with ground- or vegetation-disturbing activities before completing all of the required mitigation (including acquisition of HM Lands), monitoring, and reporting activities only if it ensures funding to complete those activities by providing to DFG prior to commencing ground- or vegetation disturbing activities or within 30 days after the effective date of this ITP, whichever occurs first, written documentation that the Permittee has allocated sufficient funds, acceptable to and approved by DFG, in the Expenditure Authorization for the Project to ensure implementation of the Conditions of Approval of this ITP. The written documentation shall identify that $175,000.00 has been allocated in the Expenditure Authorization for this purpose and shall display in itemized form, at a minimum, the estimated costs of implementing the ITP's mitigation (including land acquisition, initial enhancement, and endowment), monitoring, and reporting requirements. The written documentation submitted by the Permittee to satisfy this Condition shall be on official letterhead and signed by both the District Deputy Director of Project Management and the District Deputy Director of Environmental Planning and Engineering, and shall include a statement that the funds identified have been allocated specifically for the purpose of fulfilling the Permittee's mitigation obligations associated with this ITP and will not be redirected for other Project purposes. Even if the funding assurances described in this Condition are provided, the Permittee must complete the required acquisition, protection, and transfer of all HM Lands no later than 18 months after the start of ground-disturbing activities.	ITP Condition # 8.	Before commencing ground- or vegetation-disturbing activities	Permittee	
DURING CONSTRUCTION					
12	The Designated Biologist shall monitor for and clear the area of Covered Species during the installation of the ESA and exclusion fencing.	ITP Condition # 6.3	Entire Project	Permittee	
13	The Designated Biologist shall be on-site weekly while construction and/or surface-disturbing activities are taking place to minimize take of the Covered Species, to check for compliance with all mitigation and avoidance measures, to check all exclusion zones to ensure that ESA and exclusion fencing is intact, and that human activities are restricted to outside of these protective zones. The Designated Biologist shall also inspect material storage areas that have potential to provide retreat sites for Covered Species. These inspections shall be compiled into Monthly Compliance Reports and submitted to DFG's Regional Office listed in the Notices section of this ITP or via e-mail to DFG's Regional Representative at mescaron@dfg.ca.gov. DFG may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections	ITP Condition # 5.3	Entire Project	Permittee	
14	Permittee shall provide DFG with an Annual Status Report (ASR) no later than January 31st of every year beginning with issuance of the ITP and continuing until DFG accepts the Final Mitigation Report in accordance with the ITP. Each ASR shall include, at a minimum: 1) a general description of the status of the Project site and construction activities, including actual or projected completion dates, if known; 2) a copy of this table with notes showing the current implementation status of each mitigation measure; and 3) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and compensating for Project impacts.	ITP Condition # 5.5	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
15	Permittee shall immediately notify DFG in writing if it determines that it is not in compliance with any condition of approval of this ITP, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods indicated. Permittee shall report any non-compliance during the construction phase to DFG within 24 hours.	ITP Condition # 5.2	Entire Project	Permittee	
16	All observations of Covered Species and their sign, oversight activities, verifications, compliance inspections, surveys, monitoring, and records required by this ITP shall be reported in writing to DFG by the Project Representative or Designated Biologist. Permittee shall submit reports of these activities to DFG in the next Monthly Compliance Report. DFG can change this condition at any time to require that additional reports are generated. If DFG determines the reporting schedule is inadequate, DFG will notify Permittee by letter of the new reporting schedule.	ITP Condition # 5.4	Entire Project	Permittee	
17	Use of erosion control materials potentially harmful to Covered Species such as mono-filament netting (erosion control matting) or similar material shall not be used in potential Covered Species habitat.	ITP Condition # 4.14	Entire Project	Permittee	
18	Permittee shall prohibit firearms and domestic dogs from the Project site and site access routes during construction and development of the Project, except those in the possession of authorized security personnel or local, State, or Federal law enforcement officials.	ITP Condition # 4.7	Entire Project	Permittee	
19	Project-related personnel shall access the Project site during construction and development activities using existing routes and shall not cross Covered Species' habitat outside of the Project site. Project-related vehicle traffic shall be restricted to established roads, staging, and parking areas. Vehicle speeds shall not exceed 20 mph in order to avoid Covered Species on or traversing the roads. If construction of off-site routes of travel will be required, Permittee shall contact DFG prior to carrying out such an activity. DFG may require amendment of this ITP if additional take of Covered Species may result from Project modification.	ITP Condition # 4.10	Entire Project	Permittee	
20	Permittee shall confine all Project-related parking, storage areas, letdown sites, equipment storage, and any other surface-disturbing activities to the Project site using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project boundaries unless specifically provided for in this ITP.	ITP Condition # 4.11	Entire Project	Permittee	
21	Permittee shall immediately stop/repair any fuel or hazardous waste leaks or spills on the Project site during construction and development activities and immediately clean up such spills at the time of occurrence. Permittee shall exclude the storage and handling of hazardous materials from the construction zone and shall properly contain and dispose of any unused or leftover hazardous products off-site.	ITP Condition # 4.12	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
22	If an individual of the Covered Species is found on the Project site the Designated Biologist will capture the individual and remove it from the construction zone for immediate release in the closest suitable habitat, at the end of the day. The Designated Representative shall immediately notify DFG of the incident, or no later than noon on the next business day if the incident occurs outside of normal business hours. Notification to DFG shall be via telephone or email, followed by a written incident report. Notification shall include the date, time, location and circumstances of the incident, the name of the party that actually relocated the animal, and the location (including GPS coordinates) where the animal was moved.	ITP Condition # 6.1	Entire Project	Permittee	
23	If a Covered Species is injured as a result of Project-related activities, it shall be immediately taken to a DFG approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility prior to the start of ground- or vegetation-disturbing activities. Permittee shall bear any costs associated with the care or treatment of such injured Covered Species. Permittee shall notify DFG immediately unless the incident occurs outside of normal business hours. In that event DFG shall be notified no later than noon on the next business day. Notification to DFG shall be via telephone or email, followed by a written incident report. Notification shall include the date, time, location and circumstances of the incident, and the name of the facility to which the animal was taken.	ITP Condition # 6.2	Entire Project	Permittee	
24	If a Covered Species is killed by Project-related activities during construction, or if a Covered Species is otherwise found dead, the Designated Biologist shall be immediately notified and initial notification shall be made by calling the DFG Regional office at (707)339-0334 and providing information on the location, species, number of animals injured or killed, and the Incidental Take Permit Number. Following the initial notification, Permittee shall send DFG a written report within two (2) calendar days. The report will include the date, time and location of the finding or incident, location of the carcass, and if possible provide a photograph, cause of death and any other pertinent information.	ITP Condition # 5.7	Entire Project	Permittee	
25	DFG may issue Permittee a written stop-work order to suspend any activity covered by this ITP for an initial period of up to 25 days to prevent or remedy a violation of ITP conditions (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. Permittee shall comply with the stop-work order immediately upon receipt thereof. DFG may extend a stop-work order under this provision for a period not to exceed 25 additional days, upon written notice to the Permittee. DFG shall commence the formal suspension process pursuant to California Code of Regulations, Title 14, section 783.7 within five working days of issuing a stop-work order.	ITP	Entire Project	Department of Fish and Game	
POST-CONSTRUCTION					
26	Upon Project completion, Permittee shall remove from the Project site and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.	ITP Condition # 4.15	Post-construction	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
27	No later than 45 days after completion of the Project, including completion of all mitigation measures, Permittee shall provide the DFG with a Final Mitigation Report. The Final Mitigation Report shall be prepared by the Designated Biologist and shall include, at a minimum: 1) a copy of this table with notes showing when each of the mitigation measures was implemented; 2) all available information about Project-related incidental take of the Covered Species; 3) Information about other Project impacts on the Covered Species; 4) construction dates; 5) an assessment of the effectiveness of the ITP's Conditions of Approval in minimizing and compensating for Project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the species; and 7) any other pertinent information, including the level of take of the Covered Species associated with the Project.	ITP Condition # 5.6	Post-construction and after completion of mitigation	Permittee	
28	DFG accepts the Final Mitigation Report as complete.	ITP Condition # 4.16	Post-construction	Department of Fish and Game	

ATTACHMENT 2A

DEPARTMENT OF FISH AND GAME

HABITAT MANAGEMENT LAND ACQUISITION PACKAGE CHECKLIST FOR PROJECT APPLICANTS

The following checklist is provided to inform you of what documents are necessary to expedite Department processing of your Habitat Management Land acquisition proposal. Any land acquisition processing requests which are incomplete when received, will be returned. The Region contact will review and approve the document package and forward it to the Lands and Facilities Branch (LFB) Realty Services Coordinator with a request to process the land acquisition for formal acceptance.

To: _____
Regional Manager, Region Name

From: _____
Project Applicant

Phone: _____

Tracking #: _____
CDFG assigned permit or agreement #

Project Name: _____

Enclosed is the complete package for the ☐ Conservation Easement OR ☐ Grant Deed

Documents in this package include:

☐ Fully executed, approved as to form Conservation Easement Deed or Grant Deed.

Date executed: _____

☐ Proposed Lands for Acquisition Form (PLFAF)

☐ Phase I Environmental Site Assessment Report Date on report: _____
(An existing report may be used, but it must be less than two years old.)

☐ Preliminary Title Report(s) for subject property is enclosed and has been reviewed for encumbrances and other easements. The title report must be less than six months old when final processing is conducted.

Included are additional documents:

- ☐ document(s) to support title exceptions
- ☐ document(s) to explain title encumbrances
- ☐ a plot or map of easements/encumbrances on the property

☐ Policy of Title Insurance (an existing title policy is not acceptable)

☐ County Assessor Parcel Map(s) for subject property

☐ Site Location Map (Site location with property boundaries outline on a USGS 1:24,000 scale topo)

☐ Final Permit or Agreement (or other appropriate instrument)

Type of agreement: ☐ Bank Agreement ☐ Mitigation Agreement

☐ Permit _____ Other: _____
(write in type of permit)

☐ Final Management Plan (if required prior to finalizing permit or agreement or if this package is for a Grant Deed)

☐ Biological Resources Report

☐ Draft Summary of Transactions ☐ hard copy ☐ electronic copy (both are required)

PROPOSED LANDS FOR ACQUISITION FORM ("PLFAF")

Date: _____

TO: Regional Representative

_____

_____

_____

Facsimile:

FROM:_____

_____

_____

_____

Applicant proposes that the following parcel of land be considered for approval by the Department as suitable for purposes of habitat management lands to replace the adverse environmental impacts of the Project:

Section	Township	Range	Number of Acres
_____	_____	_____	_____

Current Legal Owner(s), include Parcel Number(s):

_____

_____

_____

Location of Parcel:

_____

_____

_____

_____

_____

APPROVED ___ By:_____ DATE:_____

REJECTED ___ _____

Region

Explanation:_____

_____

_____

ATTACHMENT 3

CALIFORNIA DEPARTMENT OF FISH AND GAME
MITIGATION PAYMENT TRANSMITTAL FORM

Project Applicant Instructions: Please fill out and attach this form to payment. For conservation banks, also attach the Bill(s) of Sale for credits sold. One form may be used for multiple transactions, **BUT YOU MUST USE A SEPARATE FORM FOR EACH CHECK YOU TRANSMIT**. Make sure to include Project Name, Project Tracking Number, and FASB Mitigation Tracking Number (if available) on the attached payment type.

(1) **DATE:** _____

TO: Charles Armor, Regional Manager
P.O. Box 47
Yountville, CA 94599

(2) **FROM:** _____
Name

_____
Mailing Address

_____
City, State, Zip

_____
Telephone Number/FAX Number

(3) **RE:** Caldecott Improvement Project, State Route 24

(4) **AGREEMENT/ACCOUNT INFORMATION:**
(Check the applicable type)

X 2081 Permit ☐ Conservation Bank ☐ 1802 Agreement ☐ 2835 NCCP

2081-2008-018-03
[HCPB Project Tracking Number]

_____
[FASB Mitigation Tracking Number (if available)]

Index _____ PCA _____

(4) PAYMENT TYPE (One check per form only):The following funds are being remitted in connection with the above referenced project:

Check information:

Total $_____ Check No. _____

Account No. _____ Bank Routing No. _____

a. Endowment: for Management of Conservation Land

Subtotal $_____

b. Habitat Enhancement

Subtotal $_____

c. Security: Cash Refundable Security Deposit

Subtotal $_____

d. Letter of Credit

Subtotal $_____
1. Financial Institution:_____
2. Letter of Credit Number: _____
3. Date of Expiration:_____

ATTACHMENT 3

CALIFORNIA DEPARTMENT OF FISH AND GAME
MITIGATION PAYMENT TRANSMITTAL FORM

MITIGATION PAYMENT TRANSMITTAL FORM INSTRUCTIONS

(1) DATE: Applicant or Permittee enters date in month / day / year format.

(2) FROM:

a. Name – Enter first name, middle initial, last name and title of principal officer if permittee is a business and name of business; or contact person if different than permittee and principal officer.

b. Mailing Address – Enter complete business mailing address or mailing address of contact person.

c. Telephone Number / FAX Number – Telephone number and fax number of principal officer or contact person listed above.

(3) RE:

Project Name – Region enters project name as it appears on Permit or Agreement document.

(4) PERMIT OR AGREEMENT TYPE / ACCOUNT INFORMATION

a. Agreement Type – Check the appropriate agreement or permit type.

b. Tracking Number– Region enters the project tracking number as it appears on the Tracking Surname Cover Sheet and Permit or Agreement document.

c. FASB Mitigation Tracking Number (if available) – Region enters the Mitigation Tracking Number (MT #) assigned by FASB for the project specific mitigation account if account has been set up prior to receiving current mitigation payment.

d. Index and PCA – Region enters the mitigation account codes associated with the accounts for deposit and expenditures.

(5) PAYMENT TYPE: Applicant or Permittee enters the following information.

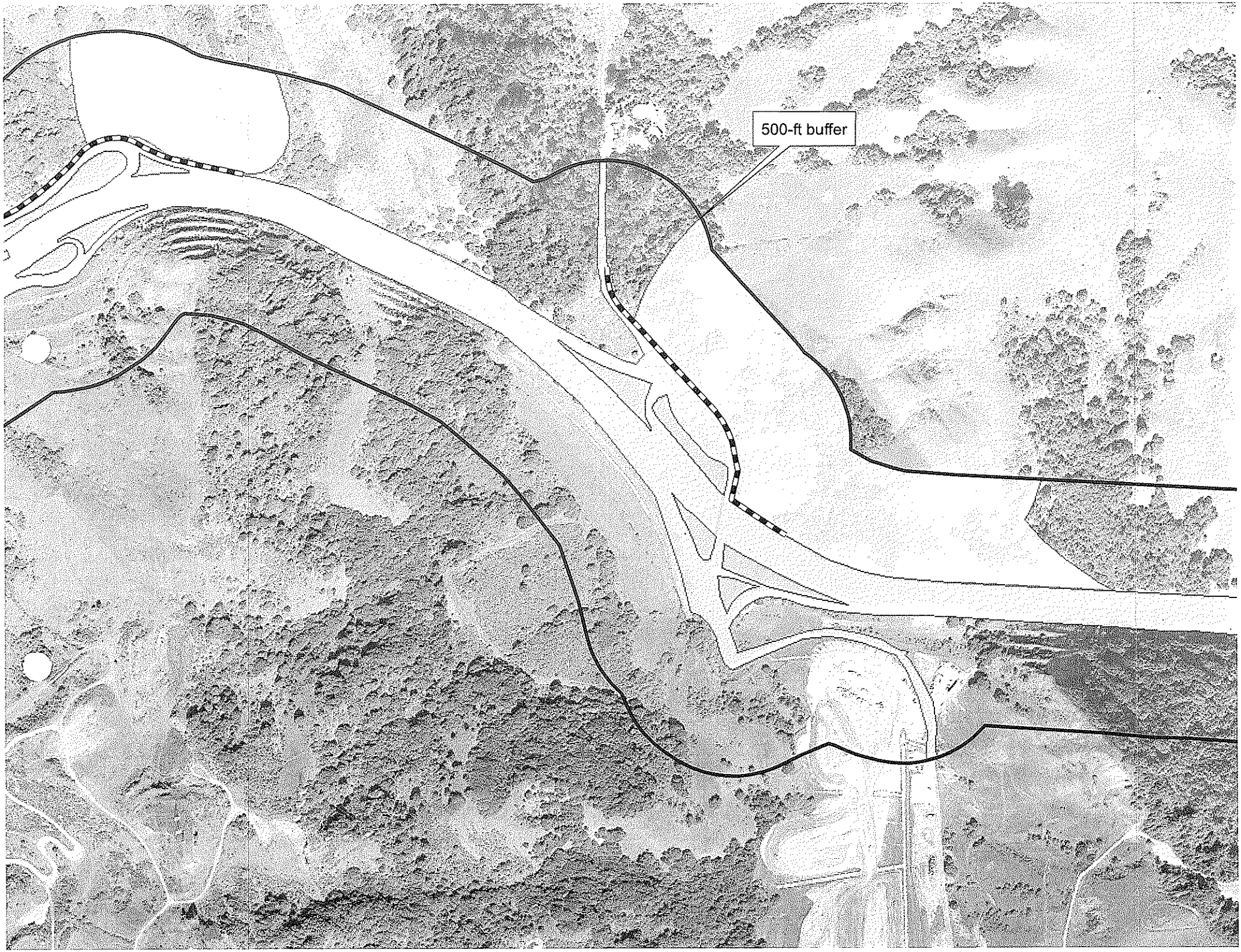
a. Permanent Endowment for Management of Conservation Land – Enter the amount of the attached payment. A permanent endowment is an account established for the long-term management of habitat management land for conservation purposes as required by a Permit or Agreement.

b. Habitat Enhancement Fees – Enter the amount of the attached payment. The habitat enhancement fees are intended for the initial preparation of the land for transfer as habitat management lands.

c. Cash Refundable Security Deposit – Enter the amount of the deposit attached. A cash refundable security deposit may be a required condition of a Permit or Agreement to ensure the proper and timely implementation of those conditions.

d. Letter of Credit – Enter the amount of the attached letter of credit. 1. Financial Institution - Include the name of the financial institution from which the letter of credit was issued. 2. Date of Expiration – Enter the date of expiration from the letter of credit.

Attachment 4


500-ft buffer

Attachment 5

OHLONE PRESERVE CONSERVATION BANK

1576 CATALINA CT
LIVERMORE, CA 94550
925-447-2344
EMAIL: rob.fletcher@sbcglobal.net

11-03-08

Cristina Ferraz
Caltrans
111 Grand Ave, Room 12-205
Oakland, CA 94612

Re: Completed Agreement for Sale of Conservation Credits for the Caldecott Tunnel Project

Dear Cristina:

Enclosed is the fully signed original copy of the Agreement for Sale of Conservation Credits for the Caldecott project. Copies of the Bill of Sale and Payment receipt are being sent to USFWS and CDFG to confirm your purchase.

Thanks for your assistance.

Sincerely,

Robert N. Fletcher
General Manager

BILL OF SALE

Sale No. 1036 (Bank Sales Number)

Bank Service File No. 1-1-00TA-3256
Bank CDFG Tacking No. 1802-2000-050-3

Project Service File Nos. 1-1-07-F-0292, 1-1-07-F-0309, and 81420-2008-F-0775

In consideration of $540,000.00, receipt of which is hereby acknowledged, Bank does hereby bargain, sell and transfer to California Department of Transportation 36 acres of California red-legged frog/Alameda whipsnake Multi-species Credits ("CRF/AWS Multi-species Credits") in the Ohlone Preserve Conservation Bank in Alameda County, California, developed and approved by the U. S. Fish and Wildlife Service and the California Department of Fish and Game.

Bank represents and warrants that it has good title to the CRF/AWS Multi-species Credits, has good right to sell the same, and that they are free and clear of all claims, liens, or encumbrances.

Bank covenants and agrees with the buyer to warrant and defend the sale of the CRF/AWS Multi-species Credits hereinbefore described against all and every person and persons whomsoever lawfully claiming or to claim the same.

Dated: 11/03/2008

Ohlone Preserve Conservation Bank

By: _____
Robert N. Fletcher, General Manager

OHLONE PRESERVE CONSERVATION BANK
PAYMENT RECEIPT

PARTICIPANT INFORMATION

Name: California Department of Transportation
Address: 111 Grand Ave, Room 12-205
Oakland, CA 94612
Telephone: 510-286-3890
Contact: Cristina Ferraz

PROJECT INFORMATION

Project Description: Construction of the 4th bore of the Caldecott Tunnel north of the existing bores. Location: State Route 24, in Alameda and Contra Costa counties.

Service File Number(s): 1-1-07-F-0292, 1-1-07-F-0309, and 81420-2008-F-0775

Species/Habitat Affected: California red-legged frog and Alameda Whipsnake

Credits to be Purchased: 36 acres of CRF/AWS Multi-species Credits

Payment Amount: $540,000.00

Project Location: SR24 in Alameda and Contra Costa Counties

County/Address: Alameda and Contra Costa Counties

PAYMENT INFORMATION

Payee: Ohlone Preserve Conservation Bank

Payer: State of California

Amount: $540,000.00

Method of payment: Cash _____ Check No. 04-072011 Wire Transfer

Received by: Robert N. Fletcher Date: 11/3/2008

Robert N. Fletcher

Appr ed by District 04
Dated 10-8-08
MARK L. WEAVER
R/W Acquisition/Utility
Relocation Services

AGREEMENT FOR SALE OF CONSERVATION CREDITS

Bank SERVICE File No.1-1-00TA-3256
Bank CDFG Tracking No. 1802-2000-050-3
Project Service File Nos. 1-1-07-F-0292, & 1-1-07-F-0309, and 81420-2008-F-0775

This Agreement for Sale of Conservation Credits ("Agreement") is made and entered into this 5th day of September, 2008 ("Effective Date"), by Robert N. Fletcher and Patricia A Fletcher, husband and wife as joint tenants, Richard S. Fletcher, and C. Nelson and Betty S. Fletcher, Trustees of the C. Nelson and Betty S. Fletcher Revocable Inter Vivos Trust, dated July 21, 1976, DBA Ohlone Preserve Conservation Bank ("Bank"), and California Department of Transportation ("State") as follows:

RECITALS

A. The Bank has developed the Ohlone Preserve Conservation Bank located in Alameda County, California; and

B. The Ohlone Preserve Conservation Bank was approved by the U.S. Fish and Wildlife Service and the California Department of Fish and Game June 23rd, 2005 and is currently in good standing with these agencies; and

C. The Bank has received approval from the U.S. Fish and Wildlife Service ("Service") and the California Department of Fish and Game ("CDFG") to offer California red-legged frog, Alameda whipsnake, and California tiger salamander Conservation Credits ("Credits") for sale as compensation for the loss of California red-legged frog, Alameda whipsnake, or California tiger salamander habitat through the Ohlone Preserve Conservation Bank Agreement ("Bank Agreement"); and

D. The Bank has authorized Robert N. Fletcher to act as General Manager and to process sales agreements, collect funds and disburse funds relating to the sale of Credits of the bank; and

E. The State is seeking to implement the project described on Exhibit "A" attached hereto ("Project"), which would unavoidably impact the California red-legged frog and Alameda whipsnake and seeks to compensate for said impacts by purchasing Credits from the Bank; and

F. The State has been authorized by the Service in a Biological Opinion, Service File No. 1-1-07-F-0292 dated August 8, 2007 as amended by Service File No. 1-1-07-F-0309 dated August 17, 2007 and Service File No. 81420-2008-F-0775 dated January 31, 2008 to purchase from Bank 36 acres of California red-legged frog/Alameda whipsnake (CRF/AWS) Multi-species Credits; and

G. The State desires to purchase from Bank and Bank desires to sell to State 36 acres of CRF/AWS Multi-species Credits from the Ohlone Preserve Conservation Bank. The Bank hereby confirms credit availability/adequate balance of CRF/AWS Multi-species Credits for sale.

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. Upon exercise of State's right to purchase, further described in Provision 5 below, Bank hereby sells to State and State hereby purchases from Bank 36 acres of CRF/AWS Multi-species Credits for the total purchase price of $540,000.00 (Purchase Price). Upon payment of the Purchase Price, the Bank will then deliver to State an executed Bill of Sale in the manner and form as attached hereto and marked Exhibit "B". The Purchase Price for said CRF/AWS Multi-species Credits shall be paid by State of California check.

2. The sale and transfer herein is not intended as a sale or transfer to State of a security, license, lease, easement, or possessory or non-possessory interest in real property, nor the granting of any interest of the foregoing.

3. The State shall have no obligation whatsoever by reason of the purchase of the CRF/AWS Multi-species Credits, to support, pay for, monitor, report on, sustain, continue in perpetuity, or otherwise be obligated or liable for the success or continued expense or maintenance in perpetuity of the CRF/AWS Multi-species Credits sold, or the Ohlone Preserve Conservation Bank. Pursuant to the Bank Agreement and any amendments thereto, Bank shall monitor and make reports to the appropriate agency or agencies. As required by law, Bank shall monitor and make reports to the appropriate agency or agencies on the status of any CRF/AWS Multi-species Credits sold to State. Bank shall be fully and completely responsible for satisfying any and all conditions placed on the Ohlone Preserve Conservation Bank or the CRF/AWS Multi-species Credits by all state or federal jurisdictional agencies. Bank shall hereinafter indemnify, protect and defend State against and from all liabilities and obligations imposed upon the Bank pursuant to the Bank Agreement or applicable state and/or federal regulatory agencies.

4. The CRF/AWS Multi-species Credits sold and transferred to State shall be non-transferable and non-assignable, and shall not be used as compensatory mitigation for any other Project or purpose, except as mutually agreed to by the parties hereto in a signed, written amendment to this Agreement and if said amendment is authorized by the appropriate regulatory agencies.

5. Within forty-five (45) days of the Effective Date of this Agreement, the State may exercise its right to purchase the CRF/AWS Multi-species Credits by submitting the Purchase Price to the Bank. If the State fails to exercise its right to purchase within the forty-five (45) day period, this Agreement will be considered null and void.

6. In the event that the Bank defaults on its obligations and responsibilities set forth

herein and as a result, State is not able to utilize the CRF/AWS Multi-species Credits as contemplated by this Agreement, Bank shall reimburse State the amount of the Purchase Price of the said CRF/AWS Multi-species Credits at the time of default or extinguishment.

7. Upon purchase of the CRF/AWS Multi-species Credits specified in paragraph E above, the Bank shall submit to the parties listed in the Notice section of the Bank Agreement / Bank Enabling Instrument, copies of the: a) Agreement for Sale of Conservation Credits; b) Description of Project to be Mitigated (Exhibit A); c) Bill of Sale (Exhibit B); d) Payment Receipt (Exhibit C); and e) an updated ledger. The updated inventory / ledger must detail: i) Project Applicant; ii) Project Name; iii) Status (sale complete/sale not complete); iv) Credit Sale Date; v) Service File Number and /or CDFG tracking number; vi) U.S. Army Corps of Engineers File Number (if applicable); vii) Total Number of Credits Authorized to Sell; viii) Total Number of Credits Sold to Date (inclusive); and ix) Balance of all Credits Available. The inventory / ledger should include all sales data from bank opening/establishment to the present.

IN WITNESS WHEREOF, the parties have executed this Agreement the day and year first above written.

BANK

Ohlone Preserve Conservation Bank

By: _____ Date: 9/5/2008
ROBERT N. FLETCHER, General Manager

PROJECT APPLICANT

California Department of Transportation

By: _____ Date: 9/11/08
CRISTINA FERRAZ, Project Manager

APPROVED BY:

_____ Date: 10/9/08
R.A. MACPHERSON
Deputy District Director
Right of Way

Exhibit "A"

DESCRIPTION OF PROJECT
TO BE MITIGATED

Construction of the 4th bore of the Caldecott tunnel north of the existing bores.

Caldecott Improvement Project on State Route 24 in Alameda and Contra Costa Counties, California, EA 294911, FWS File No. 1-1-07-F-0292 dated August 8, 2007 as amended by FWS File Nos. 1-1-07-F-0309 dated August 17, 2007 and 81420-2008-F-0775 dated, January 31, 2008.

Exhibit "B"

BILL OF SALE

Sale No. 1036 (Bank Sales Number)

Bank Service File No. 1-1-00TA-3256
Bank CDFG Tacking No. 1802-2000-050-3

Project Service File Nos. 1-1-07-F-0292, 1-1-07-F-0309, and 81420-2008-F-0775

In consideration of $540,000.00, receipt of which is hereby acknowledged, Bank does hereby bargain, sell and transfer to California Department of Transportation 36 acres of California red-legged frog/Alameda whipsnake Multi-species Credits ("CRF/AWS Multi-species Credits") in the Ohlone Preserve Conservation Bank in Alameda County, California, developed and approved by the U. S. Fish and Wildlife Service and the California Department of Fish and Game.

Bank represents and warrants that it has good title to the CRF/AWS Multi-species Credits, has good right to sell the same, and that they are free and clear of all claims, liens, or encumbrances.

Bank covenants and agrees with the buyer to warrant and defend the sale of the CRF/AWS Multi-species Credits hereinbefore described against all and every person and persons whomsoever lawfully claiming or to claim the same.

Dated: 11/3/2008

Ohlone Preserve Conservation Bank

By: _____
Robert N. Fletcher, General Manager

Exhibit "C"

OHLONE PRESERVE CONSERVATION BANK
PAYMENT RECEIPT

PARTICIPANT INFORMATION

Name: California Department of Transportation
Address: 111 Grand Ave, Room 12-205
Oakland, CA 94612
Telephone: 510-286-3890
Contact: Cristina Ferraz

PROJECT INFORMATION

Project Description: Construction of the 4th bore of the Caldecott Tunnel north of the existing bores. Location: State Route 24, in Alameda and Contra Costa counties.

Service File Number(s): 1-1-07-F-0292, 1-1-07-F-0309, and 81420-2008-F-0775

Species/Habitat Affected: California red-legged frog and Alameda Whipsnake

Credits to be Purchased: 36 acres of CRF/AWS Multi-species Credits

Payment Amount: $540,000.00

Project Location: SR24 in Alameda and Contra Costa Counties

County/Address: Alameda and Contra Costa Counties

PAYMENT INFORMATION

Payee: Ohlone Preserve Conservation Bank

Payer: State of California

Amount: $540,000.00

Method of payment: Cash _____ Check No. 04-072011 Wire Transfer

Received by: Robert N. Fletcher Date: 11/3/2008
Robert N. Fletcher

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
ENVIRONMENTAL PLANNING AND ENGINEERING
P.O. BOX 23660, MS-8E
OAKLAND, CA 94623-0660
PHONE (510) 286-5636
FAX (510) 286-5600
TTY 711
www.dot.ca.gov

Flex your power!
Be energy efficient!

October 1, 2013

Mr. Scott Wilson
Acting Regional Manager
California Department of Fish and Wildlife
Bay Delta Region
7329 Silverado Trail
Napa, CA 94588

File No. 2081-2008-018-03
Dist. 04, ALA 24 PM 5.3/6.2, & CC 24 PM 0.0/1.3
EA: 04-294914

Attn: Melissa Escaron

Subject: Request to Extend Incidental Take Permit No. 2081-2008-018-03

Dear Mr. Wilson,

The California Department of Transportation (Caltrans) is requesting an extension to the Incidental Take Permit (ITP) No. 2081-2008-018-03 for the Caldecott Tunnel Improvement Project, to extend the date from December 31, 2013 to December 31, 2017, and to add refinement to the original Project Description regarding vegetation restoration work. This letter request replaces and supersedes the letter sent to you on July 8, 2013.

Construction of the tunnel, portal and roadways is expected to be completed by the end of 2013. However, a refinement to the Project has been added, with the aim of improving the success of the vegetation restoration phase originally described in the project description of the ITP. The re-seeding process described in the project description will be enhanced to include vegetation plantings, as well as irrigation and weeding of non-native, invasive plant varieties during a plant establishment period of three years, pursuant to requirements of the August 8, 2007, U.S. Fish and Wildlife Service Biological Opinion (BO) (file number 1-1-07-F-0292), page 14-15: "Restoration of Temporarily Affected Areas." The native vegetation restoration will occur onsite, and is expected to be completed by December 31, 2017, which is approximately three years after it is scheduled to begin in the spring of 2014.

During the plant restoration period following the ending of construction, Caltrans proposes to implement all conditions of approval listed in the current ITP, with one exception. The Wildlife Exclusion Fence (WEF) (Condition 4.9) will be removed following the end of work by heavy equipment on the tunnels, portals and roadways. The WEF was installed as a barrier between

natural areas of suitable habitat for Alameda whipsnake to prevent individuals of that species from accessing the work areas during earthmoving and traffic by heavy construction equipment. With the cessation of those work activities, the fence itself could be considered a source of impact rather than a measure by which to avoid take, because by design it hampers free movements of Alameda whipsnake. Caltrans' vegetation restoration activities will be limited to the immediate areas around portals and roadways, and will consist of relatively minor work necessary for planting, irrigation, weed control, and plant monitoring. No work will occur within Alameda whipsnake critical habitat, and therefore, no impacts to Alameda whipsnake are anticipated.

The following changes are proposed for the December 15, 2008 ITP:

1. Add the following sentences on page 5, "Restoration of Temporarily Affected Areas" section:

From:

After the completion of construction, areas of temporary effects will be stabilized with the use of erosion control measures such as fiber rolls, compost, stabilizing emulsion and straw. These areas will also be seeded with a native seed mix including *Lotus purshianus*, *Bromus carinatus*, *Elymus glaucus* 'Berkeley', *Nassella pulchra*, *Nassella lepida*, *Festuca rubra 'Molate'*, and *Poa secunda*. By replacing annual grasslands with a native seed mix, it is expected that the vegetative community in the temporarily affected areas will be improved.

To:

After the completion of construction, areas of temporary effects will be stabilized with the use of erosion control measures such as fiber rolls, compost, stabilizing emulsion and straw. These areas will also be seeded with a native seed mix including *Lotus purshianus*, *Bromus carinatus*, *Elymus glaucus* 'Berkeley', *Nassella pulchra*, *Nassella lepida*, *Festuca rubra 'Molate'*, and *Poa secunda*. **After erosion control is completed, the restoration area will be further enhanced by planting seedlings of native species, and then the site will be maintained during a three-year plant establishment period (PEP). The site will be irrigated and weeds will be controlled by mechanical and hand methods during the PEP.** By replacing annual grasslands with a native seed mix, it is expected that the vegetative community in the temporarily affected areas will be improved.

2. Add the following sentence on page 9, "Conditions of Approval" section 4.9:

From:

The Permittee shall install exclusion fencing to exclude the Covered Species from construction areas within potential Covered Species habitat (see Attachment 4).

To:

The Permittee shall install exclusion fencing to exclude the Covered Species from construction areas within potential Covered Species habitat (see Attachment 4). **The exclusion fence will be removed following the end of construction activities on the tunnel, portal and roadways and prior to the erosion control, planting, and weed control activities during the PEP.**

For our environmental compliance records, Caltrans requests written approval for the change in the construction schedule and removal of the exclusion fence.

Please contact Lauren Ross, Caltrans Biologist, at (510) 286-6032 if you have any questions.

Sincerely,

Carie S. Montero
District Branch Chief
Biological Sciences and Permits

Cc: Craig Weightman, CDFW Acting Environmental Program Manager
Melissa Escaron, CDFW Senior Environmental Scientist

PALEONTOLOGICAL MITIGATION PLAN CALDECOTT IMPROVEMENT PROJECT, ALAMEDA AND CONTRA COSTA COUNTIES, CALIFORNIA

EA: 04-294900
Contract Agreement No. 04A1394
Task 04

Prepared for:

Office of Environmental Analysis
California Department of Transportation, District 04
111 Grand Avenue, 14th Floor
Oakland, CA 94612-0660

Prepared by:

PaleoResource Consultants
F & F GeoResource Associates, Inc.
5325 Elkhorn Boulevard, #294
Sacramento, CA 95842

Contact:

Dr. Lanny H. Fisk, PhD PG
Professional Geologist-#6985
Office Phone: 888-887-9745
Cell Phone: 916-947-9594
E-mail: Lanny@PaleoResource.com

November 2007

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SECTION 1

INTRODUCTION

The California Department of Transportation (Caltrans) is preparing to undertake construction excavation activities on the Caldecott Improvement Project (Project) in Alameda and Contra Costa counties on State Route (SR) 24, from SR13 to Gateway Boulevard. Under Contract 04A1394, Task 04, F & F GeoResource Associates, Inc. (F & F; doing business as PaleoResource Consultants [PRC]) has been retained by Parsons Transportation Group, Inc. to prepare this Paleontological Mitigation Plan (PMP) to define procedures required for the monitoring and salvage of sensitive paleontological resources in accordance with professional standards and requirements. The information and documentation required for this Task Order have been prepared for Project environmental compliance under the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), and other applicable statutes, regulations, and policies. This Project will include the boring of a two-lane tunnel located north of the existing Caldecott facility. In addition, major excavation and embankment work, shoulder widening, and the installation of drainage facilities will be performed at the approaches east and west of the proposed tunnel. Excavations in proposed cut areas will range in depth up to ~20 m (~65.5 ft). Implementation of this PMP will involve paleontological monitoring and salvaging operations during these excavations.

As described in the Caltrans Standard Environmental Reference, Environmental Handbook Volume 1, Chapter 8, Paleontology, as part of the project development and delivery process, Caltrans is obligated to conduct paleontological resource studies in response to federal, state, and local laws, regulations, and ordinances. As documented in the Paleontological Resources Identification and Evaluation Report for this Project (Jones and Stokes, 2004; Appendix A), there is a high potential to adversely impact paleontological resources during earth moving associated with the Caldecott Project.

Paleontological resources are the remains or traces of fossil organisms. Fossils may be found as individual specimens or as assemblages of many organisms. Of particular importance are fossils that are unique or unusual and that may make significant contributions to taxonomy, systematics, evolutionary theory, paleoecology, stratigraphy, or enhance our understanding of regional geologic history. Fossils found *in situ* (that is, fossils that have not been disturbed subsequent to their burial and fossilization) provide the most data for reconstructing taphonomic processes (that is, conditions under which the fossils were preserved).

Because most fossils are of now extinct organisms, they are nonrenewable resources. Therefore, fossils are valuable scientific and educational resources that are protected by local, state, and federal laws and regulations. The primary California state environmental law protecting fossils is the California Environmental Quality Act (CEQA; Public Resources Code [PRC] Section 21000 *et seq.*). CEQA requires that public agencies and private interests identify the environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California (Division I, California PRC Section 5020.1 [b]). Pertinent sections of the Act include the following.

California Environmental Quality Act (CEQA) (Chapter 1, Section 21002) states:

> "*it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required are intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.*"

Administrative regulations for the implementation of CEQA are set forth in California Code of Regulations (CCR) 15000 *et seq.*, commonly known as the "CEQA Guidelines." The Guidelines define procedures, types of activities, persons, and public agencies required to comply with the Act. CEQA Guidelines (Article 1, Section 15002[a][3]) state that CEQA is intended to:

> "*prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.*"

Appendix G of the Guidelines provides an Environmental Checklist of questions that a lead agency should address if relevant to a project's environmental impacts. One of the questions to be answered in this Environmental Checklist (CCR Section 15063; Appendix G, Section V, part c) is the following: "*Would the project directly or indirectly destroy a unique paleontological resource or site...?*"

Although neither CEQA nor the Guidelines define what is "*a unique paleontological resource or site*", CEQA Section 21083.2 defines "*unique archaeological resources*" as "*...any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria*:

1) *contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.*

2) *has a special and particular quality such as being the oldest of its type or the best available example of its type.*

3) *is directly associated with a scientifically recognized important prehistoric or historic event.*"

With only slight modification, this definition is equally applicable to recognizing "*a unique paleontological resource or site.*" Additional guidance is provided in CEQA Guidelines Section 15064.5(a)(3)(D), which indicates "*generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history.*"

CEQA Guidelines Section XVII, part a, of the Environmental Checklist asks a second question equally applicable to paleontological resources: "*Does the project have the potential to . . . eliminate important examples of the major periods of California history or pre-history?*" Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is yes or possibly, a

mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes. The lead agency with the responsibility to insure that fossils are protected during construction on this Project is Caltrans. CEQA Section 21081.6, requires that the lead agency demonstrate Project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resource management are in California Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on publicly owned lands to preserve or record paleontological resources. This statute applies to this Project since Project-related impacts will occur on public lands.

During initial project scoping studies, when a paleontological resource within a project area is determined to be scientifically significant, the sponsoring agency (e. g., Caltrans) must take those resources into consideration when evaluating project effects. Areas determined to have a high potential for containing significant paleontological resources require mitigation and monitoring when a project may disturb these resources. A paleontological mitigation plan (PMP) is developed and implemented. Mitigation can be initiated prior to a project or during construction. To avoid construction delays, it is recommended that mitigation be initiated prior to construction when possible. When implemented proactively, paleontological resources are not as likely to restrict project options, slow construction or affect project deadlines. In areas of high sensitivity, a pre-excavation field survey is highly recommended to locate surface concentrations of fossils, which might need special salvage methods.

This PMP provides guidance for protecting and preserving paleontological resources during construction in order to reduce potential impacts on paleontological resources to a less-than-significant level as required by CEQA. In order to demonstrate compliance with applicable statutory requirements, one purpose of this PMP is to provide for the preservation of a representative sample of any scientifically significant paleontological resources discovered during Project excavations. With implementation of this PMP, excavations may result in beneficial impacts, including the recovery and preservation of fossils that would not have been exposed without these project-related excavations and, therefore, would not have been available for scientific study or for public display in museums.

SECTION 2

BACKGROUND

Located within the Coast Range geomorphic province, the Caldecott Improvement Project lies in the Berkeley Hills within the East Bay Hills, where the Mesozoic and Cenozoic marine and nonmarine sedimentary strata of the Coast Ranges are complexly deformed in a series of folds and faults (Graymer et al., 1998). The Project location is east of the Hayward Fault and Berkeley, California. Sedimentary stratain the Project vicinity contain many fossil sites (Jones and Stokes, 2004).

2.1 ASSESSMENT REPORT ON PALEONTOLOGICAL SENSITIVITY - Dr. Nancy Buening, PhD, principle investigator at Jones and Stokes Environmental Consultants, along with other members of the paleontology working group, completed a paleontological resources identification and evaluation report (*Paleontological Resources Identification [PIR] and Evaluation Report for the Caldecott Improvement Project,* dated July 2004; included herein as Appendix A) that included a review of available geologic maps, a literature search to identify stratigraphic units, and a "windshield survey" of the Project area. Record searches for fossil sites within the Project area were conducted at the University of California Museum of Paleontology at Berkeley (UCMP).

2.2 DESCRIPTION OF THE RESOURCE - Stratigraphic units within the Project area include the Cretaceous Great Valley Sequence (GVS), Miocene Sobrante Formation, Miocene Claremont Formation, Miocene Orinda Formation, Miocene Moraga Formation, and Miocene Siesta Formation, as well as unnamed Cretaceous and Tertiary units (Jones and Stokes, 2004). These geologic units are described in Jones and Stokes (2004, see Appendix A). Several of these units have produced vertebrate and invertebrate fossils in the Project vicinity in the past.

2.3 SENSITIVITY RATING AND MITIGATION RECOMMENDATIONS - In the Paleontological Resources Identification and Evaluation Report prepared by Jones and Stokes (2004), two of the stratigraphic units that would be disturbed by SR24 construction, the Orinda and Siesta formations, were assigned a high level of sensitivity for potentially yielding scientifically significant fossils. The assessment recommended monitoring excavations only in these two stratigraphic units to salvage a representative sample of important macro- and micro-vertebrate fossils.

Following Society of Vertebrate Paleontology (SVP) guidelines, additional geologic formations found within the Project right-of way (ROW) should be assigned a high level of sensitivity, as they have also produced scientifically significant fossils in the past. These formations include the Cretaceous GVS and Miocene Sobrante, Claremont, and Moraga formations.

In the most recent geologic map of the Project area (Dibblee and Minch, 2005), the GVS unit has been identified as the Panoche Formation, which has previously produced highly significant fossils including fossil fish remains in the San Joaquin Valley (David, 1946), and fossil marine reptile remains in Contra Costa County (Hilton, 2003). Due to the previously reported occurrence of fossil remains from the Panoche Formation, this stratigraphic unit should be

assigned a high level of sensitivity for potentially yielding additional significant fossils, and should be monitored to mitigate the potential loss of scientifically important specimens.

The Sobrante and Moraga Formations have both produced fossil remains in the past (Jones and Stokes, 2004). In the case of the Sobrante Formation, fossils have been collected within the Project ROW (Jones and Stokes, 2004). The Moraga Formation has produced vertebrate remains in other localities (Jones and Stokes, 2004). Using SVP (1995) criteria, these formations should be assigned a high level of sensitivity for potentially yielding scientifically significant fossils, and should be monitored to mitigate the potential loss of scientifically important specimens.

2.4 **PERMIT REQUIREMENTS** - No federal or state permits that would be required before implementation of this PMP and would authorize the salvage of any fossil remains have been identified.

SECTION 3

SCOPE OF WORK
(PALEONTOLOGICAL MITIGATION PLAN)

This site-specific PMP is in compliance with proposed mitigation measures presented in the Paleontological Resources Identification and Evaluation Report for this Project (Jones and Stokes, 2004), with SVP standard guidelines for mitigating adverse construction-related environmental impacts on paleontological resources (SVP, 1995; see Appendix B), and with SVP curation guidelines (SVP, 1996; see Appendix C).

3.1 PALEONTOLOGICAL MITIGATION PLAN COMPONENTS – This PMP consists of the following components:

- Pre-excavation site visit, literature review, repository review.
- Project Managers/Personnel - PMP meeting/training program.
- Development and implementation of a safety program.
- Monitoring and salvage of fossils uncovered by earth moving activities.
- Recording associated specimen/sample data and corresponding geologic and geographic site data.
- Collection of sediment samples for microfossil analysis.
- Processing sediment samples to salvage microfossils.
- Preparation of fossils to the point of identification.
- Identification of fossils to the lowest taxonomic level possible.
- Accession and curation of fossil specimens into the designated repository.
- Archiving associated specimen and site data at the fossil repository.
- Preparation of the final paleontological mitigation report.

3.2 MITIGATION PLAN OBJECTIVES – This PMP will assist Caltrans in complying with environmental laws and regulations requiring mitigation of adverse impacts on paleontological resources during construction of the Caldecott Improvement Project. The PMP will allow for collection of both macrofossil specimens uncovered during Project excavation and microfossils salvaged from bulk sediment sample processing. This PMP permits the preservation of specimens that would otherwise be destroyed if monitoring were not conducted. Additionally, specimens may be discovered that would not have been found if excavation for this Project were not undertaken. Salvaged specimens will be identified and curated into a public museum where they will be available for scientific study and/or public display.

3.3 CONTRACTOR COMPLIANCE WITH THE PALEONTOLOGICAL MITIGATION PLAN - Caltrans will ensure that Caltrans personnel, the construction contractor, sub-contractors, and paleontological mitigation crew understand and fully implement the Caltrans approved PMP. Compliance with the PMP will be achieved as the procedures outlined below are implemented and completed.

3.4 MITIGATION PROGRAM STAFF AND RESPONSIBILITIES:

Project Paleontologist. To ensure compliance with mitigation measures, Caltrans will retain a qualified Project Paleontologist. The Project Paleontologist will oversee development of the mitigation program and its implementation. The Project Paleontologist will:

- ensure that the PMP is conducted in compliance with the approved mitigation measures and SVP (1995, 1996) standard guidelines.
- be consulted as necessary by the Field Supervisor and as outlined in the PMP.
- oversee final identification of fossil remains and determination of their significance.
- supervise curation of recovered fossils at the designated repository and archiving of associated specimen and corresponding geologic and geographic site data into the repository's computerized databases.
- be responsible for preparation of the Final Report.

Professional Geologist. A California registered Professional Geologist (PG) will supervise all geological work, including preparation of the geological portions of the Final Report.

Field Supervisor. In consultation with the Project Paleontologist, the Field Supervisor will coordinate all field and laboratory tasks with the Field Paleontologists and determine whether field and laboratory processing of sediment samples for microvertebrate fossils is warranted. The Field Supervisor will be responsible for the final (laboratory) processing of any fossiliferous sediment samples collected by the Field Paleontologists and for coordinating continued field processing with the Field Paleontologists. The Field Supervisor will assist in the identification, preparation, and curation of specimens and conduct other tasks as either provided in the PMP or requested by the Project Paleontologist. The Field Supervisor also will be responsible for coordinating all field tasks with the Caltrans Resident Engineer (RE) and earth-moving contractor(s). Additional responsibilities will include:

- ensure that the PMP is conducted in compliance with the approved Caltrans mitigation measures in the PMP and SVP (1995, 1996) standard guidelines.
- ensure the approved site specific Code of Safe Practices (CSP) for this Project is implemented.
- perform employee orientation meetings/training programs in the absence of the Project Paleontologist.
- conduct a pre-construction field survey of excavation sites.
- consult with the Caltrans RE on salvage operations, particularly when equipment and temporary monitors are needed to speed up fossil recovery.
- consult with the RE and advise the construction contractor on how to proceed.
- confer with the construction crew Supervisor or Foreman or the earth-moving contractors' excavation Manager to determine the schedule for earth moving during the following week and the areas where disturbance will occur the following week.
- schedule and coordinate Field Paleontologists.
- supervise the activities of Field Paleontologists.
- ensure proper ratio of Field Paleontologists needed to heavy equipment being used.
- coordinate field and laboratory processing of fossiliferous sediment samples collected by the Field Paleontologists.

- act as the Site Safety Officer/Assistant in the absence of the Project Paleontologist and ensure that all PRC personnel adhere to the CSP.
- directly oversee monitoring to ensure the collection of a representative sample of the fossils uncovered by earth-moving activities.
- record associated specimen/sample data and corresponding geologic and geographic site data.
- plot fossil/sample sites on maps.
- determine whether field and laboratory processing of sediment samples for microvertebrate fossils is warranted, in consultation with the Project Paleontologist.
- collect and process sediment samples to retrieve microfossil remains.
- oversee preparation of fossils to the point of identification.
- coordinate field processing of specimens/samples with the Paleontological Monitor(s).
- identify microvertebrate fossil remains and determine their significance.
- assist with accession and curation of recovered fossils.
- assist with archiving associated specimen data, including geologic and geographic records, into the fossil repository's files/databases.
- assist with the preparation of the draft and final reports.

Field Paleontologists. The Field Paleontologists will:

- conduct day-to-day monitoring of all earth moving activities.
- flag newly discovered fossil sites and temporarily divert earth-moving equipment around the site, as necessary, until the fossil(s) has been evaluated and, if warranted, salvaged.
- salvage fossils uncovered by earth moving.
- collect potentially fossiliferous sediment samples.
- collect sediment samples to recover microfossils.
- record associated specimen/sample and corresponding geologic and geographic site data.
- conduct initial (field) processing of fossiliferous sediment samples for microvertebrate fossils.
- prepare fossils to the point of identification.
- assist with the preparation of the draft and final reports.

3.5 ASSESSMENT BEFORE CONSTRUCTION - The field paleontological mitigation team will review literature and museum records to familiarize themselves with the geology and existing fossil localities in the Project area. This review will include a site visit to determine the boundaries of sensitive areas. These pre-construction activities will permit the paleontological mitigation team to become familiar with the Project stratigraphy and the types of fossils that might be impacted by Project construction. During the pre-construction site visit, the paleontological mitigation team will perform a surface salvage of exposed fossils, as recommended by SVP standard guidelines (1995), to prevent damage to the fossil resource(s) and to avoid delays to construction schedules. The paleontological mitigation team will document any fossil sites discovered during the pre-construction site visit using standard field techniques outlined below. Bulk sediment samples for microfossils, as outlined below, may also be collected during this period.

3.6 SAFETY MEASURES TO BE IMPLEMENTED - Prior to paleontological excavations or monitoring within the Project limits, a CSP will be approved and implemented. All PRC personnel involved in the Project must obey all safety measures.

3.7 PRE-CONSTRUCTION MEETINGS - PMP ORIENTATION/TRAINING - Prior to beginning Project excavations, the Project Paleontologist and/or Field Supervisor will attend a pre-construction meeting with the Caltrans RE and the Construction Contractor representatives. The purpose of this meeting will be to establish procedures for cooperation and provide for worker safety during excavation monitoring and salvage operations. An informal training program will be conducted to explain the essential elements of this PMP to all persons involved in earth moving for the Project, including Project managers, excavation supervisors, and heavy equipment operators and other staff. The training session will cover: the scientific importance of fossil remains; the potential for fossil remains being uncovered and/or disturbed by Project-related earth moving; where such remains are most likely to be encountered during earth moving; and procedures to be employed if fossil remains are discovered during excavations. The meeting will determine approaches and procedures for the temporary interruption of construction activities in the event of a find and how equipment would be diverted around such remains, if necessary. Additional training sessions will be conducted on an as-needed basis (e.g., hire of a new equipment operator). Attendance at training sessions will be documented by each individual's signature on a Paleontological Training Acknowledgement Form (Appendix D).

3.8 CURATION AGREEMENT - A Caltrans-approved curation agreement with an approved paleontological repository must be in place before construction begins. As per SVP (1995) mitigation guidelines, "A paleontological repository is a publicly supported, not-for-profit museum or university employing a permanent curator responsible for paleontological records and materials. Such an institution assigns accession and catalog numbers to individual specimens, which are stored and conserved to ensure their preservation under adequate security and climate control." Conditions of acceptance of salvaged fossils will be spelled out in the letter from the designated repository. In addition to the specimens, the repository will maintain associated records, including field notes, maps, and photographs. The University of California Museum of Paleontology at Berkeley (UCMP) will be the designated museum repository for all fossil remains salvaged from this Project. The conditions for acceptance of the fossils will be those imposed by SVP (1996) standard guidelines (see Appendix C) and will be spelled out in a letter of acceptance from the museum (see example in Appendix F). On Project completion, Caltrans will prepare a formal letter of donation (see example in Appendix G) to accompany the fossil collection when it is transported to the museum.

3.9 MONITORING EARTH MOVING - Field Paleontologists will monitor earth moving in all areas of construction thought to include potentially fossiliferous sediments. If numerous pieces of heavy equipment are in use simultaneously at separate locations for construction excavation, at least one Field Paleontologist shall be present at each work location. In accordance with SVP (1995) standard guidelines, monitoring will be initially conducted on a full-time basis. During initial tunnel boring, one Field Paleontologist will perform monitoring full time at each end of the tunnel. If fossils are salvaged from tunnel spoils, then the number of Field Paleontologists will increase in order to monitor all boring activities through the twenty four (24) hour work day. Caltrans statewide Paleontology Coordinator Kim Christmann has

reviewed this approach, and found it very reasonable and prudent (personal communication dated 27 July 2007). Once fifty percent (50%) of earth moving has been completed in any stratigraphic unit and no significant fossil remains have been uncovered, at the request of the Project Paleontologist and with the approval of the Caltrans RE, monitoring can be reduced or suspended entirely.

Field Paleontologists will monitor all heavy equipment operations, flag any newly discovered fossil sites and temporarily divert, redirect, or halt earth moving around the site, as necessary, until the fossil(s) has been evaluated and, if warranted, salvaged. The flagged fossil site should be avoided by a minimum of 3 meters (10 feet) on all sides. This area, to protect fossil specimens until they are removed, is called an "exclusion zone." During tunnel boring operations, a Field Paleontologist will monitor spoils as needed, and salvage any fossil specimens discovered. The Project Paleontologist and/or Field Supervisor will consult with the Caltrans RE on salvage operations, particularly regarding the need for equipment and an operator to speed up salvage operations.

Field Paleontologists will assign a unique field number to each fossil specimen or sediment sample and record the field number and associated specimen/sample data (identification by taxon and element, sample size, etc.), corresponding geologic data (particularly lithology, stratigraphic unit, stratigraphic level within the unit, inferred age, etc.) and geographic site data (location, elevation, etc.) in a daily monitoring report (see Appendix E). Each field number and fossil/sampling site will be plotted on both a 1:24,000-scale topographic map and a measured section of the exposed stratigraphic sequence. Fossils will be prepared to the point of identification and identified to the lowest possible taxonomic level. Specimen salvage and/or sediment sample collection and recording of associated data will be completed as quickly as possible to minimize any potential delays to excavation activities.

Immediately after the salvage of a specimen or collection of a sample, the Field Paleontologist will remove all materials from the exclusion zone and notify the Caltrans Resident Engineer/Construction Manager/Heavy Equipment Operator that earth moving can proceed at the fossil site. In most cases, any potential construction delay should be limited to several hours. Provision will be made for additional Field Paleontologists to monitor or help in removing large or abundant fossils to reduce potential delays to excavation schedules. If heavy equipment is in use simultaneously at different locations for construction excavation, at least one Field Paleontologist will be present at each work site.

If specimen salvage or sample collection is warranted, the Project Paleontologist or Field Supervisor will specify salvage procedures. If possible, the Field Paleontologist will salvage the specimen and/or collect a representative sample of the fossils discovered. However, if the specimen(s) are either too large or too numerous for a single Field Paleontologist to salvage, the Field Supervisor will notify the Caltrans RE of the necessity for temporarily assigning additional personnel to the Project. With the Caltrans RE's approval, a salvage crew will be mobilized to salvage the specimen(s) or sample(s) as quickly as possible to minimize any potential delays to excavation activities.

3.10 <u>EXCAVATION METHODS</u> - Excavation methods will vary based on the type of fossil and the nature of the surrounding matrix. Many macrofossils are easily recognized and can be

removed by hand or with small hand tools. Some may be fragile and require treatment with a hardener before salvage. Others may require encasement within a plaster jacket. Specimens representing all or much of a skeleton may require removal as a whole or in large blocks. Such specimens typically require the most time to excavate and stabilize before removal.

3.11 FOSSIL SITE AVOIDANCE - If an unusually large or particularly significant fossil (e.g., nearly complete skeleton, new species, or an unusual concentration of smaller fossils (such as a fossil leaf flora, a fish fauna, or a microvertebrate site) is discovered during earth moving, the Field Paleontologist will:

1) enclose the fossil site with brightly colored survey flagging tape, establishing an exclusion zone to temporarily divert earth moving around the site until the specimen or specimens can be evaluated and, if warranted, the fossil(s) salvaged.
2) advise all heavy equipment operators to avoid the site until further notice.
3) notify the Field Supervisor and/or the Project Paleontologist of the fossil discovery and of the necessity to avoid the site.

The Field Supervisor and/or the Project Paleontologist will consult with the Caltrans RE on what actions are necessary to protect and preserve the paleontological resource. A decision will be made by the Field Supervisor and/or the Project Paleontologist in consultation with the Caltrans RE. Following such consultation, the Field Supervisor or Project Paleontologist or Caltrans RE as appropriate in accordance with the procedures established as described in Section 3.7 will advise the Construction Contractor on how to proceed.

3.12 FOSSIL TREATMENT - All fossil specimens salvaged as a result of the PMP will be treated in full compliance with SVP (1995, Appendix B) standard guidelines for mitigating adverse construction-related environmental impacts on paleontological resources and SVP (1996, Appendix C) standard guidelines for the acceptance of a mitigation program fossil collection by a qualified repository.

The Field Paleontologist will:

- assign a unique field number to each newly salvaged fossil specimen or sediment sample.
- record the field number and associated specimen/sample data (identification by taxon and element, sample size, etc.) and corresponding geologic and geographic site data (location, elevation, etc.) in a daily monitoring report, field journal, and on appropriate measured sections and topographic maps.

All salvaged fossils will be:

- stabilized and prepared to the point of identification.
- identified to lowest taxonomic level possible by paleontologists qualified and experienced in the identification of that group of fossils.
- temporarily stored, unprepared, for no more than one year to prevent decomposition and pest intrusion.
- accessioned into the fossil collection of the designated repository, (UCMP) where they will be permanently stored, maintained, and, along with archived specimen and site data, made available for future study by qualified scientific investigators.

- curated in the assigned repository (UCMP). (Specimens will be assigned and labeled with appropriate museum specimen and corresponding locality numbers, placed in specimen trays and, if appropriate, vials, with completed specimen data cards).
- catalogued with specimen and locality numbers and corresponding geologic and geographic site data, and entered into appropriate museum catalogs and computerized data bases.

3.13 VOLUME OF BULK SAMPLES TO BE COLLECTED - Many significant vertebrate fossils (e. g., small mammal, bird, reptile, or fish remains) are too small to be visible with the unaided eye within sedimentary matrix. Fine-grained sedimentary deposits and paleosols (fossil soils) often contain such fossils known as microvertebrate fossils. These microvertebrate fossils are salvaged through concentration by screen washing.

As recommended by SVP (1995) standard guidelines, the Field Paleontologist(s) will periodically sift or screen sediments to look for fragmentary or small to microscopic-sized vertebrate fossils (primarily the teeth of fish, amphibians, reptiles, rodents, and insectivores). If microvertebrate fossils are discovered during screening, to obtain a representative sample of the microvertebrate fossils present, in accordance with SVP (1995) standard guidelines, a bulk sample of 6,000 pounds (between 1.2 and 1.5 cubic meters) of potentially fossiliferous sediment will be collected from the site with the assistance of a front-end loader and operator. As recommended by SVP (1995) standard guidelines, a standard sample of fossiliferous sediment may be collected and processed from each stratigraphic unit from which microvertebrate fossils are discovered. Each sediment sample will be wet screened through 1/8th-inch, 20-mesh, and/or 30-mesh screens as appropriate and the concentrates dried.

Wet screening of sediment samples will be conducted at or near the excavation site at a location approved by the Caltrans RE. The Project Paleontologist will determine whether field and laboratory processing of an entire 6,000-pound sample is warranted and will have the authority to have all processing of the sample discontinued and any remaining sediment discarded.

Salvaged fossil bones and teeth will be sorted, identified, and analyzed for their significance. Final processing will include separating any fossils from the remaining sediment with the aid of a low-power microscope.

3.14 PRESERVATION OF SAMPLES - When warranted, sediment samples will be obtained, processed, and stored for potential future analysis by scientists. Such samples may include: fine-grained sediment for pollen analysis; organic-rich sediments that may yield important scientific information on the age, paleoecology, or depositional environment of sedimentary units exposed by construction excavations; samples for paleomagnetic or radiometric analysis; and coarse sediment for clast source analysis. The Project Paleontologist will determine what samples should be collected during the pre-construction field survey and construction excavation.

3.15 PREPARATION PROCEDURES FOR SALVAGED SPECIMENS - All salvaged macrofossils will be stabilized and prepared to the point of identification, identified to lowest

taxonomic level possible by the Project Paleontologist or other paleontologists qualified and experienced in the identification of that group of fossils.

3.16 STORAGE - Depositing salvaged specimens in a qualified repository is essential. At the end of the Project, the Principal Paleontologist will arrange for all salvaged fossils and associated data to be curated at UCMP. Additionally, a complete set of field notes, geologic maps, stratigraphic sections, and photographs will accompany the fossil collections. Specimens should be stored in a fashion that allows retrieval of specific, individual specimens by researchers in the future.

3.17 DAILY MONITORING REPORTS - At the end of each working day, each Field Paleontologist will prepare a brief (typically one page) Daily Monitoring Report summarizing the activities and results of the PMP during that day and provide copies to the Field Supervisor (see daily monitoring report form in Appendix E). The Field Supervisor will provide copies to the Project Paleontologist. These Daily Monitoring Reports will document all fossil specimen(s) salvaged and/or fossiliferous sediment samples collected, along with corresponding geologic and geographic data.

3.18 MONTHLY REPORTS - Daily Monitoring Reports and any other mitigation activities will be summarized in monthly reports to Caltrans.

3.19 GRADING PLANS AND EXCAVATION SCHEDULES - Caltrans will provide the Project Paleontologist and/or Field Supervisor with copies of detailed maps, aerial photographs, and engineering grading plans, as available, for all areas where earth moving will occur. Caltrans or the contractor will also provide a general schedule for excavations.

During excavations, the Caltrans RE will provide the Field Supervisor and Field Paleontologists with updated schedules as they become available. The Field Supervisor (or Project Paleontologist) will confer with the Caltrans RE or the earth-moving contractors' excavation manager on a weekly basis to provide input in determining the schedule for earth moving during the following week and the areas where earth moving will occur the following week.

3.20 NUMBER OF CREW AND ESTIMATED DURATION OF THEIR PARTICIPATION – Based on the currently proposed construction work schedule, a team consisting of a Field Supervisor and two Field Paleontologists is recommended. Additional Field Paleontologists may be added if excavations are occurring simultaneously at more than two (2) locations or if fossils are discovered. Paleontological monitoring will occur wherever construction excavation disturbs *in situ* strata. The current construction schedule indicates approximately eighteen (18) to twenty (20) months of monitoring will be required to complete the Project. As previously stipulated and with concurrence of the Caltrans Paleontology Coordinator, monitoring will be initially conducted on a full-time basis. Once fifty percent (50%) of earth moving has been completed in any stratigraphic unit and no significant fossil remains have been uncovered, at the request of the Project Paleontologist and with the approval of the Caltrans RE, monitoring can be reduced or suspended entirely.

3.21 EQUIPMENT AND SUPPLIES - Each Field Paleontologist will be equipped with hand tools and supplies (e.g., geological hammer, shovel, pick, chisels, whisk broom, buckets, specimen bags, field notebook, daily monitoring report forms, pens, markers, and glue) to allow for the rapid salvage of fossil remains. Additional equipment and supplies (e.g. plaster, burlap, screens, wash tubs, hoses) for stabilizing and salvaging delicate fossil specimens and field processing of fossiliferous sediment samples will be stored at the Project site. Water and portable restrooms will be provided at both the excavation and screen washing sites by the Construction Contractor. The Construction Contractor may be requested to supply heavy equipment (typically a front-end loader) and an operator to assist in the rapid removal of a large fossil specimen(s) or sediment sample(s). Equipment and supplies for preparing fossil specimens, laboratory processing of screened matrix generated by field processing of sediment samples, and temporary storage of all salvaged fossil specimens will be available at PRC's facilities in Auburn, California.

3.22 DECISION THRESHOLDS - Monitoring and salvage of paleontological resources, as outlined in this paleontological mitigation plan, will be conducted using the following thresholds.

Macrofossils:

1) Initially, all potentially fossiliferous *in situ* sediment disturbed by earth moving will be monitored full-time.

2) If few or no fossils are discovered after 50% of earth moving activities in a particular area have been completed, monitoring may be reduced or suspended following consultation among the Field Supervisor, Project Paleontologist, and Caltrans.

3) When macrofossils are uncovered during earth moving, all identifiable remains will be salvaged. Unidentifiable remains may not be salvaged, at the discretion of the Field Paleontologist or Field Supervisor. If unidentifiable remains are salvaged, further processing will be done only if authorized by the Project Paleontologist.

Microvertebrate Fossils:

1) Bulk samples (6,000 lbs) of *in situ* sediment will be collected for processing only under the following conditions: a) an identifiable microvertebrate fossil has been recovered during dry test screening of sediment, and b) a 200-pound sample is collected from a stratigraphic unit suspected of containing microvertebrate fossils and, upon processing, yields identifiable fossils.

2) When bulk sediment samples are collected, a sample from a single stratigraphic unit will not normally exceed 6,000 lbs, unless the uniqueness of the recovered fossils dictates salvage of larger amounts (SVP, 1995; see Appendix B).

3) During processing of a bulk sample, if too few scientifically significant microvertebrate fossils are recovered, the Project Paleontologist may authorize suspension of further processing of the sample and the sample may be discarded. The following constitute conditions under which the sample processing may be suspended: 1) no or few microvertebrate fossils are discovered after processing 10% (600 pounds) of the sample, 2) fossil preservation quality is too poor, 3) fossils are not age or paleoenvironmentally diagnostic or significant for other reasons.

Any unidentifiable microvertebrate fossils salvaged during sample processing will not receive further treatment.

3.23 DRAFT FINAL REPORT ON PALEONTOLOGICAL RESOURCE IMPACT MITIGATION - Following the completion of paleontological monitoring for the Caldecott Improvement Project, a Draft Final Report on Paleontological Resource Impact Mitigation will be prepared under the supervision of the Project Paleontologist that discusses:

- the background of the PMP,
- geology/stratigraphy exposed by excavations,
- mitigation methods, including fossil treatment, and recommendations for additional work,
- scientific significance and importance of salvaged fossil remains,
- results and findings of analyses conducted on the fossil remains, and
- research questions that were resolved or raised as a result of the analyses.

The report also will include a U. S. Geological Survey (USGS) standard 1:24,000-scale topographic map showing each locality from which a significant fossil was collected and a measured stratigraphic section or sections, as appropriate, showing the stratigraphic position from which each significant fossil was collected. The report also will include an estimate of the time and costs to complete any remaining treatment and/or analyses of the salvaged fossil remains and to prepare the Final Report on the Paleontological Resource Impact Mitigation.

Caltrans will review the Draft Final Report on Paleontological Resource Impact Mitigation for completeness and advise the Project Paleontologist of any changes needed to the report or to the proposed schedule and cost estimate for completing the Final Report.

3.24 ACCESSIONING OF FOSSIL REMAINS - After completing the Draft Final Report on Paleontological Resource Impact Mitigation, the Project Paleontologist will ensure that all fossil remains salvaged as a result of the PMP are delivered to the designated repository (UCMP) for accessioning into the appropriate fossil collection. Other data such as field notes, photographs, and daily logs will be accessioned with the fossils, and available at the UCMP. Caltrans will maintain in its environmental compliance files a copy of the museum storage agreement with the UCMP documenting the acceptance by the museum of fossils salvaged as a result of implementing this PMP.

3.25 FINAL REPORT – Under the supervision of the Project Paleontologist the Final Report will be prepared, including a summary of the field and laboratory methods, site geology and stratigraphy, faunal list, and a brief statement of the significance and relationship of the site to similar fossil localities. A complete set of field notes, geological maps, stratigraphic sections, photographs and a list of identified specimens will accompany the report. The report will be finalized only after all aspects of the program are completed. Copies of the Final Report will be deposited with Caltrans and the museum repository.

Acceptance of the Final Report by Caltrans will signify completion of the mitigation program for the Project.

SECTION 4

CONCLUSIONS

The mitigation measures described above complete the Paleontological Mitigation Plan for the Caldecott Improvement Project. Full implementation of and compliance with these mitigation measures will ensure that adverse impacts to paleontological resources will be kept to an insignificant level as required by NEPA and CEQA. It is possible that full implementation of and compliance with these mitigation measures may result in beneficial impacts, including possibly the discovery of some new species of fossils.

SECTION 5

ACRONYMS

Caltrans	California Department of Transportation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CSP	Code of Safe Practices
GVS	Great Valley Sequence
KP	Kilo Post
NEPA	National Environmental Policy Act
PG	Professional Geologist
PIR	Paleontological Resources Identification
PM	Post Mile
PMP	Paleontological Mitigation Plan
PRC	PaleoResource Consultants
ROW	Right-of-Way
RE	Resident Engineer
SR	State Route
SVP	Society of Vertebrate Paleontology
UCMP	University of California Museum of Paleontology
USGS	United States Geological Survey

SECTION 6

LITERATURE CITED

David, L. R., 1946, Upper Cretaceous fish remains from the western border of the San Joaquin Valley, California: Carnegie Institution of Washington Publication 551, vol. 5, p.82-112.

Dibblee, T. W. and Minch, J. A., 2005, Geologic map of the Oakland East quadrangle, Contra Costa and Alameda Counties, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-160, scale 1:24000.

Graymer, R. W., Jones, D. L., and Brabb, E. E., 1998, Geologic map of the Hayward fault zone, Contra Costa, Alameda, and Santa Clara Counties, California: a digital database: U.S. Geological Survey Open-File Report OF-95-597, scale 1:50000.

Hilton, R. P. 2003. Dinosaurs and Other Mesozoic Reptiles of California: Berkeley and Los Angeles, CA: University of California Press.

Jones and Stokes, 2004, Paleontological Resources Identification (PIR) and Evaluation Report for the Caldecott Improvement Project, Alameda and Contra Costa Counties, California: unpublished report prepared for Caltrans, 16 p.

Society of Vertebrate Paleontology (SVP), 1995, Assessment and mitigation of adverse impacts to nonrenewable paleontological resources -- standard guidelines: Society of Vertebrate Paleontology News Bulletin, no. 163, p. 22-27.

Society of Vertebrate Paleontology (SVP), 1996, Conditions of receivership for paleontological salvage collections: Society of Vertebrate Paleontology News Bulletin, no. 166, p. 31-32.

APPENDIX A

PALEONTOLOGICAL RESOURCES IDENTIFICATION (PIR) AND EVALUATION REPORT FOR THE CALDECOTT IMPROVEMENT PROJECT, ALAMEDA AND CONTRA COSTA COUNTIES, CALIFORNIA

Final
Paleontological Resources Identification (PIR) and Evaluation Report for the Caldecott Improvement Project, Alameda and Contra Costa Counties, California

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July 2004

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1 Project Area Vicinity and Geologic Map..... 1

1.1 Introduction

The California Department of Transportation (the Department) is proposing the addition of a fourth bore to the Caldecott Tunnel (project) on State Route (SR) 24 in Alameda and Contra Costa Counties. The purpose of this Paleontological Resources Identification (PIR) and Evaluation Report is to outline the steps necessary to ensure compliance with the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321), the California Environmental Quality Act (CEQA) (Chapter 1, Section 21002), the Antiquities Act of 1906 (16 United States Code [USC] 431–433), and Archaeological and Paleontological Salvage (23 USC 305).

The PIR determines if paleontological resources are present in the project area, assesses their scientific significance, analyzes the project's potential effects on paleontological resources, and proposes a mitigation plan to compensate for the project's potential effects on these resources.

For the purposes of this report, paleontological resources are defined as fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. A scientifically significant paleontological resource is regarded as an identified site or geologic deposit that contains individual fossils that are unique or unusual, are diagnostically or stratigraphically important, or add to the existing body of knowledge (i.e., stratigraphic, taxonomic, or regional) of a specific area.

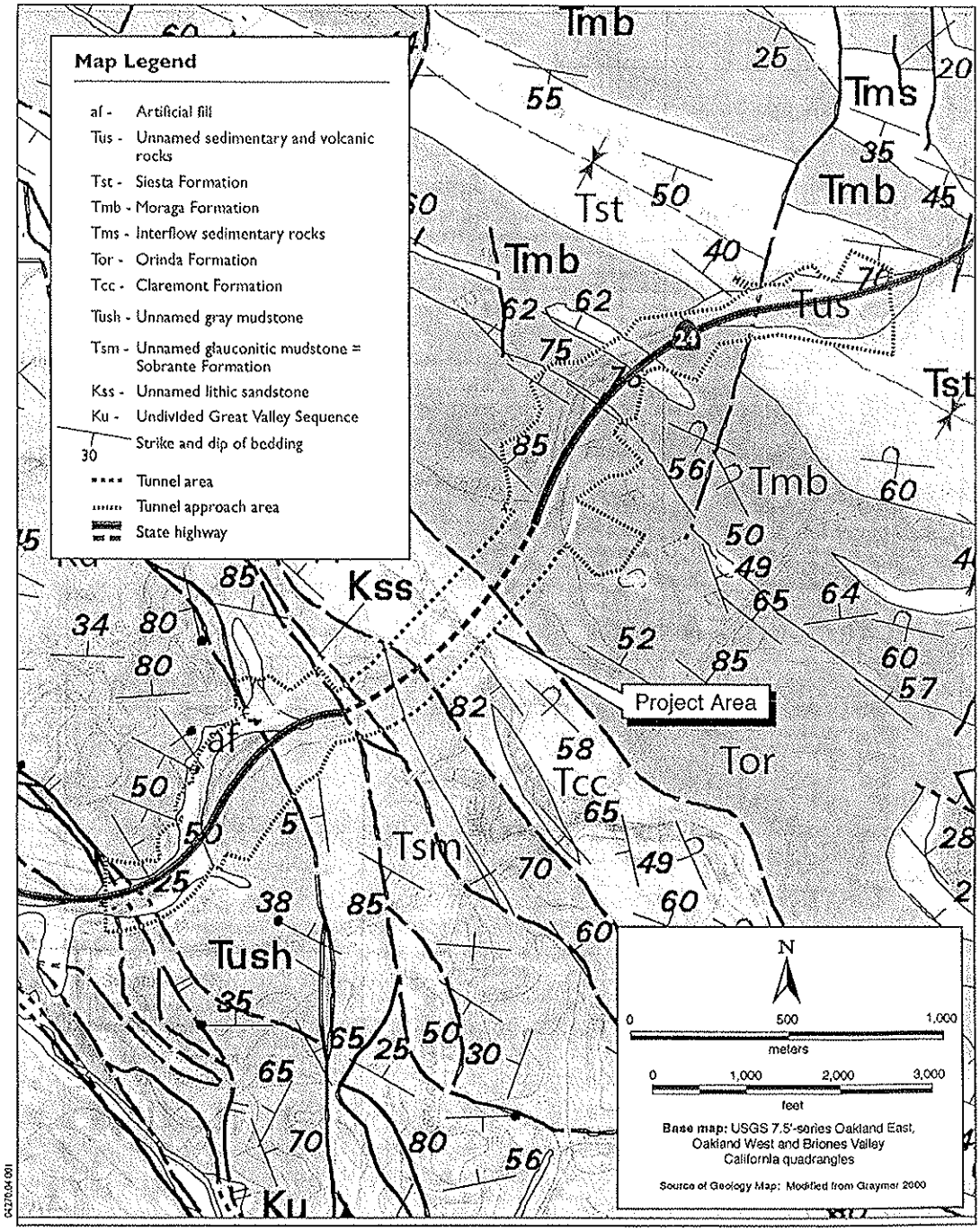
1.2 Project Description

The proposed project will consider a variety of improvements to the SR 24 corridor designed to increase passenger-moving capacity and relieve congestion at the Caldecott Tunnel, particularly congestion in the reverse commute direction.

The project area is located in Township 1 South, Range 3 West, Mount Diablo Meridian on the U.S. Geological Survey (USGS) Oakland East and Briones Valley 7.5-minute quadrangles. The project area encompasses SR 24 from the SR 24/SR 13 interchange in Oakland to the SR 24/Camino Diablo interchange in Orinda (Figure 1).

Most of the potential project impacts would be on lands within the Department's right-of-way. There are privately owned lands that may be affected by the project on the western side of the existing tunnels. The land in the vicinity of the existing tunnels on the eastern side is owned by the East Bay Municipal Utility District and the East Bay Regional Park District. Although these lands are not likely to be impacted by the project, any work done on public properties would require coordination with the appropriate agency. Any fossils found on private property during project construction would belong to the property owner, who would be encouraged to allow the Department to properly curate any fossils found.

The Caldecott Tunnel currently consists of two bores constructed in 1937 and a third bore, north of the original two, built in 1964. The tunnel bores connect Alameda County and Contra Costa County via SR 24. In addition to the No Build Alternative, the current project proposes four tunnel alternatives designed to relieve congestion and increase safety along SR 24 in the vicinity of the Caldecott Tunnel. These include a two-lane tunnel north of the existing bores (Alternative



Jones & Stokes

Figure 1
Project Area Vicinity and Geologic Map

2N); a two-lane tunnel south of the existing bores (Alternative 2S); a three-lane tunnel north of the existing bores (Alternative 3N); and a three-lane tunnel south of the existing bores (Alternative 3S).

1.2.1 No-Build Alternative

This alternative is the existing condition with no project-related activities. It would not provide any improvements to the existing SR 24 beyond those already planned, nor would it provide any relief to congestion and traffic delays, which are expected to significantly increase during the next 20 years. The No-Build Alternative provides the baseline for existing environmental conditions against which all other alternatives are compared.

1.2.2 Tunnel Alternatives

There are four variations of this alternative. All tunnel alternatives will include electrical substations and ventilation equipment located in the portal structures. Other common features with each variation of the tunnel alternative may include sound barriers and utility relocations. (Determination of the reasonableness and feasibility of any proposed sound barriers will be made subsequent to the completion of the Noise Impact Report and upon completion of project design and public involvement processes. The necessity for utility relocations will be further investigated during the final design phase of the Preferred Alternative.)

Tunnel Alternative 2N: The Addition of a Two-Lane Tunnel North of the Existing Facility

- This alternative would include the construction of a new tunnel with two westbound through lanes on an alignment north of the existing tunnels with standard shoulders (right 3-meter shoulder and left 1.5-meter shoulder) and 0.8-meter emergency walkways on each side for a total tunnel width of 13.3 meters and a tunnel length of approximately 1,052 meters;
- Traffic exiting the new fourth bore at the western end of the tunnel would pass underneath the existing Caltrans access bridge and conform to the existing freeway grade approximately 240 meters west of the existing tunnel portal;
- This alternative would require building various retaining walls (up to a maximum of 15 meters), including one on the northern side of the west portal along SR 24, between the Fish Ranch Road off-ramp and SR 24, and at each portal;
- The frontage road between Fish Ranch Road and the westbound Fish Ranch Road off-ramp would be realigned approximately 10 meters to the north;
- At the time the existing third (northern) bore was completed in 1964, the right-of-way for a proposed two lane northern fourth bore alternative (without shoulders) was acquired; and
- Right-of-way acquisition may or may not be needed for this alternative depending on the exact tunnel alignment and width, which will be determined during the final design stage of the project.

Tunnel Alternative 2S: The Addition of a Two-Lane Tunnel South of the Existing Facility

- This alternative would include the construction of a new tunnel with two eastbound through lanes on an alignment south of the existing tunnels with standard shoulders (right 3-meter shoulder and left 1.5-meter shoulder) and 0.8-meter emergency walkways on each side for a total tunnel width of 13.3 meters and a tunnel length of approximately 1,185 meters;
- A new interchange would be constructed between the West Portal and the Kay Overcrossing, including a new overcrossing, a new frontage road to the south, and a substantial retaining wall south of SR 24;
- The SR 24/Fish Ranch Road interchange would be reconstructed, which would include elimination of the eastbound on- and off-ramps, construction of a new frontage road south of SR 24, a new overcrossing, and large retaining walls (up to a maximum of 20 meters) on both sides of SR 24; and
- Right-of-way will be required for this alternative, including both fee and permanent easements.

Tunnel Alternative 3N: The Addition of a Three-Lane Tunnel North of the Existing Facility

- This alternative would include the construction of a new tunnel with three westbound through lanes on-an alignment north of the existing tunnels with standard shoulders (right 3-meter shoulder and left 3-meter shoulder) and 0.8-meter emergency walkways on each side for a total tunnel width of 18.4 meters and a tunnel length of approximately1,033 meters;
- Currently on westbound SR 24, there is an existing auxiliary lane from Camino Pablo Road to the Gateway Boulevard off-ramp, between the Gateway Boulevard off-ramp to the Fish Ranch Road off-ramp, and between the Tunnel Road on-ramp to SR 13 North. The construction of a 3-lane bore would provide a continuous auxiliary lane from Camino Pablo Road to SR 13;
- To accommodate the auxiliary lane, the westbound on- and off-ramps west of the portal would be modified. The Kay Overcrossing would be extended to the north and Caldecott Lane would be relocated to the north. This would also result in a need to modify the SR 13 North exit ramp;
- The Gateway Boulevard/SR 24 interchange would be modified on the northern side of the freeway and Fish Ranch Road to the westbound SR 24 on-ramp, and the westbound SR 24 to Fish Ranch Road off-ramp would be removed. A frontage road connecting Gateway Boulevard and Fish Ranch Road would be constructed on the northern side of SR 24;
- This alternative would require building various retaining walls (up to a maximum of 15 meters), including one on the northern side of the west portal along SR 24, between the Fish Ranch Road off-ramp and SR 24, and at each portal;
- Right-of-way will be required for this alternative including both fee and permanent easements.

Tunnel Alternative 3S: The Addition of a Three-Lane Tunnel South of the Existing Facility

- This alternative would include construction of a new tunnel with three eastbound through lanes on an alignment south of the existing tunnels with standard shoulders (right 3-meter shoulder and left 3-meter shoulder) and 0.8-meter emergency walkways on each side for a total tunnel width of 18.4 meters and a tunnel length of approximately 1,124 meters;
- A new interchange would be constructed between the West Portal and the Kay Overcrossing, including a new overcrossing, a new frontage road to the south, and a large retaining wall south of SR 24 and at each portal;
- The Gateway Boulevard/SR 24 interchange would be modified on the northern side of the freeway, and the Fish Ranch Road to westbound SR 24 on-ramp and the westbound SR 24 to Fish Ranch Road off-ramp would be removed. A frontage road connecting Gateway Boulevard and Fish Ranch Road would be constructed on the northern side of SR 24. Three substantial retaining walls (up to a maximum of 20 meters) would be required for this interchange modification; and
- Right-of-way will be required for this alternative including both fee and permanent easement.

1.3 Methods

Materials used in the preparation of this report include published geologic literature and maps and preliminary geotechnical reports, which were reviewed to identify geologic units that might be affected by excavation and tunneling in the project area. Once the geologic units were identified, the paleontological literature was consulted to evaluate the potential of finding paleontological resources in the project area. Specific reference information is provided in the text. Additionally, conversations were held with Mark Goodwin (Principal Museum Scientist) at the University of California Museum of Paleontology (UCMP).

Fossil specimens collected from the excavation of the Caldecott Tunnel and from the surrounding Berkeley Hills were examined at the University of California Museum of Paleontology. This gave the paleontologist an indication of the condition, abundance, and diversity of primarily vertebrate fossils that could be encountered during project construction.

Finally, a "windshield" survey of the project area was conducted to become familiar with the geological environment in the area.

1.4 Geological Formations/Units in the General Project Area

1.4.1 Overview

The Caldecott Tunnel is located in the Berkeley Hills, which are part of the East Bay Hills. The geology of the Berkeley Hills is characterized by two highly deformed Mesozoic basement rock assemblages that are unconformably overlain by Tertiary sedimentary and volcanic rocks and unconsolidated Quaternary deposits. The two basement rock assemblages are the Great Valley Complex and the Franciscan Complex (Graymer 2000). Only the Great Valley Complex extends

into the project area as the Franciscan Complex is not exposed. Figure 1 shows the geology of the project area.

1.4.2 Lithology

The Great Valley Complex, as defined by Graymer (2000), consists of two distinct units, the Coast Range Ophiolite (CRO), which is composed of serpentinite, gabbro, diabase and basalt, and the Great Valley Sequence (GVS), composed of sandstone, conglomerate, and shale of Jurassic and Cretaceous age. The GVS unconformably overlies the CRO, and together they represent a slice of Jurassic and Cretaceous ocean crust. The Coast Range Ophiolite is not exposed in the project area. However, a unit of GVS, which consists of undivided Cretaceous sandstone, siltstone, shale, and minor conglomerate (Ku on Figure 1) is exposed in the area west of the actual tunnel entrance. There is also a fault-bounded sliver of unnamed lithic sandstone (Kss) in the tunnel area (Graymer 2000), which is of little concern because it probably does not extend to the depths involved in tunneling.

The Great Valley Complex is unconformably overlain by Miocene marine and nonmarine sedimentary rocks (Graymer 2000). Using Graymer's (2000) terminology, the principal Miocene units exposed in the project area from oldest to youngest are unnamed glauconitic mudstone (Tsm), which corresponds to the Sobrante Formation in Page (1950) and Radbruch (1969); Claremont chert (Tcc); Orinda Formation (Tor); Moraga Formation (Tmb); and Siesta Formation (Tst) (Earth Mechanics, Inc. 2003). For convenience of reference, this report will continue the prior usage of the name "Sobrante Formation" for the sandstone and shale unit present in the western part of the tunnels (Earth Mechanics, Inc. 2003). There is also a small exposure in the eastern part of the project area of unnamed sedimentary and volcanic rocks (Tus) of late Miocene age.

There is a narrow exposure in the western tunnel approach of artificial fill (af), which is of no concern, because fossils would probably not be present in such material. Descriptions of the lithology and paleontology of these units are provided below.

Of the units named above, only the Sobrante, Claremont, and Orinda Formations are present in the tunnel section (Earth Mechanics, Inc. 2003). However, the Great Valley Complex sandstone and shale (Ku) and the artificial fill (af) are found beneath the bridges and part of the area required for the western approaches to the tunnel. The Moraga and Siesta Formations and unnamed sedimentary and volcanic rocks (Tus) are located in the area reserved for the eastern approaches to the tunnel (Earth Mechanics, Inc. 2003).

1.4.3 Structural Geology

The East Bay Hills are the result of compression and uplift of the structural block wedged between the Hayward and Calaveras-Franklin faults (Earth Mechanics, Inc. 2003). Consequently, the bedrock units in the project area have been strongly tilted and folded and generally dip moderately (40°) to steeply (85°) to the northeast and southwest. The tunnel lies on the western limb of the Siesta syncline and locally overturned beds are common, which means that older formations overlie younger formations (e.g., Tmb) (Page 1950). The relatively steep angle of dip, with some beds nearly vertical, suggests that the units indicated on the geologic map will be the same units encountered at depth while tunneling.

1.4.4 Geologic Formations Present in the Tunnel Section

The following describes those geologic units that are mapped in the tunnel portion of the project area.

Sobrante Formation (Tsm)

Approximately one-third of the fourth bore tunnel length and the west portal are expected to be in the Sobrante Formation (Earth Mechanics, Inc. 2003), which is composed of massive, brownish-gray, organic-rich sandy siltstones and shales with lesser amounts of glauconitic sandstone and minor conglomerates (Jones and Curtis 1991). Foraminifera place the age of the Sobrante Formation as middle Miocene (Radbruch 1969). Much of the sandstone and shale is fractured and sheared due to faulting of the area (Earth Mechanics, Inc. 2003).

Claremont Formation (Tcc)

Approximately one-third of the fourth bore tunnel length will be in the Claremont Formation, which is of middle to late Miocene age (Earth Mechanics, Inc. 2003). The Claremont Formation consists of chert and shale with altered diabase and sandstone dikes (Earth Mechanics, Inc. 2003). Typical exposures of the Claremont in the project area are thin bands of chert and brown shale with occasional beds of weathered dolomitic limestone (Jones and Curtis 1991). The layers are often tightly folded and highly contorted (Edwards 1983).

Orinda Formation (Tor)

The eastern one third of the fourth bore tunnel and east portal approach will be in the Orinda Formation (Tor), which is of late Miocene age (Earth Mechanics, Inc. 2003). This unit consists of pebble to boulder conglomerate, conglomeratic sandstone, siltstone, and mudstone (Graymer 2000). Conglomerate beds 30–40 feet (10–13 meters) thick occur with alternating green and red sandstones and siltstones of equal thickness (Jones and Curtis 1991, Hall 1958). The Orinda Formation is exposed along SR 24 at the east portal of the Caldecott Tunnel (Curtis 1989). Radbruch (1969) describes the Orinda and Claremont Formations at the Caldecott Tunnel as being overturned, with the younger Orinda Formation underlying the older Claremont chert.

1.4.5 Geologic Formations in the Approach Areas West and East of the Fourth Bore Tunnel

A unit of the GVS, the undivided Great Valley Sequence (Ku), underlies the western tunnel approach. The Moraga and Siesta Formations occur in the area of the eastern approach. The following describes those geologic units that are mapped in the western and eastern approaches to the tunnel.

Undivided Great Valley Sequence (Ku)

A unit of the GVS, undivided Cretaceous sandstone, siltstone, shale, and minor conglomerate is exposed in the project area west of the fourth bore tunnel. No formal formations have been identified in this mass of Cretaceous rock in the East Bay Hills because exposures are poor and the rocks are structurally complex (Jones and Curtis 1991).

Moraga Formation (Tmb)

The Moraga Formation of late Miocene age occurs in the area of the eastern approach to the tunnel. The Moraga Formation is mostly volcanic, which consists of basalt and andesite flows

with minor rhyolite tuff and locally interbedded conglomerates and sandstones (Earth Mechanics, Inc. 2003, Curtis 1989).

Siesta Formation (Tst)

The Siesta Formation of late Miocene age also occurs in the area of the eastern tunnel approach. The Siesta Formation overlies the Moraga Formation and consists of nonmarine siltstone, claystone, and fine sandstone with local beds of freshwater limestone and bentonite (Graymer 2000, Creely et al. 1982, Jones and Curtis 1991).

Unnamed sedimentary and volcanic rocks (Tus)

There is a small exposure east of the tunnel of unnamed sedimentary and volcanic rocks of late Miocene age, which includes conglomerate, sandstone, and siltstone (Graymer 2000). Evidently, the unnamed rocks have not been correlated with formations elsewhere. Consequently, these rocks have not been assigned a formation name, and no information about these rocks has been found in the literature.

1.5 Geologic Units and Associated Fossils and Their Paleontological Sensitivity

As defined above, a scientifically significant paleontological resource is an identified site or geologic deposit that contains individual fossils that are unique or unusual, are diagnostically or stratigraphically important, or add to the existing body of knowledge (i.e., stratigraphic, taxonomic, or regional) of a specific area. These resources may include any or all of the following: vertebrate fossils and their associated taphonomic (i.e., degradation processes acting upon an organism after its death) and environmental indicators, invertebrate fossils, tracks and trails, and plant fossils.

Particularly important to significance are fossils found *in situ* (in place) in primary context (e.g., fossils that have not been subjected to disturbance subsequent to their burial and fossilization). As such, they aid in stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphological evolution, paleoclimatology, the relationships between aquatic and terrestrial species, and evolution in general. Discovery of *in situ* fossil-bearing deposits is rare for many species, especially vertebrates. Terrestrial vertebrate fossils are often assigned greater significance than other fossils because they are rarer than other types of fossils (Caltrans 2003).

Significance may also be evaluated for a particular rock unit, predicated on the research potential of fossils suspected to occur in that unit. Such significance is often identified as "sensitivity" or "potential." In most cases, the decision on how to manage paleontological resources must be based on this potential because the actual situation cannot be known until construction excavation for the project is under way (Caltrans 2003).

The Department uses the following tripartite scale to evaluate the scientific significance and sensitivity of a fossil or geologic unit (Caltrans 2003):

- **High Potential:** Rock units which, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils.

These units include, but are not limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. These units may also include some volcanic and low-grade metamorphic rock units. Fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive. High sensitivity includes the potential for containing: 1) abundant vertebrate fossils; 2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; 3) areas that may contain datable organic remains older than Recent, including *Neotoma* sp. middens; or 4) areas that may contain unique new vertebrate deposits, traces, and/or trackways. Areas with a high potential for containing significant paleontological resources require monitoring and mitigation.

- **Low Potential:** This category includes sedimentary rock units that: 1) are potentially fossiliferous, but have not yielded significant fossils in the past; 2) have not yet yielded fossils, but possess a potential for containing fossil remains; or 3) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock are well understood. Sedimentary rocks expected to contain vertebrate fossils are not placed in this category because vertebrates are generally rare and found in more localized strata. Rock units designated as Low Potential generally do not require monitoring and mitigation. However, as excavation for construction gets underway it is possible that new and unanticipated paleontological resources might be encountered. If this occurs, a Construction Change Order (CCO) must be prepared in order to have a qualified Principal Paleontologist evaluate the resource. If the resource is determined to be significant, monitoring and mitigation is required.
- **No Potential:** Rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks are classified as having no potential for containing significant paleontological resources. For projects encountering only these types of rock units, paleontological resources can generally be eliminated as a concern.

The following sections describe known and inferred paleontological resources associated with geologic units exposed in the vicinity of the Caldecott Tunnel project. The paleontological sensitivity of each geologic unit is summarized in Table 1.

1.5.1 Undivided Great Valley Sequence (Ku)

There is a general paucity of fossils in the rocks of undivided GVS (Ku) in the Caldecott Tunnel area (Jones and Curtis 1991). Because fossils are rare in this unit in the vicinity of the project area, the undivided GVS (Ku) is evaluated as having low potential to contain significant paleontological resources. Consequently, the paleontological sensitivity of this unit is considered low in the project area.

Table 1. Summary of Paleontological Resource Sensitivity for Geological Units in the Caldecott Improvement Project Area [a]

Geologic Unit	Age	Fossil Content in General	Fossil Content in Project Area	Paleontological Sensitivity [b]
Undivided Great Valley Sequence	Late Cretaceous	No fossils have been reported.	There is no record of fossils at Caldecott Tunnel.	Low
Sobrante Formation	Middle Miocene	Contains sparse and poorly preserved invertebrates. No vertebrate remains have been reported.	A few poorly preserved marine bivalves were collected during construction of the Caldecott Tunnel.	Low
Claremont Formation	Middle to late Miocene	Scattered fish scales and marine bivalves. No vertebrate fossils other than scattered fish scales have been reported.	A few fish scales were collected during construction of the Caldecott Tunnel.	Low
Orinda Formation	Late Miocene	Unit is fossiliferous, containing marine invertebrates and a diverse vertebrate fauna. Vertebrate remains are scattered bones and teeth, not complete skeletons. Vertebrates include camels, horses, rhinoceri, and a mastodon.	Numerous fragments of bones and teeth were collected during construction of the Caldecott Tunnel.	High
Moraga Formation	Late Miocene	Unit is mostly volcanic with no fossils reported in volcanic rocks. Rare occurrences of horse teeth fossils have been reported in gravels.	There is no record of fossils at Caldecott Tunnel.	Low
Siesta Formation	Late Miocene	Unit is fossiliferous, containing occasional freshwater invertebrates, vertebrates, and plant remains. Vertebrate remains are scattered bones and teeth, not complete skeletons. Vertebrates include fragments of camel, hare, beaver, mastodon, and lizard.	There is no record of fossils at Caldecott Tunnel.	High
Unnamed sedimentary and volcanic rocks [c]	Late Miocene	Unknown	Unknown	Unknown

[a] See text for information sources and a more detailed discussion.

[b] Paleontological sensitivity based on Caltrans tripartite scale (Caltrans 2003) outlined in the text.

[c] Monitoring of this unit is recommended.

1.5.2 Sobrante Formation (Tsm)

Fossils in the Sobrante Formation are generally scarce and are scattered and poorly preserved when found. Several marine bivalves, *Tellina congesta* and *Pecten peckhami* and a few fish scales have been collected from the Sobrante (Lawson and Palache 1901). Some scattered marine bivalves *Chione*, *Protothaca*, and *Apolymetis* have been identified in the Sobrante Formation near Westmoreland Drive, which is approximately one-half mile north of the Caldecott Tunnel (Case 1963). During the construction of the Caldecott Tunnel, a few poorly preserved marine bivalves of the genus *Arca* were found in the shaly sandstone of the Sobrante Formation (Page 1950). Generally, the bivalves are in such poor condition that identification at the species level is difficult. The bivalves that have been identified are common fossils of the Cenozoic. Based on the paucity of vertebrate fossils and the poor condition of invertebrate remains, the Sobrante Formation is evaluated as having a low potential to contain significant paleontological resources in the project area. Consequently, its paleontological sensitivity is considered low.

1.5.3 Claremont Formation (Tcc)

The Claremont Formation is interpreted as a deep marine deposit; hence, terrestrial vertebrate remains would not be expected. Occasional Miocene fish scales were locally present in the shale units of the Claremont Formation during construction of the Caldecott Tunnel (Page 1950). The shales of the Claremont Formation in Pleasanton contained a few small, ordinary bivalves (*Anadara obispoana* and *Yolida supramontereyensis*), as well as scattered fish scales (Hall 1958). Because of the lack of terrestrial vertebrate fossils and the paucity of fish scales and unusual invertebrates, the Claremont Formation is evaluated as having low potential to contain significant paleontological resources in the project area. Consequently, the paleontological sensitivity of this unit is considered low in the project area.

1.5.4 Orinda Formation (Tor)

Most of the Orinda Formation is nonmarine or fluvial (river) in origin with mammal fossils locally abundant (e.g., Jones and Curtis 1991, Creely et al. 1982, Edwards 1983, Merriam 1913). Scattered marine fossils, including a diversity of bivalves, have been found at the base of the Orinda Formation, which suggests brackish water of an estuary or bay (Richey 1943, Page 1950). A zone of oyster shells was found in Strawberry Creek, 1.8 miles north of the Caldecott Tunnel (Richey 1943). Fragmentary oyster shells were found in the conglomerate at the east portal of the old Tunnel Road (Richey 1943). Marine invertebrates have been collected from four localities in the vicinity of Eastport Station, located approximately 2 miles southeast of the Caldecott Tunnel (Richey 1943). The invertebrate fossils include a genus of gastropod (*Calyptraea)* and at least 10 different genera of marine bivalves (*Chione*, *Ostrea*, *Tivela*, *Volsella*, *Mytilus*, *Saxidomus*, *Clementia*, *Cryptomya*, *Macoma*, and *Solen*) (Richey 1943). The marine invertebrate fossils from the Orinda Formation examined by Jones & Stokes in the collections at the UCMP were either molds or poorly preserved. In addition, the species of bivalves are relatively common fossils of the Miocene.

Fossils of land mammals have been discovered in the Caldecott Tunnel area from the Orinda Formation and from the formation elsewhere in the Berkeley Hills. The diversity of mammal fossils suggests a floodplain or deltaic environment of deposition for the Orinda Formation. Vertebrate fossils collected from the construction of the Caldecott Tunnel are housed at the UCMP and contain bone fragments, teeth, and a few jaws with teeth from horses, camels,

rhinoceri, and mastodons (e.g., Stirton 1939, Edwards 1983, Merriam 1913). Examples of vertebrates found in the Caldecott Tunnel include a portion of leg bone from a small horse species, *Hipparion,* discovered 465 feet below the surface; fragments from another horse, *Pliohippus,* located 1,200 feet below the surface; and part of a milk tusk from a mastodon collected 1,072 feet below the surface (Stirton 1939); all of these were in the Orinda Formation. In addition, vertebrate fossils (not specified) were identified in the crown drift (small pilot tunnel) near the east portal (presumably in the Orinda Formation) during the construction of the Caldecott Tunnel (Radbruch 1969).

Scattered teeth and a few bone fragments from a variety of horse genera including *Protohippine*, *Neohipparron*, *Pliohippus*, and *Nannippus* were collected from the Orinda Formation in the Berkeley Hills near the Caldecott Tunnel (Merriam 1913). In fact, the wide diversity of horse teeth is often the best evidence for correlation of geological units in the region (Stirton 1939). Bones from mastodon-like mammals (*Tetrabelodon*), camels, pronghorn antelopes, oreodonts (an ungulate with pig-like feet and camel-like teeth), and a lower jaw of a cow-like animal *Merycoidontidae* have been found in the upper Orinda Formation near the Caldecott Tunnel (Merriam 1913, Stirton 1939).

The invertebrate fossils from the Orinda Formation are not considered scientifically significant paleontological resources, as they are scattered and are relatively common. Examination of the vertebrate fossils by Jones & Stokes in the UCMP indicated that the teeth and bones are well preserved, yet no complete skeletons or skulls have been curated. In addition, the vertebrate collection from the UCMP was relatively small, which suggests that the vertebrate remains are scattered. Nevertheless, the wide diversity of vertebrate fossils and the utility of fossil horse teeth for geological correlation indicate that the Orinda Formation has a high potential to contain significant paleontological resources in the project area. Consequently, its paleontological sensitivity is considered high.

1.5.5 Moraga Formation (Tmb)

At the base of Mount Diablo, a complete tooth and several fragments of upper teeth from the horse *Nannippus tehonensis* were found in the gravels associated with lava flows in the Moraga Formation (Stirton 1939). However, since fossils are not typically found in volcanic deposits and vertebrate fossils are rare in the sedimentary layers associated with the lavas near the project area, the Moraga Formation is evaluated as having low potential to contain significant paleontological resources in the project area. Consequently, the paleontological sensitivity of the Moraga Formation is considered low in the project area.

1.5.6 Siesta Formation (Tst)

The Siesta Formation contains scattered fossilized remains of mammals with species of freshwater invertebrates in the limestone lenses. The freshwater fossils include a variety of snails (*Planorbis*, *Physa*, *Helix,* and *Ancylus*) and the pea mussel *Pisidium* (Lawson and Palache 1901). Interestingly, several teeth of the horse *Hipparion* have been found in the freshwater limestone lens of the Siesta Formation on the east side of Bald Peak in the Berkeley Hills (Stock 1921, Stirton 1939).

Fragments of bones from a camel, a hare (*Lepus*), and several beavers (*Dipoides lecontei* and *Eucastor lecontei*) have been collected from the Siesta clays (Creely et al. 1982, Stirton 1939,

Merriam 1913, Stock 1921, Lawson and Palache 1901). A tooth from the mastodon *Bunomastodontidae* (Stirton 1939), and a portion of the lizard *Lacerta* (Lawson and Palache 1901) were collected from the Siesta Formation in the Berkeley Hills. There are also scattered plant remains in the Siesta, which include fragments of stems and leaves of rushes and grass, along with some tree leaves (Merriam 1913). The relatively small collection of vertebrate bones and teeth from the Siesta Formation housed at UCMP suggests that vertebrate remains are scattered. No complete or nearly complete skeletons or skulls were curated from the Siesta Formation.

The invertebrate fossils of the Siesta Formation are scattered and have a low paleontological sensitivity. The vertebrate remains, while scattered, are quite diverse. Therefore, the Siesta Formation has a high potential to contain significant paleontological resources in the project area. Consequently, the paleontological sensitivity of the Siesta Formation is considered high in the project area.

1.5.7 Unnamed Sedimentary and Volcanic Rocks (Tus)

The unnamed sedimentary and volcanic rocks include conglomerate, sandstone, and siltstone, all of which have the potential to contain paleontological resources. However, without a formation name, it is difficult to obtain information from the literature about the lithology or paleontology of these rocks. Therefore, the paleontological sensitivity of the unnamed sedimentary rocks is unknown.

1.6 Project Impacts

The project involves two distinct construction elements: 1) boring a tunnel, and 2) modifying or widening bridge structures, portals, and approach cuts to the tunnel. If paleontological resources are present in any of the formations involved in the project area, these resources could certainly be disturbed, and it would not be possible to avoid the paleontological resources. Clearly, both elements have the potential to disturb or damage geologic formations and associated fossils in different ways, which are discussed below.

Potential paleontological resource impacts would be the same for all the project alternatives because the alternative alignments cross essentially the same geologic units.

1.6.1 Impacts Associated with Tunnel Boring

Excavating the tunnel will involve grinding rock material to form a hole or tunnel. During this process, any paleontological resources in the rock will naturally be destroyed. Of the three formations (Sobrante, Claremont, and Orinda Formations) present in the tunnel section, both the Sobrante and Claremont Formations have a low paleontological sensitivity; that is, both of these units are considered unlikely to contain significant paleontological resources. Consequently, no mitigation is required for construction activities in these formations.

However, the third formation in the tunnel, the Orinda Formation, has a high paleontological sensitivity, which means that a high potential for impacts on significant paleontological resources in this formation exists. Vertebrate fossils in the Orinda Formation are scattered and fragmentary; thus, it is unlikely that entire skeletons will be destroyed during construction of the tunnel. There is no doubt, however, that any fragments of bone and teeth will be impacted by

tunneling through the Orinda Formation. Consequently, mitigation is required for construction activities in this formation.

1.6.2 Impacts Associated with Western Tunnel Approaches

Approaches to the fourth bore tunnel from the west may involve excavation in the undivided GVS (Ku), which has a low paleontological sensitivity and is considered unlikely to contain significant paleontological resources. Consequently, no mitigation is required for construction work in this formation. The artificial fill (af) described above would not contain paleontological resources; consequently, no mitigation will be required for construction activities in this unit.

1.6.3 Impacts Associated with Eastern Tunnel Approaches

Approaches to the fourth bore tunnel from the east may involve excavation in the Moraga and Siesta Formations and in the unnamed sedimentary and volcanic rocks (Tus). Because the Moraga Formation has low paleontological sensitivity, it is unlikely to contain significant paleontological resources. Consequently, no mitigation is required for construction activities in this formation.

However, the Siesta Formation is evaluated as having high paleontological sensitivity because of its diverse vertebrate fauna of camel, hare, beaver, mastodon, and lizards. Excavation in this unit could disturb or damage significant paleontological resources. Consequently, mitigation is required for construction activities in the Siesta Formation.

The paleontological sensitivity of the unnamed sedimentary and volcanic rocks (Tus), which consist of conglomerate, sandstone, and siltstone (Graymer 2000), is unknown. Furthermore, it is not known if the siltstone and sandstone of the unnamed sedimentary rocks are marine or nonmarine. If they are nonmarine, they have a high potential to contain vertebrate fossils. Indeed, other late Miocene sedimentary rocks in the area, specifically rocks of the Siesta Formation, contain significant vertebrate remains, and it must be assumed that the unnamed sedimentary rocks also have the potential to contain vertebrate remains. Presently, the only way to determine the environment of deposition of the unnamed sedimentary rocks (Tus) is to examine the rocks in the field. This could be accomplished either by field mapping and examination prior to excavation of the area or by monitoring the excavation during work in the area. Consequently, mitigation would be required for construction activities in the unnamed sedimentary and volcanic rocks if prior fieldwork is not conducted. Otherwise, mitigation would be required only if prior field mapping determined the rocks to have a high potential to contain paleontological resources.

1.7 Mitigation Plan

The following sections outline a plan to mitigate potential impacts on scientifically significant paleontological resources caused by project construction and provide rough labor estimates for construction monitoring and related activities.

1.7.1 Mitigation Measures

Mitigation Measure A: Retain a Vertebrate Paleontologist to Monitor Selected Construction Activities Associated with Tunnel Boring and during Excavation of Eastern Approach to the Tunnel

A typical mitigation measure is to retain a qualified vertebrate paleontologist to monitor construction in a paleontologically sensitive geological unit. However, due to the very nature of the boring process, monitoring of tunnel spoils would be of little value.

Accordingly, the Department should retain a qualified vertebrate paleontologist to monitor construction activities under the following conditions:

A-1. **Tunnel Mitigation.** Once the tunnel has been excavated, the paleontologist should be retained to "walk" the tunnel to determine if any paleontological resources are exposed in the tunnel walls and worth collecting (Goodwin pers. comm.). This measure is contingent on the tunnel walls not being immediately lined with concrete or other cover as the boring proceeds, such that fossils would not be visible in the tunnel walls.

A-2. **Approach Mitigation.** A qualified vertebrate paleontologist should be retained to monitor any excavation of the eastern approach and bridges that involves disturbances of bedrock in the Siesta Formation and the unnamed sedimentary rocks and any construction in the east portal area of the tunnel in the Orinda Formation.

Mitigation Measure B: Stop Work if Vertebrate Remains Are Encountered in the Rock Walls of the Tunnel or during Construction and Excavation

B-1. **Tunnel Mitigation.** If vertebrate fossils are discovered in the rock walls of the tunnel (item A-1 above) or during the construction of the east portal (item A-2 above), the construction contractor will stop work immediately until the paleontological monitor can assess the nature and importance of the find and recommend appropriate treatment. If the fossils are determined to be sensitive, treatment will include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection and may also include preparation of a report for publication describing the finds.

B-2. **Approach Mitigation.** If vertebrate fossils are discovered during excavation of the Siesta Formation and/or the unnamed sedimentary rocks, the construction contractor should stop work immediately until the paleontological monitor can assess the nature and importance of the find and recommend appropriate treatment. If the fossils are determined to be sensitive, treatment will include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection and may also include preparation of a report for publication describing the finds.

1.7.2 Labor and Cost Estimates for Mitigation

Table 2 provides an estimation of the amount of labor that may be required to conduct the construction monitoring.

Table 2. Labor Estimates for Paleontological Resource Construction Monitoring, Evaluation, Recovery, and Curation for the Caldecott Improvement Project (Work Breakdown Structure Code 235.05.25)

Task	Estimated Labor Hours
1. Conduct construction monitoring of roads and tunnel approaches in Siesta Formation	Principal Paleontologist – 60
Assumption: three 10-hour days each week for 8-week ground disturbance period	Paleontological Monitor – 240
2. Conduct survey of tunnel through Orinda Formation after boring (if feasible)	Principal Paleontologist – 10 Paleontological Monitor – 10
3. Conduct construction monitoring of Orinda Formation at east portal	Principal Paleontologist – 80
Assumption: three 10-hour days each week for 12-week ground disturbance period	Paleontological Monitor – 360
4. Evaluate fossils as required for scientific significance as required	Principal Paleontologist – 40
Assumption: ten incidents requiring fossil evaluation	Paleontological Monitor – 100
5. Recover/collect fossils as required	Principal Paleontologist – 200
Assumptions: two formal recovery operations for a large specimen and 20 informal fossil collections	Paleontological Monitors – 800
6. Facilitate museum curation of recovered fossils as required	Principal Paleontologist – 80
Assumption: curation required for the above two formal fossil recoveries and 20 informal fossil collections	Paleontological Monitor – 40
Total Labor Hours	**Principal Paleontologist – 470** **Paleontological Monitor – 1,550**
7. Optional geologic mapping and paleontological resource evaluation of east portal area	Principal Geologist – 40 Principal Paleontologist – 16

Because it is unknown whether scientifically significant fossils would be encountered during project construction, it is difficult to provide an accurate estimate of the labor that may be required for fossil evaluation, recovery, and curation work. The labor estimate assumes a modest effort for fossil evaluation, recovery, and curation.

1.8 Further Studies

The scale of the Graymer (2000) geologic map (i.e., 1:50,000) provides only a general depiction of the positions of the geologic units in the project area. Although not mandatory, detailed geologic mapping in the east tunnel portal area would provide a more precise depiction of the extent of the Siesta and Orinda Formations, which are regarded as having high paleontological resource sensitivity.

Since information about the late Miocene unnamed sedimentary and volcanic rocks (Tus) is scarce, it is essential that exposures be examined for paleontological resources and mapped in an attempt to correlate this unit with others in the area.

Such mapping, conducted at a scale of approximately 1:6,000 (1 inch = 500 feet), could provide the basis for reducing the amount of construction monitoring required in the east portal area. The mapping should be conducted by a qualified field geologist. In addition, a qualified paleontologist should be retained to further assess the paleontological sensitivity of exposed fossiliferous units identified during the geologic mapping.

1.9 References Cited

1.9.1 Printed References

Caltrans 2003. Standard Environmental Reference. Chapter 8 – Paleontology. Available at: http://www.dot.ca.gov/ser/vol1/sec3/physical/Ch08Paleo/chap08paleo .htm#rep. Accessed: June 2004.

Case, J.E. 1963. *Geology of a portion of the Berkeley and San Leandro Hills, California.* (Ph.D. dissertation.) Berkeley, CA: University of California.

Creely, S., Savage, D.E., and Ogle, B.A. 1982. Stratigraphy of upper Tertiary nonmarine rocks of central Contra Costa basin, California. Pages 11–22 in R. V. Ingersoll and M. W. Woodburne (eds.), *Cenozoic nonmarine deposits of California and Arizona.* Pacific Section, Society of Economic Paleontologists and Mineralogists.

Curtis, G.H. 1989. Berkeley Hills. Pages 47–52 in C. Wahrhaftig and D. Sloan (eds.), *Geology of San Francisco and vicinity.* Washington, D.C: Field Trip Guidebook T105, 28th International Geological Congress, American Geophysical Union.

Earth Mechanics, Inc. 2003. Preliminary geotechnical report, Caldecott improvement project. Caltrans Contract No. 04a1394. Prepared for Parsons Brinkerhoff and California Department of Transportation.

Edwards, S.W. 1983. Ancient volcanic features of the Berkeley Hills. *California Geology* 36:83–87.

Graymer, R.W. 2000. Geologic map and map database of the Oakland metropolitan area, Alameda, Contra Costa, and San Francisco Counties, California. USGS Miscellaneous Field Study MF-2342, scale 1:50,000.

Hall, C.A., Jr. 1958. Geology and paleontology of the Pleasanton area, Alameda and Contra Costa Counties, California. University of California Publications Bulletin of the Department of Geological Sciences 34:1–90.

Jones, D.L. and Curtis, G. 1991. Guide to the geology of the Berkeley Hills, central Coast Ranges, California. Pages 62-73 in D. Sloan and D. L. Wagner (eds.), *Geologic excursions in northern California: San Francisco to the Sierra Nevada.* (Special Publication 109.) Sacramento, CA: California Division of Mines and Geology.

Lawson, A.C. and Palache, C. 1901. The Berkeley Hills, a detail of Coast Range geology. University of California Publications Bulletin of the Department of Geological Sciences 2:349–450.

Merriam, J.C. 1913. Vertebrate fauna of the Orindan and Siestan beds in middle California. University of California Publications Bulletin of the Department of Geological Sciences 7:373–385.

Page, B. M. 1950. Geology of the Broadway Tunnel, Berkeley Hills, California. *Economic Geology* 45:142–166.

Radbruch, D. H. 1969. Areal and engineering geology of the Oakland East Quadrangle, California: USGS GQ-769, 1:24,000 scale.

Richey, K. A. 1943. A marine invertebrate fauna from the Orinda, California, Formation. University of California Publications Bulletin of the Department of Geological Sciences 27:25–36.

Stirton, R.A. 1939. Cenozoic mammal remains from the San Francisco Bay region. University of California Publications Bulletin of the Department of Geological Sciences 24:339–410.

Stock, C. 1921. Note on an Hipparion tooth from the Siestan deposits of the Berkeley Hills, California. University of California Publications Bulletin of the Department of Geological Sciences 13:19–21.

1.9.2 Personal Communications

Goodwin, Mark. Principal Museum Scientist. University of California Museum of Paleontology, Berkeley, California. Meeting with and email to Nancy Buening, June 15 and 21, 2004.

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APPENDIX B

ASSESSMENT AND MITIGATION OF ADVERSE IMPACTS TO NONRENEWABLE PALEONTOLOGIC RESOURCES: STANDARD GUIDELINES

ASSESSMENT AND MITIGATION OF ADVERSE IMPACTS TO NONRENEWABLE PALEONTOLOGIC RESOURCES: STANDARD GUIDELINES

Society of Vertebrate Paleontology
Conformable Impact Mitigation Guidelines Committee
Robert E. Reynolds, Chairman

Society of Vertebrate Paleontology News Bulletin Number 163, pages 22-27

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INTRODUCTION

Vertebrate fossils are significant nonrenewable paleontological resources that are afforded protection by federal, state, and local environmental laws and guidelines. The potential for destruction or degradation by construction impacts to paleontologic resources on public lands (federal, state, county, or municipal) and land selected for development under the jurisdiction of various governmental planning agencies is recognized. Protection of paleontologic resources includes: (a) assessment of the potential for property to contain significant nonrenewable paleontologic resources which might be directly or indirectly impacted, damaged, or destroyed by development, and (b) formulation and implementation of measures to mitigate adverse impacts, including permanent preservation of the site and/or permanent preservation of salvaged materials in established institutions. Decisions regarding the intensity of the Paleontological Resource Impact Mitigation Program (PRIMP) will be made by the Principal Paleontologist on the basis of the paleontologic resources, not on the ability of an applicant to fund the project.

ASSESSMENT OF THE PALEONTOLOGICAL POTENTIAL OF ROCK UNITS

Sedimentary rock units may be described as having (a) high (or unknown) potential for containing significant nonrenewable paleontologic resources, (b) low potential for containing nonrenewable paleontologic resources or (c) undetermined potential.

It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case. Paleontologists can thus develop maps which suggest sensitive areas and units that are likely to contain paleontological resources. These maps form the bases for preliminary planning decisions. Lead agency evaluation of a project relative to paleontologic sensitivity maps should trigger a "request for opinion" from a state paleontologic clearing house or an accredited institution with an established paleontological repository.

The determination of a site's (or rock unit's) degree of paleontological potential is first founded on a review of pertinent geological and paleontological literature and on locality records

of specimens deposited in institutions. This preliminary review may suggest particular areas of known high potential. If an area of high potential cannot be delimited from the literature search and specimen records, a surface survey will determine the fossiliferous potential and extent of the sedimentary units within a specific project. The field survey may extend outside the defined project to areas where rock units are better exposed. If an area is determined to have a high potential for containing paleontologic resources, a program to mitigate impacts is developed. In areas of high sensitivity, a pre-excavation survey prior to excavation is recommended to locate surface concentrations of fossils, which might need special salvage methods.

The sensitivity of rock units in which fossils occur may be divided into three operational categories.

A. HIGH POTENTIAL

Rock units from which vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered are considered to have a high potential for containing significant non-renewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations, which contain significant nonrenewable paleontologic resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas which contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas which may contain new vertebrate deposits, traces, or track ways are also classified as significant.

B. UNDETERMINED POTENTIAL

Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.

C. LOW POTENTIAL

Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections. These deposits generally will not require protection or salvage operations.

MEASURES TO MITIGATE ADVERSE IMPACTS RESULTING FROM DEVELOPMENT

Measures for adequate protection or salvage of significant nonrenewable paleontologic resources are applied to areas determined to have a high potential for containing significant fossils. Specific mitigation measures generally need not be developed for areas of low

paleontological potential. Developers and contractors should be made aware, however, that it is necessary to contact a qualified paleontologist if fossils are unearthed in the course of excavation. The paleontologist will then salvage the fossils and assess the necessity for further mitigation measures, if applicable.

A. AREAS OF HIGH POTENTIAL

In areas determined to have a high potential for significant paleontologic resources, an adequate program for mitigating the impact of development should include:

1. A preliminary survey and surface salvage prior to construction.
2. Monitoring and salvage during excavation:
3. Preparation, including screen washing to recover small specimens (if applicable), and specimen preparation to a point of stabilization and identification.
4. Identification, cataloging, curation, and storage; and
5. a final report of the finds and their significance, after all operations are complete.

All phases of mitigation are supervised by a professional paleontologist who maintains the necessary paleontologic collecting permits and repository agreements. The Lead Agency assures compliance with the measures developed to mitigate impacts of excavation during the initial assessment. To assure compliance with the start of the project, a statement that confirms the site's potential sensitivity, confirms the repository agreement with an established institution, and describes the program for impact mitigation, should be deposited with the Lead Agency and contractors before work begins. The program will be reviewed and accepted by the Lead Agency's designated vertebrate paleontologist. If a mitigation program is initiated early during the course of project planning, construction delays due to paleontologic salvage activities can be minimized or avoided.

RECOMMENDED GENERAL GUIDELINES

These guidelines are designed to apply to areas of high paleontologic potential.

A. ASSESSMENT BEFORE CONSTRUCTION STARTS

Pre-construction assessment will develop an adequate program of mitigation. This may include a field survey to delimit the specific boundaries of sensitive areas and pre-excavation meetings with contractors and developers. In some cases, it may be necessary to conduct field surveys and/or a salvage program prior to grading to prevent damage to known resources and to avoid delays to construction schedules. Such a program may involve surface collection and/or quarry excavations. A review of the initial assessment and proposed mitigation program by the Lead Agency before operations begin will confirm the adequacy of the proposed program.

B. ADEQUATE MONITORING

An excavation project will retain a qualified Principal Paleontologist. In areas of known high potential, the Principal Paleontologist may designate a paleontologic monitor to be present

during 100% of the earth-moving activities. If, after 50% of the grading is completed, it can be demonstrated that the level of monitoring should be reduced, the Principal Paleontologist may so amend the mitigation program.

Paleontologists who monitor excavations must be qualified and experienced in salvaging fossils and authorized to divert equipment temporarily while removing fossils. They should be properly equipped with tools and supplies to allow rapid removal of specimens.

Provision should be made for additional assistants to monitor or help in removing large or abundant fossils to reduce potential delays to excavation schedules. If many pieces of heavy equipment are in use simultaneously but at diverse locations, each location may be individually monitored.

C. MACROFOSSIL SALVAGE

Many specimens recovered from paleontological excavations are easily visible to the eye and large enough to be easily recognized and removed. Some may be fragile and require hardening before moving. Others may require encasing within a plaster jacket for later preparation and conservation in a laboratory. Occasionally specimens encompass all or much of a skeleton and will require moving either as a whole or in blocks for eventual preparation. Such specimens require time to excavate and strengthen before removal and the patience and understanding of the contractor to recover the specimens properly. It is thus important that the contractors and developers are fully aware of the importance and fragility of fossils for their recovery to be undertaken with the optimum chances of successful extraction. The monitor must be empowered to temporarily halt or redirect the excavation equipment away from the fossils to be salvaged.

D. MICROFOSSIL SALVAGE

Many significant vertebrate fossils (e.g., small mammal, bird, reptile, or fish remains) are too small to be visible within the sedimentary matrix. Fine-grained sedimentary horizons and paleosols most often contain such fossils. They are recovered through concentration by screen washing. If the sediments are fossiliferous, bulk samples are taken for later processing to recover any fossils. An adequate sample comprises 12 cubic meters (6,000 lbs or 2,500 kg) of matrix for each site horizon or paleosol, or as determined by the supervising paleontologist. The uniqueness of the recovered fossils may dictate salvage of larger amounts. To avoid construction delays, samples of matrix should be removed from the site and processed elsewhere.

E. PRESERVATION OF SAMPLES

Oriented samples must be preserved for paleomagnetic analysis. Samples of fine matrices should be obtained and stored for pollen analysis. Other matrix samples may be retained with the samples for potential analysis by later workers, for clast source analysis, as a witness to the source rock unit and possibly for procedures that are not yet envisioned.

F. PREPARATION

Recovered specimens are prepared for identification (not exhibition) and stabilized. Sedimentary matrix with microfossils is screen washed and sorted to identify the contained fossils. Removal of excess matrix during the preparation process reduces storage space.

G. IDENTIFICATION

Specimens are identified by competent qualified specialists to a point of maximum specificity. Ideally, identification is of individual specimens to element, genus, and species. Batch identification and batch numbering (e.g., "mammals, 75 specimens") should be avoided.

H. ANALYSIS

Specimens may be analyzed by stratigraphic occurrence, and by size, taxa, or taphonomic conditions. This results in a faunal list, a stratigraphic distribution of taxa, or evolutionary, ecological, or depositional deductions.

I. STORAGE

Adequate storage in a recognized repository institution for the recovered specimens is an essential goal of the program. Specimens will be cataloged and a complete list will be prepared of specimens introduced into the collections of a repository by the curator of the museum or university. Adequate storage includes curation of individual specimens into the collections of a recognized, nonprofit paleontologic specimen repository with a permanent curator, such as a museum or a university. A complete set of field notes, geologic maps, and stratigraphic sections accompany the fossil collections. Specimens are stored in a fashion that allows retrieval of specific, individual specimens by researchers in the future.

J. SITE PROTECTION

In exceptional instances, the process of construction may reveal a fossil occurrence of such importance that salvage or removal is unacceptable to all concerned parties. In such cases, the design concept may be modified to protect and exhibit the occurrence with the project's design, e.g., as an exhibit in a basement mall. Under such circumstances, the site may be declared and dedicated as a protected resource of public value. Associated fragments recovered from such a site will be placed in an approved institutional repository.

K. FINAL REPORT

A report is prepared by the Principal Paleontologist including a summary of the field and laboratory methods, site geology and stratigraphy, faunal list, and a brief statement of the significance and relationship of the site to similar fossil localities. A complete set of field notes, geological maps, stratigraphic sections, and a list of identified specimens accompany the report. The report is finalized only after all aspects of the program are completed. The Final Report together with its accompanying documents constitutes the goals of a mitigation project. Full copies of the Final Report are deposited with the Lead Agency and the repository institution.

L. COMPLIANCE

The Lead Agency assures compliance with measures to protect fossil resources from the beginning of the project by:

1. requesting an assessment and program for impact mitigation which includes salvage and protection during the initial planning phases;

2. by arranging for recovered specimens to be housed in an institutional paleontologic repository; and

3. by requiring the Final Report.

The supervising paleontologist is responsible for:

1. assessment and development of the program for impact mitigation during initial planning phases;

2. the repository agreement;

3. the adequacy and execution of the mitigation measures; and

4. the Final Report.

Acceptance of the Final Report for the project by the Lead Agency signifies completion of the program of mitigation for the project. Review of the Final Report by a vertebrate paleontologist designated by the Lead Agency will establish the effectiveness of the program and adequacy of the report. Inadequate performances in either field comprise noncompliance, and may result in the Lead Agency removing the paleontologist from its list of qualified consultants.

DEFINITIONS

A QUALIFIED VERTEBRATE PALEONTOLOGIST is a practicing scientist who is recognized in the paleontologic community and is proficient in vertebrate paleontology, as demonstrated by:

1. institutional affiliations or appropriate credentials;

2. ability to recognize and recover vertebrate fossils in the field;

3. local geological and biostratigraphic expertise;

4. proficiency in identifying vertebrate fossils; and

5. publications in scientific journals.

A PALEONTOLOGICAL REPOSITORY is a publicly supported, not-for-profit museum or university employing a permanent curator responsible for paleontological records and materials. Such an institution assigns accession and catalog numbers to individual specimens, which are stored and conserved to ensure their preservation under adequate security and climate control. The repository will also retain site lists of recovered specimens, and any associated field notes, maps, diagrams, or associated data. It makes its collections of cataloged specimens available to researchers.

SIGNIFICANT NONRENEWABLE PALEONTOLOGIC RESOURCES are fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or botanical fossils except when present within a given vertebrate assemblage. Certain plant and invertebrate fossils or assemblages may be defined as significant by a Principal Paleontologist, local paleontologist, specialists, or special interest groups, or by Lead Agencies or local governments.

A SIGNIFICANT FOSSILIFEROUS DEPOSIT is a rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., track ways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years BP.

A LEAD AGENCY is the agency responsible for addressing impacts to nonrenewable resources that a specific project might generate.

PALEONTOLOGIC POTENTIAL is the potential for the presence of significant nonrenewable paleontological resources. All sedimentary rocks, some volcanic rocks, and some metamorphic rocks have potential for the presence of significant nonrenewable paleontologic

resources. Review of available literature may further refine the potential of each rock unit, formation, or facies.

PALEONTOLOGIC SENSITIVITY is determined only after a field survey of the rock unit in conjunction with a review of available literature and paleontologic locality records. In cases where no subsurface data are available, sensitivity may be determined by subsurface excavations.

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APPENDIX C

CONDITIONS OF RECEIVERSHIP FOR PALEONTOLOGICAL SALVAGE COLLECTIONS

CONDITIONS OF RECEIVERSHIP FOR PALEONTOLOGIC SALVAGE COLLECTIONS

Society of Vertebrate Paleontology
Conformable Impact Mitigation Guidelines Committee
Robert E. Reynolds, Chairman

Society of Vertebrate Paleontology News Bulletin Number 166, pages 31-32

February 1996

1. The repository museum and its curator maintain the right to accept or refuse the materials.
2. The materials received must fit with the repository museum's mission and policy statements.
3. All repository arrangements must be made with the curator in advance of receipt. All arrangements for inventory numbers and locality numbers must be made in advance. "Museums are not a dumping ground."
4. The museum will act as the trustee for the specimens. A deed of gift from the landowner or agent must be provided. A loan form or M.O.U. must be prepared for specimens from government lands.
5. Specimens must receive discrete locality numbers. Locality data must be to the maximum specificity available and plotted on 7.5-minute topographic maps, and as specific as allowed by stratigraphic collecting and field mapping. The repository may require the repositor to bear the cost of entering locality data into computerized data files.
6. All reports prepared to meet mitigation requirements, field notes, and photographs must be provided at the time of transfer to the repository museum.
7. Specimens must be delivered to the repository fully prepared and stabilized. Standards of stabilization and modern conservation techniques must be established prior to preparation and must be acceptable to the repository institution. Details of stabilizing materials and chemicals must be provided by the repositor. For microvertebrates, this means sorting and mounting. For large specimens, including whales, this means removal of all unnecessary materials and full stabilization. Fossiliferous matrix must be washed and processed. Earthquake proofing includes inventory numbers on corks and in vials. In storage, specimens must be insulated or cushioned to protect each from contact or abrasion. Oversized specimens must be stored on shelves or on racks developed to fit existing constraints of the repository museum. The repositor must provide for all nonstandard materials for storage.

8. Specimens must be individually inventoried in accordance with the established system at the repository museum. The specimen inventory must be acceptable to and meet the requirements of the lead agency. Specimens must be identified to element and to maximum reasonable taxonomic specificity. Batch or bulk cataloging must be avoided.

9. Specimens must be cataloged in accord with the repository system so that specimens are retrievable to curators and to researchers. The repository museum may require that the repositor bear the cost of having repository staff catalog the specimens into computerized databases.

10. The repository may require the repositor to bear the cost for completing preparation and stabilization, completing inventory, and completing cataloging.

11. There will be a one-time fee charged by the repository for permanent storage of specimens. This fee will be utilized to compensate the repository for storage space, cabinets or shelves, access or aisle space, a retrievable catalog system, additional preparation, specimen filing, and labor involved in the above. The repository reserves the right to charge the repositor for unpacking and placement of specimens in approved storage cabinets.

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APPENDIX D

PALEONTOLOGICAL TRAINING ACKNOWLEDGEMENT FORM

PALEONTOLOGICAL TRAINING ACKNOWLEDGMENT FORM

I hereby acknowledge that I attended paleontological training regarding the scientific importance of fossil remains; the potential for fossil remains being uncovered and/or disturbed by project-related earth moving; where such remains are most likely to be encountered during earth moving; and procedures to be employed if fossil remains are discovered during excavations. I understand the requirements to protect fossils during project construction and agree to follow the procedures outlined in the paleontological training. I understand that failure to follow these procedures may result in disciplinary action including dismissal from the job site, fines, and imprisonment.

Name (please print)	Signature	Date

Printed name of paleontologist providing the paleontological training: _____

Signature Date

APPENDIX E

DAILY MONITORING REPORT FORM

Caltrans State Route 33 Devil's Den Rehabilitation Project

Paleontological Monitoring and Mitigation Program

DAILY MONITORING REPORT

Project Name: Caltrans Caldecott Improvement Project

Client: Parsons/Caltrans **PRC Project Number:**_____

Task No./Name: Task ?? -- Monitoring of Excavations

Location: Alameda and Contra Costa Counties, California

Employee:_____

Signature:_____

Date:_____ **Times: Start:**_____ **Finish:**_____

Daily Monitoring Report (*note excavation activities, stratigraphy impacted, specimens/samples collected, problems and resolution; attach maps, diagrams, photographs, etc., as appropriate*):

APPENDIX F

MODEL LETTER
FROM THE UNIVERSITY OF CALIFORNIA
MUSEUM OF PALEONTOLOGY
ACCEPTING FOSSILS SALVAGED
FROM THE CALTRANS CALDECOTT IMPROVEMENT PROJECT

Dr. Lanny H. Fisk, PhD, PG
PaleoResource Consultants
5325 Elkhorn Boulevard, #294
Sacramento, CA 95842

10 October 2007

Dear Dr. Fisk:

This letter will confirm our willingness to accept the fossil collection salvaged as part of the paleontological mitigation program for the Caltrans Caldecott Improvement Project in Alameda and Contra Costa Counties, California. UCMP is willing to accept the collection if all the following conditions are met:

1. Letter of donation from project sponsor granting UCMP ownership of the fossil material.

2. Where applicable, specimens are trimmed of excess matrix and the specimens identified to lowest level possible. All specimens should be accompanied by specimen labels in appropriate storage containers (i. e., trays, vials, boxes), and, in the case of microvertebrate specimens, they should be pinned.

3. Field notes should be placed on file concurrent with the accessioning of this material in order to guarantee that the material can be properly curated and used for research. Locality numbers for all collections will be issued only when the appropriate locality form is completed and ready to be filed.

4. Specimens are accompanied by accurate stratigraphic and geographic data that are tied to field numbers. Specifically, specimens should be associated with descriptions of the lithologic unit, instructions for relocating the site and determining its stratigraphic position, and standard map data (viz., state, county, section, township, range, quarter sections, latitude and longitude), and a plot on a map.

5. Associated specimens must be clearly marked as having been found in association.

6. Field notes and copies of field maps will be deposited in the Museum archives in order to document the fieldwork and accession of the collection.

All material curated into the UCMP collections will be available for scientific analysis and comparative study with collections made throughout the world. Data pertaining to the location of finds, depositional environment, geologic and biostratigraphic age, and taxonomic assignments of fossils will be entered into our computerized databases. These data are available to land managers, state officials, and qualified researchers.

Please contact me if you have any questions regarding these conditions.

Sincerely,

Dr.
Curator

APPENDIX G

PROPOSED LETTER DONATING FOSSILS SALVAGED FROM THE CALTRANS CALDECOTT IMPROVEMENT PROJECT TO THE UNIVERSITY OF CALIFORNIA MUSEUM OF PALEONTOLOGY

California Department of Transportation
District 4
111 Grand Avenue, 14th Floor
Oakland, CA 94612-0660

10 October 2007

Dr. Patricia A. Holroyd, PhD
Curator of Vertebrate Paleontology
Museum of Paleontology
University of California at Berkeley
1101 Valley Life Sciences Building
Berkeley, CA 94720

Re: Gift of Fossil Collection from Caltran's Caldecott Improvement Project

Dear Dr. Holroyd:

Caltrans hereby irrevocably and unconditionally donates, gives, and assigns to the University of California Museum of Paleontology (UCMP) absolute and unconditional ownership of fossils collected during excavations for the Caltrans Caldecott Improvement Project in Alameda and Contra Costa Counties, California. It is my understanding that you are already in receipt of a copy of the project Final Report authored by the Project Paleontologist Dr. Lanny H. Fisk, PhD PG with PaleoResource Consultants. This report describes the fossil collection to which this letter refers and will suffice as a legal description of the property we are herewith donating.

This gift includes without limitation full powers of management, access, display, conservation, and disposition at UCMP's sole discretion and in exercise of its general purpose, together with all other rights associated with this property to which we are hereby assigning UCMP full title. To the best of our belief, the subject of this gift is free and clear of all encumbrances and restrictions.

We request that the fossils being donated with this letter be identified in UCMP records and, if put on display, to the public as a gift of Caltrans.

Respectfully,

Mr. Gregory C. McConnell, District 4 Functional Project Manager
On behalf of California Department of Transportation

cc. Dr. Lanny H. Fisk, PhD PG, Project Paleontologist

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Welcome to the online source for the California Code of Regulations

3 CA ADC § 4500

3 CCR § 4500

Cal. Admin. Code tit. 3, § 4500

Barclays Official California Code of Regulations Currentness
Title 3. Food and Agriculture
Division 4. Plant Industry (Refs & Annos)
Chapter 6. Weed Free Areas and Weed Eradication Areas (Refs & Annos)
Subchapter 6. Noxious Weed Species
§ 4500. Noxious Weed Species.

It has been determined that the following species of plants are noxious weeds within the meaning of Section 5004 of the Food and Agricultural Code:
Acacia paradoxa (Kangaroo thorn)
Acaena anserinifolia (biddy biddy)
Acaena novae-zelandiae (biddy biddy)
Acaena pallida (biddy biddy)
Achnatherum brachychaetum (punagrass)
Acroptilon repens (Russian knapweed)
Aegilops cylindrica (jointed goatgrass)
Aegilops ovata (ovate goatgrass)
Aegilops triuncialis (barb goatgrass)
Aeschynomene rudis (rough jointvetch)
Alhagi maurorum (camelthorn)
Ailanthus altissima (tree of heaven)
Allium paniculatum (panicled onion)
Allium vineale (wild garlic)
Alternanthera philoxeroides (alligatorweed)
Alternanthera sessilis (sessile joyweed)
Ambrosia trifida (giant ragweed)
Araujia sericofera (bladderflower)
Arctotheca calendula (capeweed, as seed or fertile plants)
Arundo donax (giant reed)
Atriplex amnicola (swamp saltbush)
Berteroa incana (hoary alyssum)
Cabomba caroliniana (Carolina fanwort)
Cardaras chalepensis (lens-podded hoary cress)
Cardaria draba (heart-podded hoary cress)
Cardaria pubescens (globe-podded hoary cress)
Carduus acanthoides (plumeless thistle)
Carduus crispus (curly plumeless thistle)
Carduus nutans (musk thistle)
Carduus pycnocephalus (Italian thistle)
Carduus tenuiflorus (Italian thistle)
Carthamus baeticus (smooth distaff thistle)
Carthamus lanatus (woolly distaff thistle)
Carthamus leucocaulos (whitestem distaff thistle)
Cenchrus echinatus (southern sandbur)

Cenchrus incertus (coast sandbur)
Cenchrus longispinus (mat sandbur)
Centaurea calcitrapa (purple starthistle)
Centaurea diffusa (diffuse knapweed)
Centaurea iberica (Iberian starthistle)
Centaurea maculosa (spotted knapweed)
Centaurea melitensis (tocalote)
Centaurea solstitialis (yellow starthistle)
Centaurea squarrosa (squarrose knapweed)
Centaurea sulphurea (Sicilian thistle)
Ceratopteris thalictroides (watersprite)
Chondrilla juncea (skeletonweed)
Chorispora tenella (purple mustard)
Cirsium arvense (Canada thistle)
Cirsium japonicum (Japanese thistle)
Cirsium ochrocentrum (yellowspine thistle)
Cirsium undulatum (wavyleaf thistle)
Cirsium vulgare (bull thistle)
Convolvulus arvensis (field bindweed)
Coronopus squamatus (swinecress)
Cortaderia jubata (jubata grass)
Crupina vulgaris (bearded creeper)
Cucumis melovar. var. *dudaim* (dudaim melon)
Cucumis myriocarpus (paddy melon)
Cuscuta spp. (dodder)
Cynara cardunculus (artichoke thistle)
Cyperus esculentus (yellow nutsedge)
Cyperus rotundus (purple nutsedge)
Cytisus scoparius (Scotch broom)
Diodia virginiana (Virginia buttonweed)
Drymaria cordata (whitesnow, tropical chickweed)
Egeria najas (anacharis)
Elytrigia repens (quackgrass)
Euphorbia esula (leafy spurge)
Euphorbia graminea (grassleaf spurge)
Euphorbia oblongata (oblong spurge)
Euphorbia serrata (serrate spurge)
Euphorbia terracina (carnation spurge)
Fatoua villosa (hairy crabweed)
Gaura drummondii (scented gaura)
Gaura sinuata (wavyleaf gaura)
Genista monspessulana (French broom)
Halimodendron halodendron (Russian salt tree)
Halogeton glomeratus (halogeton)
Helianthus ciliaris (blueweed)
Heteropogon contortus (tanglehead)
Hydrilla verticillata (hydrilla)
Hygrophila polysperma (Indian swampweed)
Hyoscyamus niger (black henbane)
Hypericum canariense (Canary Island St. Johnswort)
Hypericum perforatum (Klamath weed)
Isatis tinctoria (dyer's woad)
Lagarosiphon major (oxygen weed, African elodea)
Lepidium latifolium (perennial peppercress)
Limnobium spongia (American spongeplant, American frog's-bit)
Limnophila indica (Indian marshweed)
Limnophila sessiliflora (Asian marshweed)
Linaria genistifolia ssp. *dalmatica* (Dalmatian toadflax)
Ludwigia peruviana (Peruvian primrose-willow)
Lythrum salicaria (purple loosestrife)
Muhlenbergia schreberi (nimblewill)
Myosoton aquatica (giant chickweed)

Nothoscordum inodorum (false garlic)
Nymphaea mexicana (banana waterlily)
Ononis alopecuroides (foxtail restharrow)
Onopordum (spp. onopordum thistles)
Orobanche ramosa (branched broomrape)
Oryza rufipogon (red rice)
Panicum antidotale (blue panicgrass)
Peganum harmala (harmel)
Pennisetum clandestinum(Kikuyugrass)
Physalis virginiana var. *sonorae* (smooth groundcherry)
Physalis viscosa (grape groundcherry)
Polygonum cuspidatum (Japanese knotweed)
Polygonum polystachyum (Himalayan knotweed)
Polygonum sachalinense (giant knotweed)
Potentilla recta (sulphur cinquefoil)
Prosopis strombulifera (creeping mesquite)
Retama monosperma (bridal veil broom)
Rorippa austriaca (Austrian fieldcress)
Rorippa sylvestris (creeping yellowcress)
Salsola australis (common Russianthistle)
Salsola collina (spineless Russian thistle)
Salsola paulsenii (barbwire Russianthistle)
Salsola vermiculata (wormleaf salsola)
Salvia aethiopis (Mediterranean sage)
Salvia virgata (meadow sage)
Scolymus hispanicus (golden thistle)
Senecio jacobaea (tansy ragwort)
Senecio linearifolius (fireweed groundsel)
Senecio mikanioides (*Delairea odorata*)(Cape ivy)
Senecio squalidus (Oxford ragwort)
Sesbania punicea (red sesbania, rattlebox)
Setaria faberi (giant foxtail)
Solanum cardiophyllum (heartleaf nightshade)
Solanum carolinense (Carolina horsenettle)
Solanum dimidiatum (Torrey's nightshade)
Solanum elaeagnifolium (white horsenettle)
Solanum lanceolatum (lanceleaf nightshade)
Solanum marginatum (white-margined nightshade)
Sonchus arvensis (perennial sowthistle)
Sorghum halepense (Johnsongrass and other perennial *Sorghum* spp. including but not limited to *Sorghum almum* and perennial sweet sudangrass)
Spartina alterniflora and hybrids (smooth cordgrass and hybrids)
Spartina anglica (common cordgrass)
Spartina densiflora (dense-flowered cordgrass)
Spartina patens (saltmeadow cord grass)
Spartium junceum (Spanish broom)
Sphaerophysa salsula (Austrian peaweed)
Striga lutea (witchweed)
Symphytum asperum (rough comfrey)
Taeniatherum caput-medusae (medusahead)
Tagetes minuta (wild marigold)
Tamarix chinensis (salt cedar)
Tamarix gallica (salt cedar)
Tamarix parviflora (salt cedar)
Tamarix ramosissima (salt cedar)
Tribulus terrestris (puncture vine)
Ulex europaeus (gorse)
Viscum album (European mistletoe)
Zostera japonica (dwarf eelgrass)
Zygophyllum fabago (Syrian beancaper)
This regulation shall in no way restrict the designation of a weed pest to those species listed herein.

Note: Authority cited: Sections 407 and 5004, Food and Agricultural Code. Reference: Section 5004, Food and Agricultural Code.

HISTORY

1. Amendment filed 12-21-77 as an emergency; designated effective 1-1-78 (Register 77, No. 52). For prior history, see Register 77, No. 31.

2. Certificate of Compliance filed 1-6-78 (Register 78, No. 1).

3. Amendment of NOTE filed 3-9-83; effective thirtieth day thereafter (Register 83, No. 11).

4. Amendment filed 5-7-97; operative 6-6-97 (Register 97, No. 19).

5. Amendment filed 8-12-2003; operative 9-11-2003 (Register 2003, No. 33).

6. Amendment filed 1-28-2008; operative 2-27-2008 (Register 2008, No. 5).

7. Amendment filed 6-7-2010; operative 7-7-2010 (Register 2010, No. 24).

3 CCR § 4500, 3 CA ADC § 4500
This database is current through 2/11/11 Register 2011, No. 6
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