CHAPTER 1 PROPOSED PROJECT

1.1 Purpose and Need

1.1.1 Introduction

The California Department of Transportation (Department or Caltrans) and the Federal Highway Administration (FHWA), in cooperation with the Metropolitan Transportation Commission (MTC), the Alameda County Congestion Management Agency (ACCMA), and the Contra Costa Transportation Authority (CCTA), propose to address traffic congestion along State Route 24 near/through the Caldecott Tunnel by constructing a fourth bore or tunnel between Alameda and Contra Costa Counties, California. The project area is located in the San Francisco Bay Area in northern California (Figure 1.1.2-1). The Caldecott Tunnel is part of the State Route 24 corridor between Alameda and Contra Costa Counties. The State Route 24 corridor extends from Interstate 980 (I-980)/Interstate 580 (I-580) in Oakland, Alameda County to Interstate 680 (I-680) in Walnut Creek, Contra Costa County. The project limits extend from the State Route24/Broadway Interchange in Alameda County to the State Route 24/Camino Pablo Interchange in Contra Costa County (Figure 1.1.2-2). The actual project construction is proposed to be along State Route 24/13 Interchange in Alameda County to the State Route 24/Gateway Blvd. Interchange in Contra Costa County.

The primary purpose of state transportation projects and programs is to increase mobility by providing for the movement of people and goods, consistent with regional and local planning. The project must be cost effective and environmentally sensitive. Inter-agency coordination for the proposed project strives to meet the purpose and need for the project while also addressing the environmental constraints. In accomplishing the agreed-upon purpose and need for this project, complete avoidance of impacts to resources may not be practicable, and minimization of impacts and mitigation will be achieved to the extent reasonable and practicable.

The information presented below describes why the project is being proposed.

1.1.2 Background

A tunnel through the East Bay Hills to improve regional traffic circulation was envisioned as early as in the 1860s. The first tunnel, known as the Kennedy Tunnel, was constructed for horse-drawn vehicles and pedestrians. Construction began in the 1870s but, because of funding shortages, was not completed until 1903, after which it became known as the Broadway Tunnel. It passed through the Berkeley Hills about 78.8 to 88.4 meters (160 to 290 feet) above the current Caldecott Tunnel and 97.5 meters (320 feet) below the top of the ridge. The timber-lined Broadway Tunnel was about 5.2 meters (17 feet) wide and was built to reduce the danger of accidents to travelers descending the steep grade from the summit of the Berkeley Hills. In 1915, the Broadway Tunnel was improved to accommodate automobiles and trucks. The increase in population and the increasing popularity of the automobile rendered this first facility inadequate by the 1930s.

Figure 1.1.2-1: Project Area

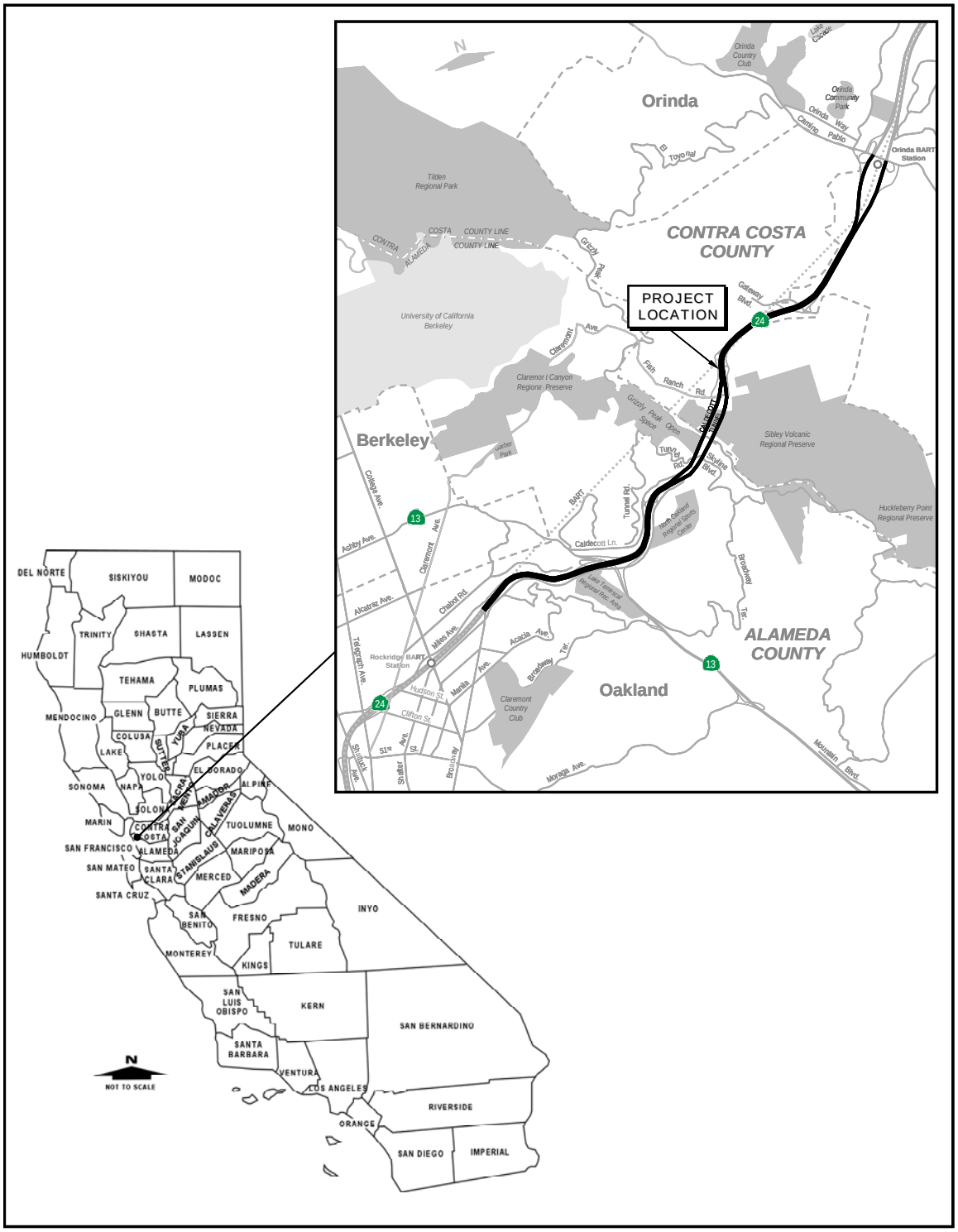
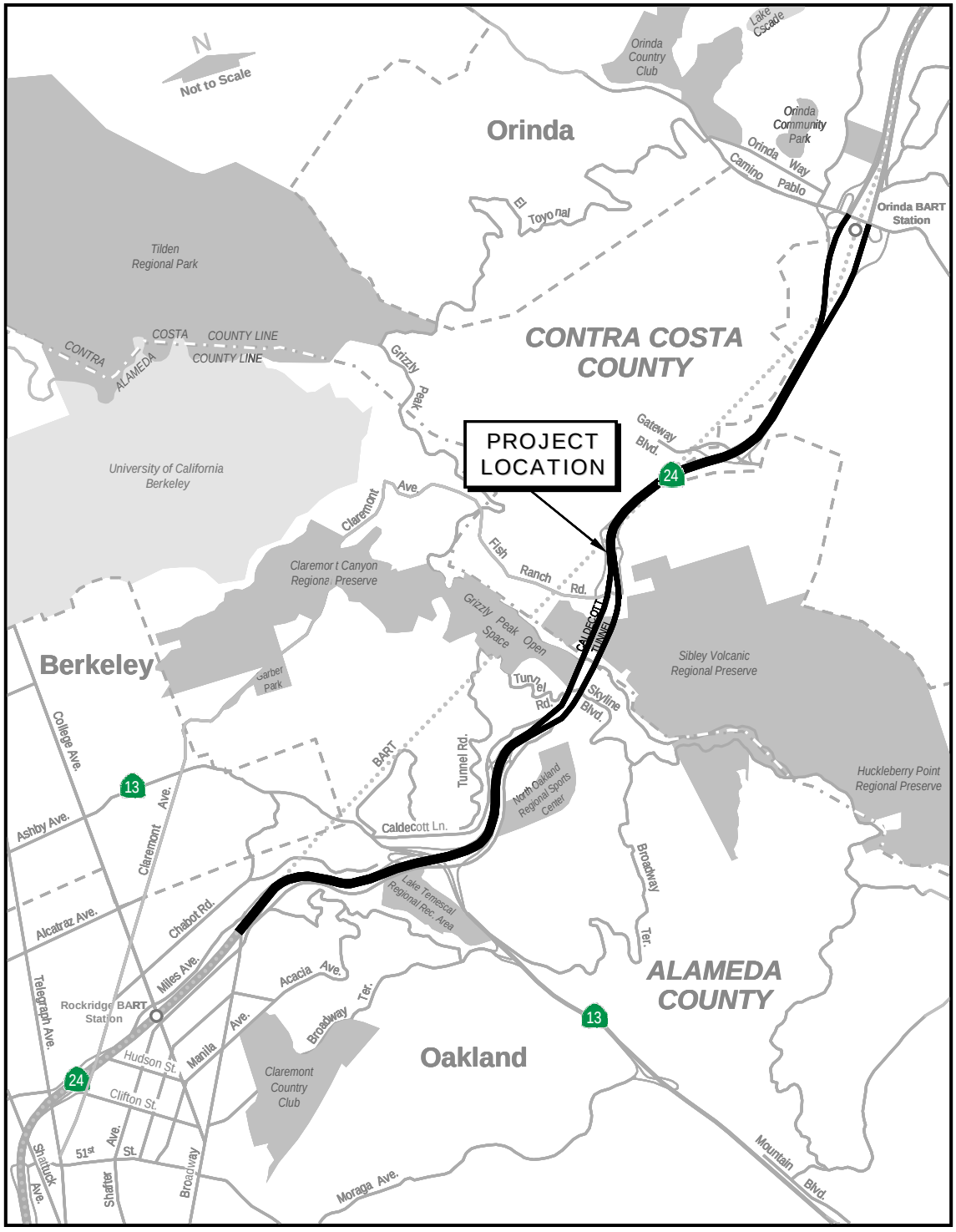


Figure 1.1.2-2: Project Limits



In 1937, the current twin bores of the Caldecott Tunnel were completed and became the main access between Alameda and Contra Costa Counties. After the completion of the new twin bores, the Broadway Tunnel was abandoned. During the 1950s, when the population of Contra Costa County increased by 37 percent, the need to increase the capacity of the tunnel became apparent. In 1964, a third bore, north of the original two, was opened. The design for the third bore included a preliminary alignment and grading for a future fourth bore to be located north of the third bore.

The first and second bores are each 1,103 meters (3,619 feet) long and 8.1 meters (26.7 feet) wide and include two 3.4-meter (11-foot) traffic lanes. There are no shoulders within the bore sections, but each bore has an emergency egress walkway that varies from 0.3–0.9 meters (1–3 feet) wide. The third bore, is 1,149 meters (3,771 feet) long and 10.5 meters (34.5 feet) wide and includes two 4.25-meter (14-foot) traffic lanes. There are no shoulders, but the bore has an emergency egress walkway that varies from 0.75–1.2 meters (2.5–4 feet) wide.

The growth in population and the decentralization of employment centers in Contra Costa County and the Bay Area during the 1980s and 1990s have resulted in a substantial increase in traffic accidents and reverse commute congestion on State Route 24 and surrounding areas, both on weekdays and weekends. In addition, peak direction volumes and the reverse commute direction volumes are becoming more balanced. To maximize the capacity of the tunnels, the Department reverses the traffic direction in the center bore twice each weekday to provide four lanes in the peak commute direction and two lanes in the reverse commute direction. During weekends, the Department has had to change the number of peak direction lanes up to five times daily to accommodate changing demands and reduce queuing. Reversing the commute capacity results in congestion and queuing upstream of the tunnel portals.

In the 1998 State legislative session, Assemblywoman Lynne Leach of Walnut Creek introduced a bill requesting that the Department conduct a study of a fourth bore for the Caldecott Tunnel. The bill, Assembly Bill 2010, never came to a vote in the Legislature, but soon after MTC received numerous entreaties urging that it undertake such a study. In September 1998, following a brief evaluation, MTC decided to initiate a broader study of the entire State Route 24 corridor. The result of that study, the *Route 24/Caldecott Tunnel Corridor Study* (2001) confirmed that State Route 24 is a major transportation corridor between Alameda and Contra Costa Counties. The study characterized existing travel as follows:

- Most of the corridor travel is regional, primarily between Oakland/Berkeley and Lamorinda (Lafayette, Moraga, and Orinda)/Walnut Creek;
- The peak has been westbound in the morning and eastbound in the evening;
- State Route 24 has a relatively large transit share, with 33 percent of the a.m. peak period person trips through the tunnel made by Bay Area Rapid Transit (BART) during the morning in the westbound direction and 14 percent reverse-commute person-trips eastbound;
- Carpools and vanpools comprise a small percentage (less than 10 percent) of total traffic during peak commute periods;
- Eastbound traffic queues during the morning commute period extend 0.8 kilometer (0.5 mile) from the west portal; and
- Westbound traffic queues upstream from the east portal extend past the Camino Pablo/Moraga Way Interchange.

The MTC study considered three broad transportation strategies for reducing congestion: improving the street and highway operations, expanding transit (Bus and Bay Area Rapid Transit) service, and constructing a new fourth bore. The study found that operational and transit improvements would

have only a marginal impact on relieving the corridor congestion. The addition of a fourth bore would provide additional capacity through the tunnel and relieve congestion through the corridor. (See the Alternatives section [Section 1.2] for additional discussion.)

The Department began the formal environmental review process for this project in December 2002. This process of determining the scope, focus, and content of environmental review is commonly referred to as "scoping." Scoping ensures that issues most important to Contra Costa and Alameda County residents, public agencies, and other interested parties are addressed in the review. Three public scoping meetings were held in Orinda and Oakland. These meetings were an open-house format where individuals had the opportunity to review information and talk with staff regarding the Caldecott Improvement Project. Scoping comments were accepted through the end of January 2003. The final scoping summary report was issued in February 2003.

The Caldecott Improvement Project is included in the 2004 Contra Costa Countywide Comprehensive Transportation Plan Volume 1, Draft 2003. The project is also listed in MTC's 2001 Regional Transportation Plan (RTP) Project Notebook, Track 1 Investments (August 2001), the 2004 Regional Transportation Improvement Program (RTIP), Regional Measure 2, and the 2005 MTC Update to the RTP/T2030 RTP, which is currently in draft form. It is also listed in the Department's District 4 Office of System and Regional Planning 2005 RTP District Priorities (Draft November 2003), Alameda County Countywide Transportation Plan, and Contra Costa County 2002 Inter-regional Transportation Improvement Program (ITIP) project.

1.1.3 Purpose of Proposed Caldecott Improvement Project

Recognizing the importance of the State Route 24 Caldecott Tunnel (Figure 1.1.2-1) as a connector for the movement of people and goods between Contra Costa County, Alameda County, and the Central Valley, the Department and the FHWA propose a project that:

- Reduces delays within the vicinity of the tunnels, through the year 2032;
- Improves mobility for the traveling public and emergency crews;
- Reduces the potential for congestion-related accidents at the queues that form at the tunnels' approaches, thus increasing safety for the public and Caltrans maintenance personnel;
- Eliminates the need for daily tunnel reversals and thus reduces the amount of time Caltrans maintenance personnel are exposed to live traffic;
- Responds to Regional Measure 2 (RM2) passed by the San Francisco Bay Area voters, which raised tolls on the Bay Area's seven state-owned bridges from $2 to $3. The $125 million in annual revenue from that toll increase funds a wide variety of transportation projects across the region including $50 million for a forth bore at the Caldecott Tunnel; and
- Responds to Contra Costa County Measure J, a half-cent transportation sales tax passed in November 2004 which funds a $2 billion spending plan. The Caldecott Tunnel project is programmed to receive $110 million of these funds.

1.1.4 Need for Proposed Improvement Project

State Route 24 is a major east/west connector between Interstate 580 in Alameda County and Interstate 680 in Contra Costa County. It is a connector route for people and goods between the Contra Costa County and the greater San Francisco Bay Area.

The Caldecott Tunnel on State Route 24 in the East Bay Hills of the San Francisco Bay Area is the primary bottleneck on this major freeway. Freeway capacity at the tunnels is reduced from eight to six lanes. Congestion related delays caused by the lane reduction have increased travel times and transportation costs. The configuration of the three existing tunnel bores, in which the middle two-lane bore reverses depending on demand (providing only two lanes in one direction), results in delay throughout the peak periods, early evening, and on Saturdays. Maintenance workers need to reverse traffic flow up to five times each day during a busy weekend.

The diminished freeway capacity[1] at the Caldecott Tunnel is different from other Bay Area freeway bottlenecks in that the bottleneck at the tunnel is bi-directional and persists even during off-peak periods and on weekends. This constant, all-day congestion causes dramatic, unpredictable delays similar to those caused by major freeway incidents or accidents.

The existing recurrent congestion during off-peak periods and in reverse-commute directions during weekday peak periods, as well as throughout Saturdays, demonstrates the need to provide at least a full eight-lane freeway through the tunnel.

According to Caltrans' year 2004 data, the average annual traffic volume on State Route 24 near the I-580 Interchange was approximately 142,000 vehicles per day. The average annual traffic volume near I-680 was about 190,000 vehicles per day. The truck traffic component is two to three percent of the total traffic volumes. During the peak weekday periods, the existing bores are operating at capacity, with traffic backing up in the peak commute direction as well as the off-peak commute direction.

During the westbound morning commute, demand exceeds capacity and congestion generally develops in three locations. The primary bottleneck occurs at the Caldecott Tunnel approach, near the Fish Ranch Road Interchange just before entering the Caldecott Tunnel. A queue extends 4.8 to 6.4 kilometers (3 to 4 miles) from the tunnel to somewhere between the Camino Pablo and the Acalanes Interchanges. Peak period starts around 6 a.m. and ends after 9 a.m. The travel time through the congestion is 7 to 8 minutes with a speed below 48 km/h (30 mph). For the entire State Route 24 corridor between the I-680 and the I-580 junctions, the delay[2] ranges between 1,000 to 1,500 vehicle-hours.

Congestion occurs daily at variable levels. A secondary bottleneck often occurs west of the tunnel near the I-580 connector. A queue often develops at the connector and can extend more than one mile to beyond the Broadway Street off-ramp. The travel speed is around 48-64 km/h (30-40 mph). The delay is approximately 400 vehicle-hours.

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[1] The capacity of a facility is the maximum hourly rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions. Vehicle capacity is the maximum number of vehicles that can pass a given point assuming that there is no influence from downstream traffic operations, such as the backing up of traffic into the analysis point.

[2] Delay is expressed in terms of vehicle-hours. It is defined as the additional travel time over what would be expected for those same vehicles had they been traveling under smooth flow condition at some minimum desired speed (50 mph was used in the Highway Operations Report for this project). The mainline vehicle-hour delay is the total delay over a given period of time (four-hour peak period for this study).

East of the Tunnel near the I-680 junction, the traffic is often congested from near the Central Lafayette interchange to the I-680 junction, a distance of one to two miles. The travel speed is less than 48 km/h (30 mph). The delay is approximately 220 vehicle-hours.

During the eastbound evening commute, the first and second bores are open to the eastbound traffic. With demand exceeding capacity the traffic congestion begins as early as 3 p.m. While congestion fluctuates daily, a bottleneck usually develops near the west-end portal of the tunnel, causing the travel speeds to reduce to less than 80 km/h (50 mph). By 5 p.m., the congestion often extends as far back as the I-580 interchange, a distance of 4.8 to 6.4 kilometers (3 to 4 miles). Peak period starts around 3 p.m. and ends after 7 p.m. The travel time through the congestion is 15 to 16 minutes with a speed of 16 to 24 km/h (10 to 15 mph). The delay[2] is approximately 2,470 vehicle-hours. The travel speeds return to the limit upon exiting the east-end portal of the tunnel. Toward the I-680 junction, traffic is also congested near the northbound I-680 connector for about half-mile with travel speed less than 48 km/h (30 mph). The delay is approximately 190 vehicle-hours.

For the off-peak direction, only the first bore is opened to the eastbound traffic in the morning while the third bore is opened to the westbound traffic in the evening. The traffic that approaches the bores is merged from four lanes into two lanes. A bottleneck develops near the tunnel approach and the congestion extends .8 kilometer (.5 mile) from the tunnel to near the State Route 13 on-ramp in the off-peak eastbound morning commute. During the evening westbound commute, the congestion begins somewhere between Fish Ranch Road and the Gateway Interchanges to near the Camino Pablo on-ramp, a distance greater than 1.6 kilometer (one mile).

The traffic volumes in each direction on the weekends are roughly equal and less predictable. Traffic congestion occurs during the midday hours in the direction being served by only one bore. Congestion is particularly heavy during major weekend events in the surrounding area. The travel direction in the second bore may be switched several times during the day to relieve congestion in either direction.

Studies revealed that in 2002 the Caldecott Tunnel operated at near capacity from early morning until early evening on a typical weekday. During the peak periods, the tunnel operated at capacity for at least three out of the four morning peak hours and for the entire four-hour afternoon peak period. The average Level of Service (LOS) for eastbound and westbound State Route 24 is “E” during the morning and afternoon peak periods. (Figure 1.1.4-1 defines LOS as it applies to freeways). Any increase in demand will add directly to the queue and lengthen the duration of the peak periods. The average LOS from 6 a.m. to 7 p.m., which includes the mid-day periods, is “D”.

Based on future demand forecasts, a number of intersections within the study area would experience high growth in demand even in the No-Build alternative. Compared to the No-Build alternative, Alternative 2N would cause incremental demand growth. Alternative 3N would only cause marginal demand increase compared to Alternative 2N.

For the purposes of determining LOS at a signalized intersection, average control delay is considered (See Figure 1.1.4-2). LOS for an unsignalized intersection is based on the control delay experienced and is not defined for the intersection as a whole (See Figure 1.1.4-3). This is discussed further in Section 2.1.5.2 under *Intersection Analysis*.

Within the limits of the project, 640 total accidents occurred during the three-year period between April 1, 2001 and March 31, 2004, of which 168 were injury accidents and one fatal accident. This

represents an actual accident rate of 1.62 per million vehicle-miles that is higher than the statewide average accident rate of 1.05 per million vehicle miles for a comparable facility over the same period.

The construction of either build alternative would reduce delay, eliminate the need for daily tunnel reversals and relieve congestion. Eliminating the daily tunnel reversal would increase safety to Caltrans personnel and the public.

Currently crews are exposed to considerable potential traffic hazards during the lane change operations. Generally two large attenuator trucks with crash cushion boxes on the back are used to drive several miles eastbound to Saint Stephens in Orinda and then turn around and re-enter the freeway going westbound. The trucks merge with traffic into the number four lane and then move over as traffic allows into the number one lane (fast lane). After the Orinda interchange where the freeway starts to ascend, attenuator boxes are lowered and an arrow board is lit up in the right arrow mode. Flares are then dropped in the number one lane to get the attention of motorists and have them move over gradually into the number three lane.

Next under the first overhead sign which reads “Both Tunnels Open” buttons are pushed on a remote control unit, changing the sign to read “2 Left Lanes Closed Ahead”. Continuing up the hill more overhead advance warning signs are activated and a trailing attenuator truck is moved into the number two lane in order to divert traffic into the number three and four lanes. If at anytime during this entire operation, the remote control fails to function, personnel must leave the truck and physically put a key into the control box which is either on the pole or on the “K” rail in the center divide.

Next seven groups of pop-ups are raised by remote control. The first three groups close off the number one lane. The next three groups close off the number two lane. With the two lanes closed, westbound traffic moves into bore number three. Caution must be taken when raising these pop-ups because a pop-up going up in front of a car in that lane could cause the motorist to swerve. With traffic now going into bore three the steel barrier cable and posts are raised. The raised barrier now prevents any car from entering bore two in the westbound direction. A worker then gets out of the truck and checks the hour and air pressure readings for the barrier air compressor. One more group of pop-ups is raised near the barrier. This completes the lane change for the westbound traffic; diverting the flow from bore two into bore three.

Next the trucks drive through bore two, ensuring that it is clear of stalled vehicles or debris, and stop at the west end barrier, where additional hour and air pressure readings are done. Bore two is next opened to eastbound traffic by lowering the first set of pop-ups near the barrier and then the steel barrier cable. Workers then proceed to another control box to lower a second set of pop-ups and change the arrow sign to indicate traffic can now enter into bore two in the eastbound direction. The second attenuator truck has now moved in back of the first truck and drops flares in the number one lane. When the five groups of pop-ups on the west-end have been lowered, the eastbound traffic can now have access to the lanes that allow them to enter into bore two.

The last step is to change three more overhead signs for the eastbound traffic from reading “Two Left Lanes Closed Ahead” to “Both Tunnels Open”. This completes the lane change operation for switching the traffic in bore two from the westbound to eastbound direction. The attenuator trucks have been rear ended in the past and workers are at risk anytime they must leave their vehicles to manually operate any of the roadway lane change equipment.

Figure 1.1.4-1 Freeway Level of Service (LOS) Criteria

LEVELS OF SERVICE
for Freeways

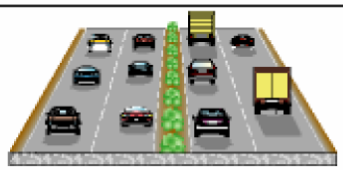
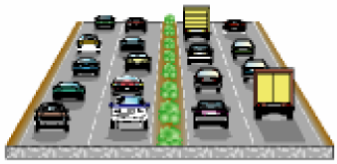
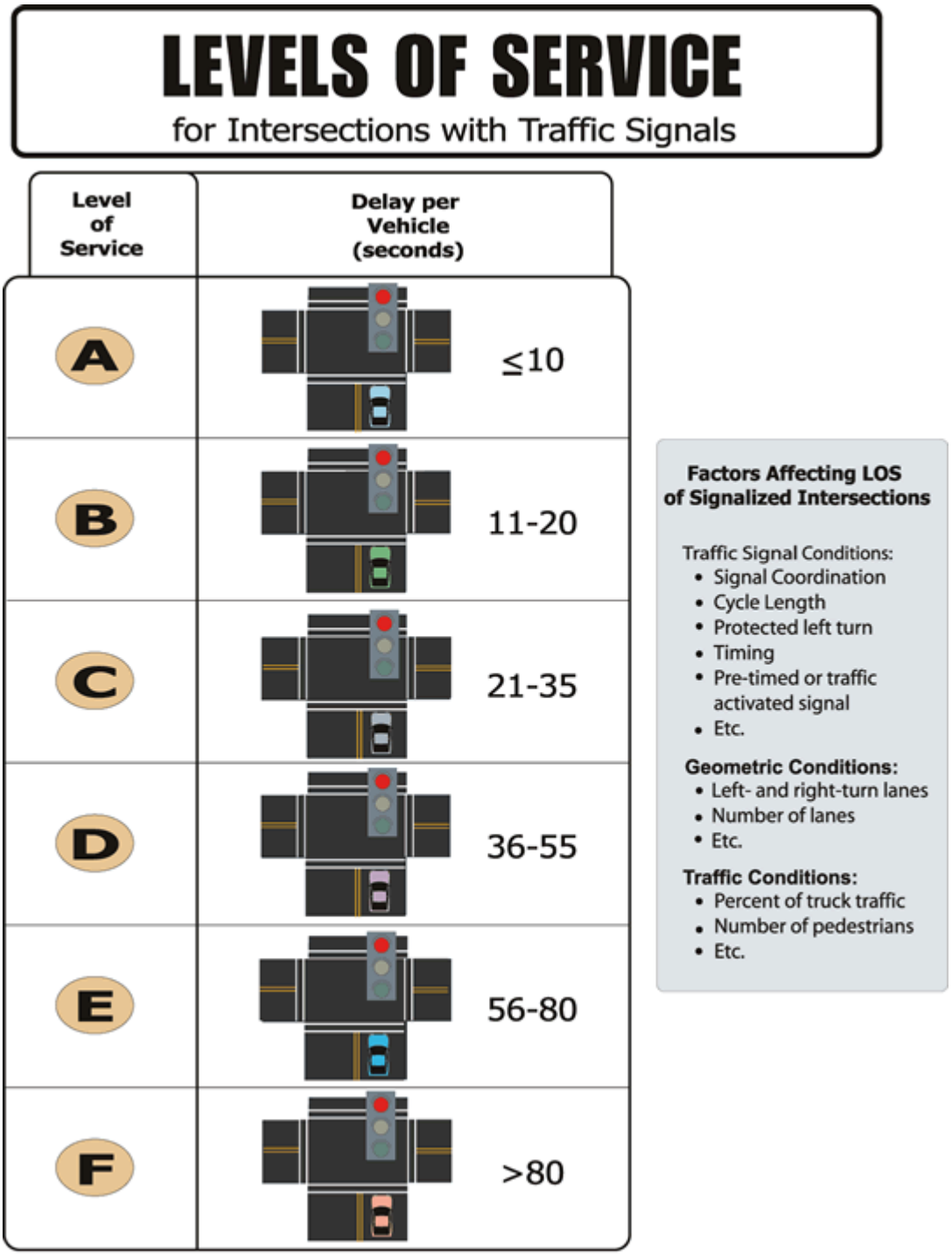
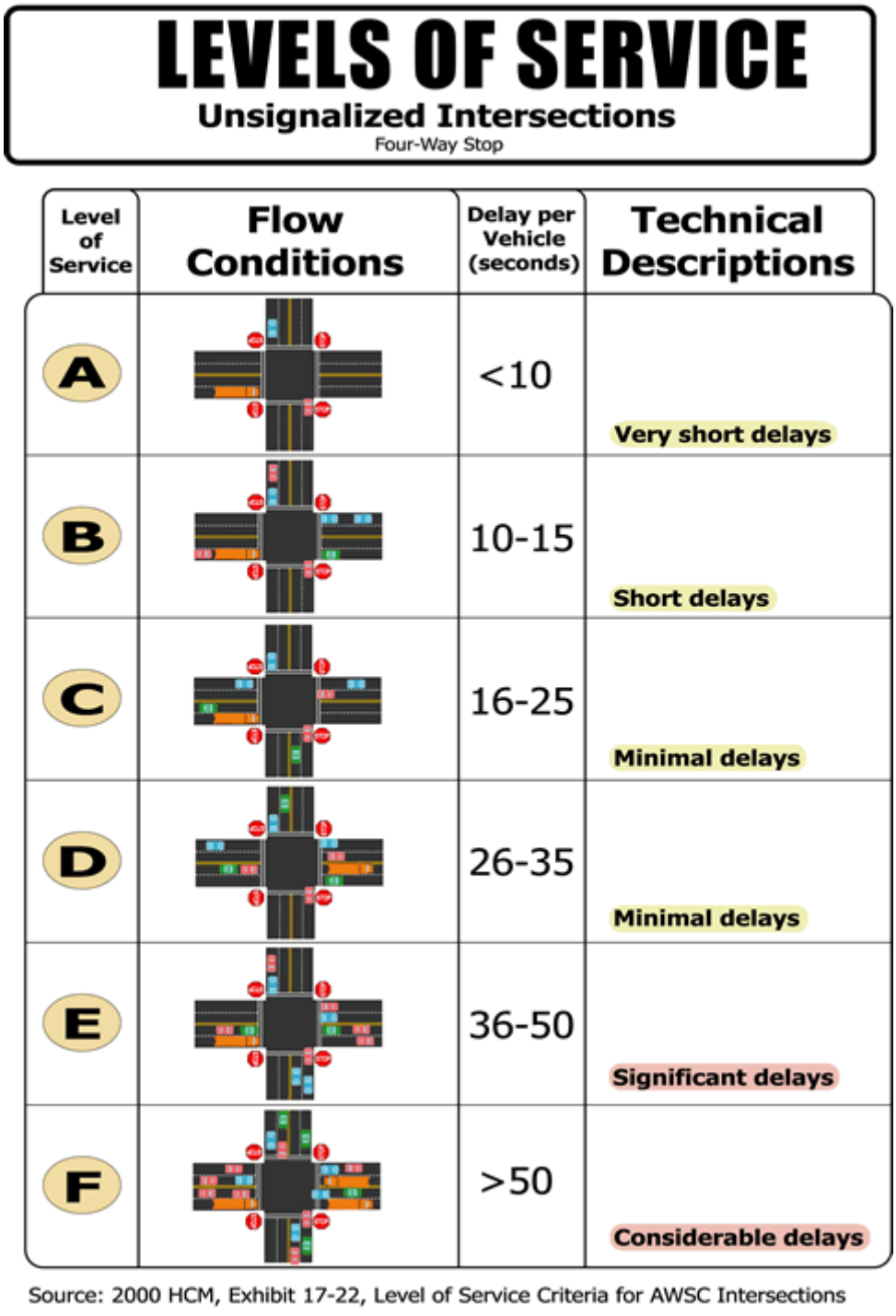
Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		70	Highest quality of service. Traffic flows freely with little or no restrictions on speed or maneuverability. **No delays**
B		70	Traffic is stable and flows freely. The ability to maneuver in traffic is only slightly restricted. **No delays**
C		67	Few restrictions on speed. Freedom to maneuver is restricted. Drivers must be more careful making lane changes. **Minimal delays**
D		62	Speeds decline slightly and density increases. Freedom to maneuver is noticeably limited. **Minimal delays**
E		53	Vehicles are closely spaced, with little room to maneuver. Driver comfort is poor. **Significant delays**
F		<53	Very congested traffic with traffic jams, especially in areas where vehicles have to merge. **Considerable delays**

Figure 1.1.4-2 Intersection Level of Service Criteria (Signalized Intersection)



Source: 2000 HCM, Exhibit 16-2, Level of Service Criteria for Signalized Intersections

Figure 1.1.4-3 Intersection Level of Service Criteria (Unsignalized Intersection)



Source: 2000 HCM, Exhibit 17-22, Level of Service Criteria for AWSC Intersections

To the extent that traffic congestion relief is achieved, the construction of either build alternative will have a beneficial effect on the potential for congestion related accidents and the response time of emergency vehicles.

Voter support is indicative of a perceived need. This has been demonstrated by the passage of RM2 and Contra Costa Measure J. On March 2, 2004, voters of the San Francisco Bay Area passed RM2, raising the toll for all vehicles on the seven State-owned bridges in the San Francisco Bay Area, by $1.00. This extra dollar funds various transportation projects within the region that have been determined to reduce congestion or to make improvements to travel in the toll bridge corridors. Of the estimated $125 million in annual revenue $50 million is earmarked for the Caldecott Tunnel. Specifically, RM2 establishes the Regional Traffic Relief Plan, identifies specific capital projects and programs, and transit operating assistance eligible to receive RM2 funding as identified in Sections 30914 (c) & (d) of the California Streets and Highways Code. The California Streets and Highway Code 30914(c), Capital Program Project List, includes a provision to "Provide funds to plan and construct a fourth bore at the Caldecott tunnel between Contra Costa and Alameda Counties. The fourth bore will be a two-lane bore with a shoulder or shoulders north of the current three bores."

On November 2, 2004, voters of Contra Costa County passed Measure J by over 71%. The "Sales Tax Measure J Contra Costa Transportation Authority" which funds a $ 2 billion spending plan including $113 million for the Caldecott Tunnel. The measure asked the voters, "Shall voters approve a Transportation Expenditure Plan to: - Extend and improve the BART system, - Add a Fourth Bore to the Caldecott Tunnel and improve Highway 24, - …and Authorize a 25-year continuation of the local half-cent sales tax to implement the Transportation Expenditure Plan, which shall not increase the current sales tax?" Revenues derived from the measure are being expended for the transportation projects in the Contra Costa County Transportation Authority's transportation expenditure plan, which includes adding a fourth bore to the Caldecott Tunnel. Voter support of this measure is indicative of the need of the proposed project.

1.1.4.1 ACCIDENT RATES

Within the limits of the project, 640 total accidents occurred during the three-year period between April 1, 2001 and March 31, 2004, of which 168 were injury accidents and one fatal accident. This represents an actual accident rate of 1.62 per million vehicle-miles, which is higher than the statewide average accident rate of 1.05 per million vehicle miles for a comparable facility over the same period.

1.2 Alternatives

1.2.1 Introduction

The goal of the Department and the FHWA is to ensure that a full range of alternatives be evaluated that are consistent with the National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA). Numerous alternatives for this project were proposed before and during the formal scoping process. This section describes the alternatives that were proposed during the scoping process, the alternatives considered, the reasons various alternatives were withdrawn from consideration, and the proposed build alternatives. The Project Development Team (PDT) evaluated each build alternative to ascertain whether they met the purpose and need of the project while avoiding and minimizing potential environmental impacts. Alternatives were selected on their ability to meet the project objectives of improving mobility, relieving congestion, maintaining trip reliability, and enhancing the overall safety for motorists and maintenance personnel in the project area. In addition, other factors such as cost, environmental impacts, operational

efficiency, and maintainability of the built system were considered. After the public comment period, the Department and the FHWA will consider all comments, select a preferred alternative, and make the final determination of the project's effect on the environment.

1.2.2 Alternatives Development Process

As noted in Section 1.1.2, **Background**, in January 2001, the Metropolitan Transportation Commission (MTC) in conjunction with its partners–the Department, the Alameda County Congestion Management Agency, and the Contra Costa Transportation Authority–published the *Route 24/Caldecott Tunnel Corridor Study*. Among the goals of the study were to evaluate a full range of transportation improvements including improvements to transit, carpooling, freight movement, non-motorized options, and a new bore-specifically analyzing project performance, impacts and costs. Some of these types of improvements are often referred to as Transportation System Management (TSM) and Transportation Demand Management (TDM) strategies. The study proposed short and long-term improvement strategies including such improvements as streets and highway operations, transit (bus and Bay Area Rapid Transit [BART] expansion) and a new fourth bore. The corridor study found that operational and transit improvements could be only modestly effective when implemented in combination with a fourth bore. They would not provide the additional capacity that a fourth bore would through the tunnel. This study also serves as a Major Investment Study (MIS) for the project. Though no longer required as a separate study by federal law, a MIS is required for major transportation projects involving federal funds that are expected to have a substantial effect on capacity, traffic flow, level of service or mode share in a transportation corridor. The MIS was prepared during the early planning phase to analyze the range of modal alternatives and cost/benefits of the project. The MTC study considered the following transportation strategies:

1. Street & Highway Operations:

- Meter on-ramps in reverse commute direction (a.m. eastbound/ p.m. westbound);
- Relocation of merges near both sides of the Caldecott Tunnel; and
- HOV lane "queue jumpers" in both directions (a.m. & p.m.);

    - Using westbound auxiliary lane between Orinda & the Caldecott Tunnel;
    - Using westbound/eastbound shoulders of the Caldecott Tunnel approaches; and
    - Using movable barriers to capture unused reverse commute capacity.

2. Transit (Bus & BART Expansion):

- Increase feeder bus to and from BART (a.m. & p.m. in both directions);
- New inter-county bus service through Tunnel (a.m. & p.m. in both directions);
- Direct Bay Point/Fremont BART service (benefits a.m. & p.m. in both directions); and
- Expand corridor BART station parking.

3. New Fourth Bore:

- Construct a new two-lane bore at the Caldecott Tunnel; and
- Construct a new three-lane bore at the Caldecott Tunnel.

After evaluating the strategies above, MTC concluded the following for each of the strategies:

1. Street & Highway Operations:

- Reverse commute carpool lanes could be implemented cost-effectively by using one of the two unused lanes approaching the Caldecott Tunnel;
- The relocation of the Tunnel Road on-ramp away from the Caldecott Tunnel entrance would not measurably reduce State Route 24 congestion. It would likely result in increased delays and queues for vehicles from State Route 13 southbound accessing State Route 24 eastbound, and also may affect access on State Route 13 southbound destined to State Route 24 westbound;
- Ramp metering was found not to be effective because the queues at the Caldecott Tunnel extend past adjacent on-ramps and would extend ramp queues onto local streets; and
- An auxiliary lane between Broadway Terrace and the eastbound on-ramp to State Route 24 was proposed late in the corridor study and was not fully evaluated. An initial Department assessment indicates that an auxiliary lane between the State Route 13 off-ramp and eastbound State Route 24 could be constructed to accommodate the Caldecott Tunnel queues off of the mainline State Route 13 and allow northbound traffic to flow unimpeded.

2. Transit (Bus and BART Expansion):

- Traffic forecasts indicate that only a minor increase in overall a.m. peak period trips per person would occur through the Caldecott Tunnel;
- Of the anticipated 13,700 new transit riders generated, only about 25 percent (3,700) pass through the Caldecott Tunnel;
- Nearly all of the projected new transit riders through the Caldecott Tunnel would take BART. The new express bus service did not attract a substantial number of new transit riders;
- The new direct BART Bay Point/Fremont line will not appreciably reduce vehicle delay. The new BART line attracted about 1,000 new daily transit riders through the Caldecott Tunnel but only about 100 additional eastbound a.m. peak two-hour person trips;
- BART and connecting buses are already an established transit mode share;
- Reverse commute transit travel times are not competitive with auto travel times. Even those commuters whose origins and destinations have fairly direct BART service take longer with public transit;
- With the exception of a few areas, corridor household incomes and auto ownership levels exceed average regional household incomes and auto ownership levels. Consequently, corridor commuters tend to be more discretionary transit riders; and
- Housing populations are not dense in the Oakland Hills and in most areas of Contra Costa County and thus these areas become more difficult to serve by transit due to the dispersed nature of the trips made.

3. New Fourth Bore:

- A new two-lane bore would balance capacity by providing an equal number of lanes (four-lanes) in each direction through the Caldecott Tunnel;
- The new two-lane bore would provide additional capacity in the reverse-commute direction;
- The new two-lane bore would reduce travel times between Oakland and Walnut Creek in the reverse commute direction;
- Peak commute direction travel would be unaffected with the construction of the two-lane bore;

- The new two-lane bore would substantially improve traffic operations during the weekends with four travel lanes in each direction throughout the day;
- A new three-lane bore with an auxiliary lane option would create five travel lanes in the eastbound direction through the Caldecott Tunnel. This option increases by one lane the capacity in the westbound peak commute direction during the a.m. peak period;
- The new three-lane bore would eliminate the existing bottleneck at the Gateway ramps by starting the third lane of the bore at the Gateway off-ramp, which would result in increased capacity through the Caldecott Tunnel;
- Existing traffic volumes are creating operations problems on streets in adjoining neighborhoods, which may be exacerbated by the expected growth in traffic generally. A new bore, which would increase tunnel capacity in the reverse commute direction, would not deliver any greater traffic to local streets than generated in the peak direction;
- A preliminary assessment indicates that a new fourth bore is not likely to create substantial environmental impacts that could not be mitigated; and
- Providing bicycle access through a new bore would be very costly, and more cost-effective ways to improve bicycle travel between both sides of the tunnel are available.

Concurrent with the *Route 24/Caldecott Tunnel Corridor Study* the Department produced a *Project Study Report* (PSR) using the technical information from the corridor study regarding traffic, operations, capital costs, tunnel assumptions and preliminary environmental evaluations. The PSR studied several variations of two- and three-lane tunnels only on the northern alignment.

The Department signed a Notice of Preparation (NOP) on November 14, 2002 for the Caldecott Improvement Project stating that "The Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) are preparing an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) to analyze the environmental effects of constructing a fourth bore of the Caldecott Tunnel."

In the November 21, 2002 edition of the Federal Register, the FHWA issued a Notice of Intent stating that "The FHWA, in cooperation with the California Department of Transportation (Caltrans) will prepare an Environmental Impact Statement (EIS) for a proposed project to construct a forth bore of the Caldecott Tunnel…." "Alternatives under consideration include (1) taking no action; (2) a 2 lane bore North or South; (3) a 3 lane bore North or South; and (4) a 4-lane bore North or South."

A formal environmental review process for the proposed project began in December 2002. Three meetings were held to ensure that issues most important to Contra Costa and Alameda County residents, public agencies, and other interested parties are addressed in the review. These meetings were in an open-house format where individuals had the opportunity to review information and talk with staff regarding the Caldecott Improvement Project. Comments were open to the public until January 2003. A final scoping summary document was issued in February 2003.

Jones and Stokes completed for the Department an Environmental Constraints Memorandum for the Caldecott Improvement Project in February 2003. This memorandum included the same alternatives as an Initial Study for the project completed in November 2002, except for the Bikeway Tunnel Alternative. The Bikeway Tunnel Alternative had been excluded because it was not practicable, nor was there any substantial community support for it.

Because of budgetary constraints, work on the project was halted in February 2003 and resumed in April 2004 after the voters of the San Francisco Bay Area passed RM2 to, "Provide funds to plan and

construct a fourth bore at the Caldecott Tunnel between Contra Costa and Alameda Counties. The fourth bore will be a two-lane bore with a shoulder or shoulders north of the current bores."

On March 18, 2004, at the first meeting of the Department's Project Development Team (PDT) for the Caldecott Improvement Project, both the northern and southern four-lane tunnel alternatives were eliminated because it was apparent that the four-lane alternatives provided no operational benefits beyond the three-lane tunnel alternatives and because of extremely high right-of-way and construction costs.

After work on the project resumed, more detailed studies were continued for the following alternatives: (1) Tunnel Alternative 2N; a two-lane tunnel north of the existing facility; (2) Tunnel Alternative 3N; a three-lane tunnel north of the existing facility; (3) Tunnel Alternative 2S; a two-lane tunnel south of the existing facility; and (4) Tunnel Alternative 3S; a three-lane tunnel south of the existing facility.

The studies included refining the alignments and profiles (Department staff, previously done by consultants Parsons Brinckerhoff); conducting a geotechnical analysis (Department staff), preparing visual simulations of the project (consultant Company 39); conducting preliminary water quality analysis (Department staff), conducting biological surveys (consultants Jones and Stokes, and Dr. McGinnus); conducting a Paleontology Study of the project area (Jones and Stokes); conducting initial cultural resources investigations (Jones and Stokes), and completing the *State Route 24 Caldecott Improvement Project - Preliminary Freeway Operations Memo* (consultant Thomson Transportation Engineers, Inc.).

With the additional information from these studies, the Project Manager, at a meeting on July 26, 2004, sought and obtained the concurrence of Department District 4 management to eliminate the two southern alternatives from further study. These alternatives are discussed in Section 1.2.8, Alternatives Considered but Eliminated from Further Discussion. Additional concurrence was obtained on August 10, 2004, from the Executive Steering Committee created for the Caldecott Improvement Project. In the summer of 2004 a Memorandum of Understanding (MOU) was signed by the Department, the Contra Costa Transportation Authority (CCTA), and the Alameda County Congestion Management Agency (ACCMA). The MOU established roles and responsibilities for the three agencies including the creation of an Executive Steering Committee, whose role is providing project guidance and issuing project-specific policies or policy determinations related to each phase of the project. The members of the committee are the Department's District 4 Director, the Executive Director of the CCTA, and the Executive Director of the ACCMA. The FHWA also concurred at the August 25, 2004, PDT meeting. Because the alternatives under consideration would have limited environmental impacts, FHWA concluded that it was not clear than an EIS was required. On this basis, it determined that an EA should be prepared to assess whether an EIS or a Finding of No Significant Impact (FONSI) is required under NEPA.

1.2.3 Project Description

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 (See Figures 1.1.2-1 and 1.1.2-2). In addition to the No-Build Alternative, the Caldecott Improvement Project proposes two tunnel alternatives designed to relieve congestion and improve safety along State Route 24 in the vicinity of the Caldecott Tunnel.

1.2.4 Project Alternatives

The tunnel alternatives under consideration in this document include the construction of a two-lane tunnel north of the existing bores (Alternative 2N) and the construction of a three-lane tunnel north of the existing bores (Alternative 3N).

Both tunnel alternatives would include approximately 15-30 meters (49-98 feet) of cut and cover type tunnel at the west portal (Oakland side) and at the east portal (Orinda side), electrical substations and ventilation systems. Noise barriers (which could include sound walls, earth berms, a combination of a berm and a wall and a combination soundwall/retaining wall) may also be constructed on the Oakland side of the tunnel for each alternative. Existing utilities along the corridor, such as electrical and storm drains may be relocated. Both alternatives include the realignment of eastbound State Route 24 west of the original bores to improve traffic flow into the tunnel. Both alternatives include a new Operations Maintenance and Control (OMC) building, which would replace the existing OMC building, which does not meet seismic building code.

While the current portal structures house ventilation equipment and/or system control, the new portal structures for the fourth bore would not need to house ventilation equipment or system control since the ventilation system for the new bore will consist of jet fans[3] located within the tunnel and the control and monitoring systems will be connected to the existing or new control room. The portal would be used as a visual screen to hide a new electrical equipment building and substation on the west side and another substation on the east side. The portal structure on the west side would be constructed on the cut and cover portion of the new tunnel. It would consist of a west wall that would be architecturally treated and a north and south retaining wall. An access road would be constructed to connect the portal structure to the existing road along the west side of the existing OMC building. The portal structure at the east side would also be constructed on the cut and cover portion of the tunnel. It would consist of an east wall that is architecturally treated and north and south sidewalls. Two architectural schemes were developed for the new portal structures. Option 1 reflects a contemporary theme and Option 2 carries the art deco spirit of the existing structures.

Emergency cross passages or emergency exits as required by the National Fire Protection Association (NFPA 502) would be included in both build alternatives. It is proposed to provide five to seven cross passages between the new bore and the third bore spaced at 120 meters (394 feet) intervals. This would also upgrade emergency egress facilities for the third bore. Connections of the cross passages into the third bore will create some traffic staging issues and possible lane closures.

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

- Allows emergency relief access to and through the affected region;
- Connects major population centers within the affected region;
- Serves as the most effective of several routes for emergency relief access;

[3] Jet fans are axial-flow fans specially developed to produce the highest possible air flow from the power installed. They are predominantly for the longitudinal ventilation of road tunnels.

- Provides direct or nearby access to and from major emergency supply centers;
- Links various modes of transportation; and
- Provides access to major traffic distribution center.

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 Alternative 2N and 3N will be designed to meet the performance criteria for a lifeline route.

Tunnel Alternative "2N": The addition of a **two-lane tunnel north** of the existing facility:

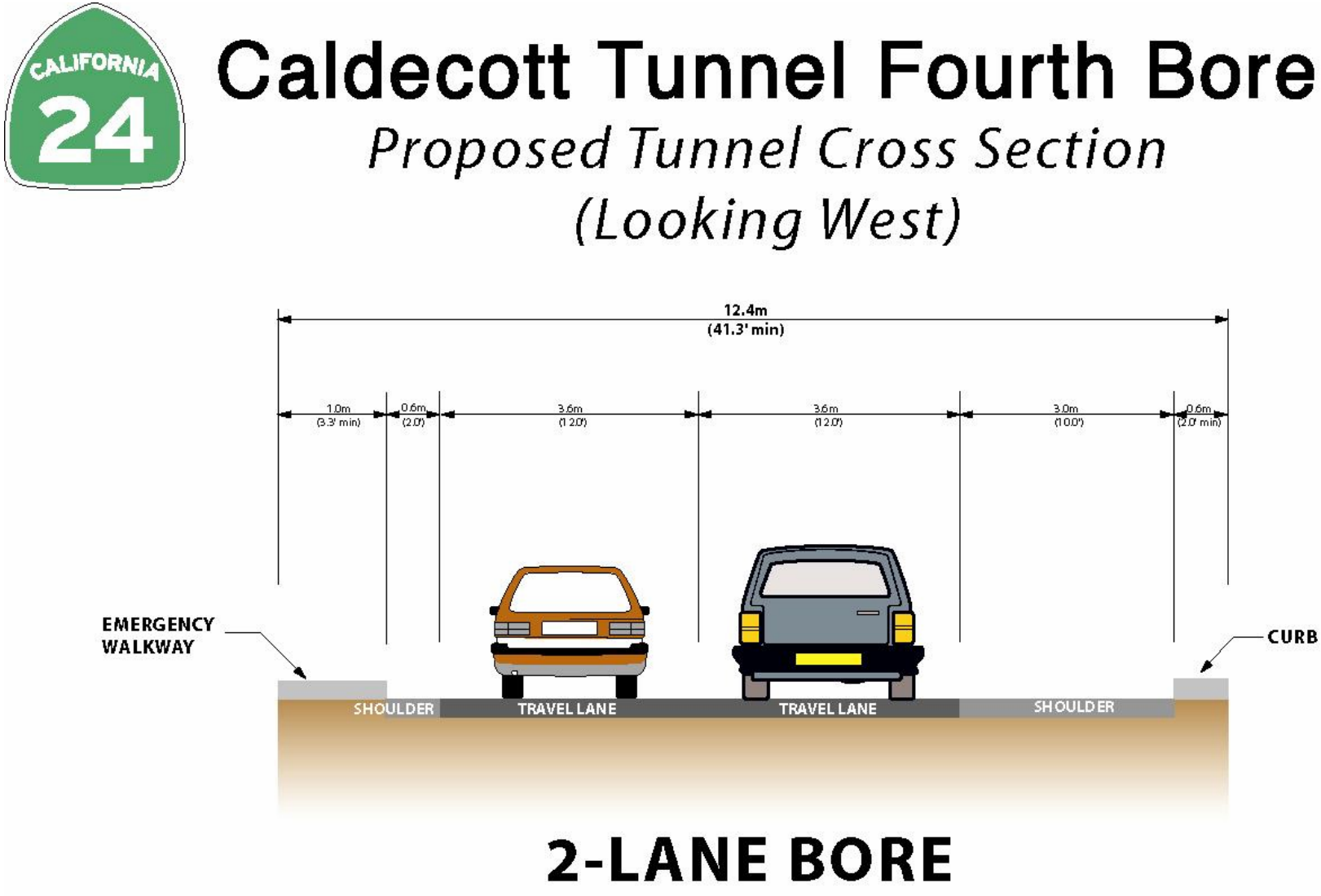
This alternative would include construction of a tunnel with two westbound through lanes. The typical cross section (Figure 1.2.4-1) of the proposed tunnel would be two 3.66-meter (12 foot) lanes, south 0.61-meter (2 foot) shoulder, north 3.05-meter (10 foot) shoulder, north minimum 0.6-meter (1.97 foot) curb and south minimum 1.0-meter (3.28 foot) emergency walkway for a total tunnel width of 12.58-meter (41.25 foot) and a tunnel length of 1,033-meter (3,389 foot). On the West (Oakland) side of the tunnel traffic exiting the new bore would pass underneath the existing maintenance access bridge and conform to the existing freeway grade approximately 180-meter (591 foot) west of the existing tunnel portal. The on and off-ramps at Caldecott Lane and Broadway would be modified to standard "hook" ramps (Type L-6 Interchange) replacing the existing scissor ramp configurations. Additionally, the connector from westbound State Route 24 to northbound State Route 13 would be moved to provide increased westbound State Route 24 weaving distance from 170 m (557.6 foot) to 500-meter (1640 foot) between Caldecott Lane on-ramp and State Route 13 north connector. The eastbound mainline would 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 Kay Street will provide a right only turn lane to Kay Street from eastbound Caldecott Lane.

On the East (Orinda) side of the tunnel the ramps on the north side of State Route 24 at Fish Ranch Road would be slightly realigned to accommodate the proposed fourth bore.

This alternative would require the construction of four retaining walls along State Route 24. Retaining wall number 1 (RW# 1) at the north side of the west portal cut will be 45-meter (147.63 foot) long with maximum height of 11.54-meter (37.86 foot) from finish grade. Retaining wall number 2 (RW# 2) at the south side of the west portal cut will be 20-meter (65.6 foot) long with maximum height of 7.73-meter (25.37 foot) from finish grade. Retaining wall number 3 (RW# 3) at the north side of the east portal cut will be 292-meter (958 foot) long with maximum height of 8.40 -meter (27.58 foot) from finish grade. Retaining wall number 4 (RW# 4) at the south side of the east portal cut will be 17 m (55.79 foot) long with maximum height of 6.79-meter (22.29 foot) from finish grade.

At the time the existing third bore was completed in 1964, the right-of-way for a proposed 2-lane northern fourth bore was acquired. Thus, no new right-of-way is anticipated to be needed, however, 14 parcels would require underground easements.

Figure 1.2.4-1 Alternative 2N Proposed Tunnel Cross Section



Tunnel Alternative "3N": The addition of a three-lane tunnel north of the existing facility:

This alternative would include construction of a tunnel with three westbound through lanes and standard shoulders. The typical cross section (Figure 1.2.4-2) would be three 3.66-meter (12 foot) lanes, south and north 3.05-meter (10 foot) shoulders, north minimum 0.6-meter (2.0 foot) curb and south minimum 1.0-meter (3.0 foot) emergency walkway for a total width of 18.7-meter (61 foot) and a length of 1033-meter (3389 foot).

Currently on westbound State Route 24 there are auxiliary lanes from Camino Pablo Road to Gateway Boulevard off-ramp, between the Gateway Boulevard off-ramp and the Fish Ranch Road off-ramp and between Tunnel Road on-ramp and State Route 13 North. The construction of a 3-lane bore would provide a continuous auxiliary lane from Camino Pablo Road to State Route 13.

On the West side of the tunnel, the existing maintenance access bridge would be replaced in order to provide horizontal clearance for the 3 lane roadway exiting the fourth bore. It would conform to the existing freeway grade approximately 180-meter (591 foot) west of the existing tunnel portal. The on and off-ramps at Caldecott Lane and Broadway would be modified to standard "hook" ramps (Type L-6 Interchange). Additionally the connector from westbound State Route 24 to northbound State Route 13 would be moved to provide increased westbound State Route 24 weaving distance from 170-meter (557.6 foot) to 500-meter (1640 foot) between Caldecott Lane on-ramp and the State Route 13 north connector. The eastbound mainline would 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 Kay St. will provide a right only turn lane to Kay St. from eastbound Caldecott Lane.

On the East side of the tunnel the north side of State Route 24 at Fish Ranch Road would be slightly realigned to accommodate the proposed fourth bore.

This alternative would require the construction of four retaining walls along State Route 24. Retaining wall number 1 (RW# 1) at the north side of the west portal cut will be 55-meter (180.44 foot) long with maximum height of 13.03-meter (42.76 foot) from finish grade. Retaining wall number 2 (RW# 2) at the south side of the west portal cut will be 20-meter (65.6 foot) long with maximum height of 7.80 -meter (25.60 foot) from finish grade. Retaining wall number 3 (RW# 3) at the north side of the east portal cut will be 305.93-meter (1003.71 foot) long with maximum height of 9.25-meter (30.36 foot) from finish grade. Retaining wall number 4 (RW# 4) at the south side of the east portal cut will be 17-meter (55.79 foot) long with maximum height of 6.70-meter (21.99 foot) from finish grade.

The right-of-way acquired in 1964 is also adequate for this alternative. However, 17 parcels would require underground easements.

No-Build Alternative

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

Figure 1.2.4-2 Alternative 3N Proposed Tunnel Cross Section

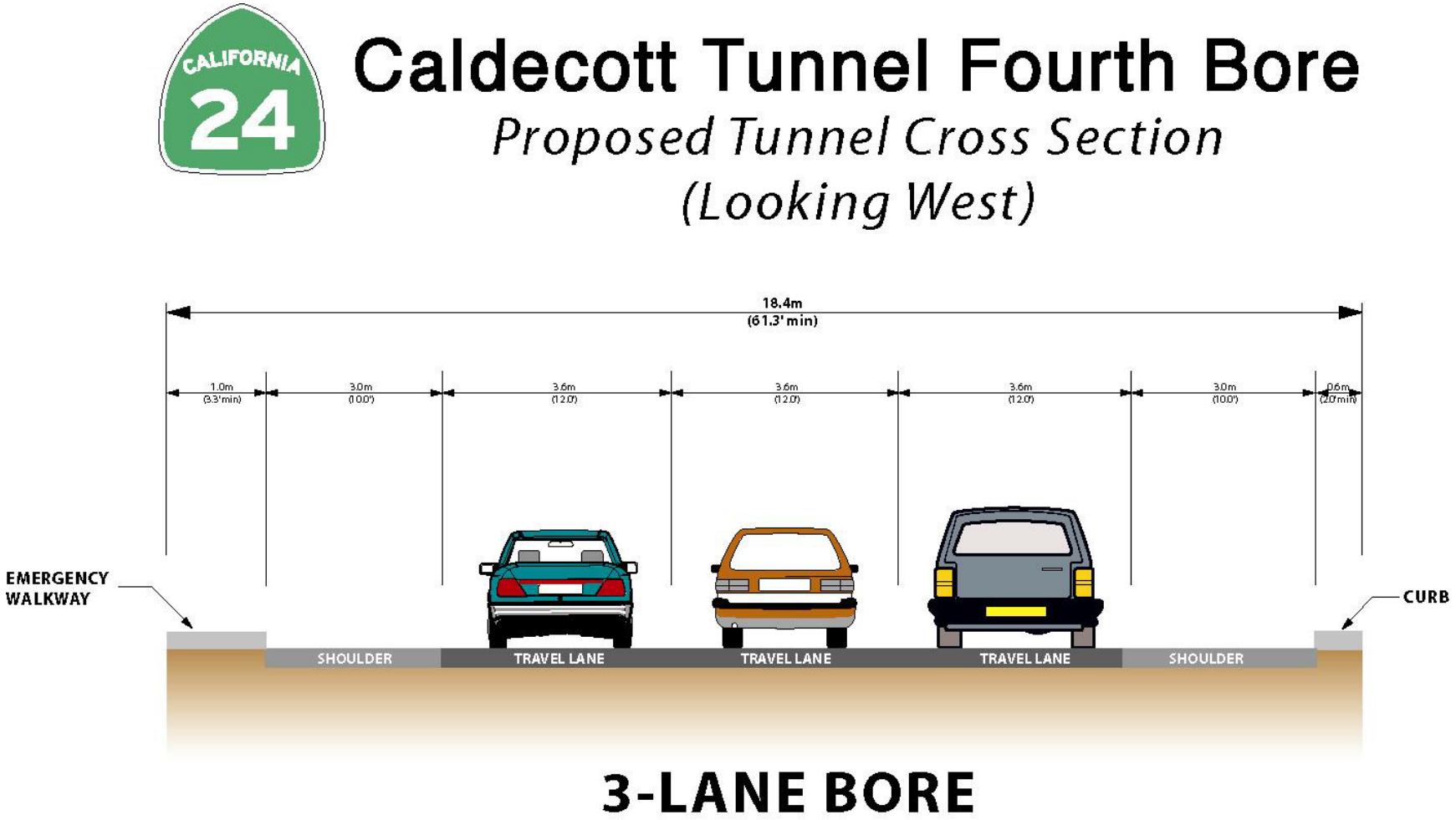


Figure 1.2.4-3 Existing Condition — State Route 24 Looking East Towards Portals (Oakland Side)

Figure 1.2.4-4 Two-Lane North Bore Alternative (Oakland Side)

Figure 1.2.4-5 Existing Condition — Route 24 Looking West Towards Portals (Orinda Side)

Figure 1.2.4-6 Two-Lane North Bore Alternative (Orinda Side)

Figure 1.2.4-7 Three-Lane North Bore Alternative (Oakland Side)

Figure 1.2.4-8 Three-Lane North Bore Alternative (Orinda Side)

1.2.5 Comparison of Alternatives 2N and 3N

Alternatives 2N and 3N are very similar. Both would be tunnels constructed just north of the currently existing northern most bore. Neither alternative would have an adverse effect on the historic southern bores. Neither would use Section 4(f) property (a use of land from a substantial publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any substantial historic site). [See Appendix B, Resources Evaluated Relative to the Requirements of Section 4(f)]. Neither would have a substantial impact on wetlands (under .2 hectare [0.5 acre]) or any impact on riparian habitat.

Both would create visual impacts including retaining walls and a change to the visual character of the area. The visual impact for motorists would be similar. Alternative 2N would have fewer visual impacts for residents. Based on preliminary designs, both alternatives may have similar noise abatement features in the form of sound walls, earth berms, or a combination of the two. One wall or walls is proposed to be located in the northeastern corner of the Temescal Regional Park. Other noise barriers are proposed to be alongside the shoulders of the proposed westbound off-ramp near Caldecott Lane.

Additional water quality issues are foreseen (see Section 2.2.2 Water Quality and Storm Water Runoff) with Alternative 3N because of its greater amount of excavation, new geometry and a large increase in impervious surfaces.

There are no foreseen archaeological issues with either alternative. Both alternatives would be monitored for paleontological resources during construction.

The potential for traffic impacts to the project vicinity with Alternative 3N is greater than with Alternative 2N because the tunnel would be closer to residential dwellings.

For geotechnical analysis, the Department evaluated and ranked alternatives from one to four the alternatives using 15 criteria. These included the complexity of the geology, the geotechnical design, the excavation/support and construction, and the risks of impacts upon existing facilities. The risk increases as the ranking gets higher with one being the most preferred and four being the least preferred. Alternative 2N was ranked 1.1. Alternative 3N was ranked 2.3. (See Appendix G for additional information on the Geotechnical Analysis.)

Both alternatives would include a new Operations Maintenance and Control (OMC) building, which would replace the existing OMC building, which does not meet seismic building code. The proposed electrical building and substation will be located behind the facade of the fourth bore at the west portal. At the east portal one new substation will be required. It will also be located behind the facade wall of the fourth bore.

The proposed portals will be used as a visual screen to hide an electrical equipment building and substation on the west side and another substation on the east side.

Both build alternatives will also include improvements at the Caldecott Lane on and off ramps and the westbound State Route 24 to northbound State Route 13 connector. The Kay/Caldecott Lane intersection may also be improved by providing a right turn lane.

Emergency cross passages or emergency exits as required by the National Fire Protection Association (NFPA 502) will be included in both build alternatives. Section 7.16.7 addresses the use of cross passages in lieu of emergency exits. Section 7.16.7 states that cross passages shall be spaced no

farther than 200 meters (656 feet) apart. If hazardous material vehicles are allowed in the tunnel, cross passages may have to be spaced closer. It is proposed to provide seven cross passages between the new bore and the third bore spaced at 120 meters (394 feet) intervals. This would also upgrade emergency egress facilities for the third bore. Connections of the cross passages into the third bore will create some traffic staging issues and possible lane closures.

Alternative 2N would be approximately 1,033 meters (3,389 feet) long, 12.58 meters (41.25 feet) wide, and would produce approximately 200,313 cubic meters (262,000 cubic yards) of excavated material. Right-of-way costs (for easements only) are expected to be $142,000[4], tunnel construction costs are estimated to be $ 186-210 million[4], roadway construction costs are estimated to be $33-36 million[4], and support costs are estimated to be $64 million[4]. With the construction of two lanes, Alternative 2N would increase tunnel capacity, as the eight-lane freeway would no longer be reduced to six lanes at the Caldecott Tunnel. It would only provide an off- peak (reverse commute) benefit. This alternative would reduce weekday delays by 45 percent from 88,000 person-hours of delay from the No-Build Alternative to 48,000 person-hours of delay.

Alternative 3N would be 1,033 meters (3,389 feet long), 18.7 meters (61 feet wide), and would produce approximately 286,708 cubic meters (375,000 cubic yards) of material. Right-of-way costs are estimated to be approximately $163,000[4], tunnel construction costs about $240-270 million[4], roadway construction costs are estimated to be $35-39 million[4], and total support costs of $64 million[44]. With the construction of the three lanes, Alternative 3N would provide the greatest congestion relief during both peak and off-peak hours. This alternative would reduce weekday delays by 52 percent from 88,000 person-hours of delay from the No-Build Alternative to 42,000 person-hours. A continuous auxiliary lane from Camino Pablo Road to State Route 13 is proposed. However, westbound traffic constraints upstream of the bore as four lanes lead into five would still be present. The construction of the third lane would also allow the future option of constructing a High Occupancy Vehicle (HOV) lane with additional costs and widening. This would provide a continuous HOV lane from west of I-680 to west of the tunnels, just upstream of State Route 13 northbound, for a total HOV lane length of approximately 14.5 kilometers (9 miles).

1.2.6 Alternatives Considered but Eliminated from Further Discussion

The Alternative Analysis process initially considered a broad range of alternatives to address the Purpose and Need of the Caldecott Improvement Project. These include alternatives and options suggested by the public and other interested parties during the project's scoping process. The following alternatives were evaluated and eliminated from further consideration based on feasibility, costs, environmental and engineering considerations and failure to meet the Purpose and Need of the project:

- Southern Alignment Tunnels;

    a. Alternative 2S; and
    b. Alternative 3S.

- Four Lane Tunnels;

[4] Costs are based on 2005 dollars and are rounded up to the nearest $5 million.

a. Alternative 4N; and
b. Alternative 4S.

- Street and Highway Operations;
- Bikeway Tunnel; and
- Mass Transit.

1.2.6.1 SOUTHERN ALTERNATIVE TUNNELS

As noted above in Section 1.2.2, Alternative Development Process, after resuming work on the project early in 2004, the Department studied the tunnel alternatives in more detail. These included Alternative 2S, a two-lane tunnel south of the existing facility, and alternative 3S, a three-lane tunnel south of the existing facility. These alternatives are described below.

Tunnel Alternative 2S: The addition of a **two-lane tunnel south** of the existing facility.

- This alternative consists of a new tunnel with two eastbound through lanes on an alignment south of the existing tunnels with standard shoulders (right 3-meter (10-foot) shoulder and left 1.5-meter [5-foot] shoulder) and 0.8-meter (2.5-foot) emergency walkways on each side. The total tunnel width is 13.3 meters (43.5 feet), and the tunnel length is approximately 1,185 meters (3,888 feet);
- 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 State Route 24;
- The State Route 24/Fish Ranch Road Interchange would be reconstructed including elimination of the eastbound on and off-ramps, construction of a new frontage road south of State Route 24, a new overcrossing, and large retaining walls (measuring a maximum of 20 meters [65.5 feet] high) on both sides of State Route 24;
- Right-of-way would be required for this alternative including both fee and permanent easement; and
- Stabilization of the rock between the southernmost historic bore and the new bore may be necessary to prevent potential damage during construction. This would entail drilling holes in the pillar (the rock area between the tunnels) and placing reinforcing steel and grout into the holes. The drilling would take place along the south wall of the southernmost tunnel near the east and west portals (although not within the portal buildings themselves) and would involve removing some of the concrete facing of the interior of the tunnel in spot locations. The holes would then be patched with material consistent with the original.

Tunnel Alternative 3S: The addition of a **three-lane tunnel south** of the existing facility (see Figures 1.2.6-1 to 1.2.6-4).

- This alternative consists of a new tunnel with three eastbound through lanes on an alignment south of the existing tunnels with standard shoulders (right 3-meter [10-foot] shoulder and left 3-meter [10-foot] shoulder) and 0.8-meter (2.5-foot) wide emergency walkways on each side. The total tunnel width is approximately 18.4 meters (60 feet) and the tunnel length is approximately 1,124 meters (3,688 meters);
- A new interchange would be constructed between the West Portal and the Kay Overcrossing, which will include a new overcrossing, a new frontage road to the south, and a large retaining wall south of State Route 24 and at each newly-constructed portal;
- The Gateway Boulevard/State Route 24 Interchange would be modified on the north side of the freeway. Fish Ranch Road to the westbound State Route 24 on-ramp and the westbound State

Route 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 north side of State Route 24. Three substantial retaining walls (a maximum of 20 meters [65.5 feet] high) would be required for this interchange modification;

- Right-of-way will be required for this alternative including both fee and permanent easement; and
- Stabilization of the rock between the southernmost historic bore and the new bore may be necessary to prevent potential damage during construction. This would entail drilling holes in the pillar (the rock area between the tunnels) and placing reinforcing steel and grout into the holes. The drilling will take place along the south wall of the first bore near the east and west portals and will involve removing some of the concrete facing of the interior of the tunnel in spot locations. The holes would then be patched with material consistent with the original.

Alternatives 2S and 3S are very similar. Both would be tunnels constructed just south of the currently existing southernmost bore. Neither alternative would have an adverse effect on the historic southern bores. However, both alternatives would require drilling holes in the pillar (the rock area between the tunnels) and placing reinforcing steel and grout into the holes. Both would require use of Section 4(f) property (see Appendix B, Resources Evaluated Relative to the Requirements of Section 4(f)). Neither would have a substantial impact on wetlands, though both would have potential impacts on riparian habitat. Both would have substantial visual impacts including retaining walls diminishing the visual quality and character of the area especially for motorists (see Figures 1.2.6-1 to 1.2.6-4). Both would probably require storm water treatment controls to maintain water quality. No archaeological issues for the southern alternatives are anticipated. Both alternatives would be monitored for paleontological resources. The potential for traffic impacts to the local area with Alternative 3S is greater than with Alternative 2S.

The Department's Geotechnical Services evaluated and ranked the alternatives based on 15 factors involving the complexity of geology, geotechnical design, excavation/support and construction and the risks of impacts upon existing facilities. The ranking was 1 to 4 with 1 being the most preferred and 4 being the least preferred. The risk increases as the ranking gets higher. Alternative 2S was ranked 2.2. Alternative 3S was ranked 3.3. (see Appendix G for additional information on the Geotechnical Analysis.)

Alternative 2S would be 1185 meters (3,888 feet) long, 14.9 meters (49 feet) wide and would produce approximately 250,838 cubic meters (300,000 cubic yards) of material. Right-of-way, construction and support costs would be more than Alternative 2N. With the construction of two lanes, Alternative 2S would increase tunnel capacity, as the eight-lane freeway would no longer be reduced to six lanes at the Caldecott Tunnel. It would only provide off-peak (reverse commute) benefit. This alternative would reduce weekday delays by 45 percent. The No-Build delay is 88,000 person-hours, Alternative 2S delay would be 44,000 person hours. This is an improvement of 40,000 person-hours.

Alternative 3S would be 1124 meters (3,688 feet) long, 18.6 meters (61 feet) wide and would produce approximately 341,140 cubic meters (408,000 cubic yards) of material. With the construction of the three lanes, Alternative 3S would provide an auxiliary lane from State Route 13 to the Acalanes

Figure 1.2.6-1 Existing Condition: State Route 24 Looking East Towards Tunnels (Oakland Side)

Figure 1.2.6-2 South Bore Alternative (Oakland Side)

Figure 1.2.6-3 Existing Condition— State Route 24 Looking West Towards Tunnels (Orinda Side)

Figure 1.2.6-4 South Bore Alternative (Orinda Side)

Interchange. This alternative would reduce weekday delays by 44 percent from 88,000 person-hours of delay from the No-Build Alternative to 49,000 person-hours. This reduction is about the same as would occur with Alternatives 2N and 2S with additional costs. While the fifth lane adds capacity at the bore, it shifts the bottleneck to the I-680 connector during the p.m. peak period negating the benefit of the added capacity. As with Alternative 3N, this alternative would also entail additional construction.

A new interchange would be constructed between the West Portal and the Kay Overcrossing, which would include a new overcrossing, and a new frontage road to the south. The Gateway Boulevard/State Route 24 Interchange would be modified on the north side of the freeway and the Fish Ranch Road to westbound State Route 24 on-ramp and the westbound State Route 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 north side of State Route 24. The construction of the third lane would also allow the future option of constructing a HOV lane with additional costs and widening. This would provide a continuous HOV lane from near State Route 13 through the tunnels to west of I-680, for a total HOV lane length of approximately 16 kilometers (10 miles).

Tunnel Alternative 2S was withdrawn from further discussion for the following reasons:

- Alternative 2S would require the use of Section 4(f) land at the North Oakland Regional Sports Center west of the portal and use of East Bay Regional Park land at the eastern portal of the proposed new tunnel (See Appendix B, Resources Evaluated Relative to the Requirements of Section 4(f)):

  Section 4(f) of the U.S. Department of Transportation Act of 1996, codified in Federal law at 49 USC 303, declares that "[i]t is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

  Section 4(f) specifies that "[t]he Secretary [of Transportation] may approve a transportation program or project…requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if:

    - *there is no feasible and prudent alternative to using that land; and*
    - *the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."*

- Alternatives 2N and 3N are feasible and prudent alternatives that would not require the "use" of Section 4(f) properties;
- Alternative 2S would create substantial visual impacts especially on views of hillside residents;
- Alternative 2S would have impacts to riparian habitat;
- Alternative 2S would have substantial water quality issues probably requiring storm water treatment controls;
- Alternative 2S would essentially reduce person-hour delays as much as Alternative 2N but would cause additional backups at northbound State Route 13 to eastbound State Route 24 connector because of the short merge at the approach to the bore;
- Alternative 2S costs more than Alternative 2N for the same traffic benefits;
- Alternative 2S has greater potential geotechnical problems than Alternative 2N (2.2 versus 1.1 on a scale of 1 to 4) for the same benefits;

- Alternative 2S would be more difficult to construct than Alternative 2N for the same benefits;
- Alternative 2S produces more excavated material than Alternative 2N for the same benefits; and
- Alternative 2S would not meet the purpose of Regional Measure 2, "Provide funds to plan and construct a fourth bore at the Caldecott … north of the current bores."

Tunnel Alternative 3S was withdrawn from further discussion for the following reasons:

- Alternative 3S would require the use of Section 4(f) land at the North Oakland Regional Sports Center, west of the portal, and use of East Bay Regional Park land at the eastern portal of the proposed new tunnel (See Appendix B, Figure A.1);
- Alternatives 2N and 3N are feasible and prudent alternatives that would not require the "use" of Section 4(f) properties;
- Alternative 3S would create substantial visual impacts especially on views of hillside residents;
- Alternative 3S would have impacts to riparian habitat;
- Alternative 3S would have substantial water quality issues probably requiring storm water treatment controls;
- Alternative 3S would essentially reduce person-hour delays as much as Alternatives 2N and 2S. While the fifth eastbound lane would add capacity at the tunnel it would move the bottleneck to the I-680 northbound connector negating the added capacity (this drawback could be alleviated by adding a fourth lane to the I-680 north connector as an HOV lane);
- Alternative 3S costs more than Alternatives 2N and 2S for the same traffic benefits;
- Has greater potential geotechnical problems than any of the other tunnel alternatives (3.3 on a scale of 1 to 4);
- Would be more difficult to construct than Alternatives 2N or 2S for the same benefits;
- Produces more excavated material than Alternatives 2N and 2S for the same benefits; and
- Alternative 3S would not meet the purpose of Regional Measure 2, "Provide funds to plan and construct a fourth bore at the Caldecott … north of the current bores."

1.2.6.2 FOUR LANE TUNNEL ALTERNATIVES

The four-lane tunnel alternatives, Alternative 4N north of the northernmost tunnel and Alternative 4S south of the southernmost tunnel were considered to provide an even number of lanes for both the eastbound and westbound direction at all times. These alternatives would provide a four-lane roadway tunnel with standard shoulders. Traffic studies have indicated that these alternatives would provide more capacity than warranted. On March 18, 2004, at the first meeting of the Department's PDT for the Caldecott Improvement Project both the northern and southern four-lane tunnel alternatives were withdrawn from further consideration because the four-lane alternatives provided no operational benefits beyond the three-lane tunnel alternatives and because of extremely high right-of-way and construction costs. Alternative 4S would also use Section 4(f) parkland and recreational facilities.

1.2.6.3 STREET AND HIGHWAY OPERATIONS ALTERNATIVE

The *Route 24/Caldecott Tunnel Corridor Study* examined this alternative and found that proposed State Route 24 highway/operational improvements (e.g. HOV lanes, tunnel on-ramp relocations and ramp metering) would have only a marginal impact on corridor congestion. This alternative would not meet the Purpose and Need of the project. The study found the following:

- Carpool Lanes

  Reverse commute carpool lanes could be cost-effectively implemented by using one of the two unused lanes approaching the tunnel. Peak direction carpool lanes would require eliminating the inside shoulder and/or widening the freeway. Reducing the shoulder width raises safety concerns and widening the freeway is not likely a near-term cost-effective solution. The study also examined using the westbound auxiliary lane between Orinda and the Caldecott Tunnel for carpools. This idea was abandoned because of operational and safety concerns. These lanes would not run through the corridor due to the tunnel as a constraint and thus the carpool lanes would limit capacity, increase congestion, and generate weaving concerns with traffic entering and exiting across the lanes;

- Tunnel Road Ramp Relocation

  The relocation of the Tunnel Road on-ramp from the Caldecott Tunnel entrance would not provide any measurable reduction to State Route 24 congestion and would likely result in increased delays/queues for vehicles from State Route 13 southbound accessing State Route 24 eastbound, and also may affect access on State Route 13 southbound destined to State Route 24 westbound;

- Ramp Metering in Reverse Commute

  Ramp metering was found not to be effective because queues at the Caldecott Tunnel extend past adjacent on-ramps and would extend ramp queues onto local roads; and

- State Route 13 Auxiliary Lane between Broadway Terrace and Eastbound On-ramp to State Route 24

  This project was proposed late in the corridor study and was not fully evaluated. A Project Initiation Document has been completed and the project is currently a candidate for the 2006 State Highway Operations Protection Program).

Eastbound weekday morning and afternoon tunnel queues often extend back toward Broadway Terrace restricting northbound State Route 13 traffic towards Berkeley. An initial Department assessment indicated that an auxiliary lane between the State Route 13 off-ramp and the eastbound State Route 24 could be constructed to store tunnel queues off mainline State Route 13 and allow northbound traffic to flow unimpeded.

The Contra Costa Transportation Authority has retained a private transportation firm, *DKS Associates*, to conduct a transit study, which will further examine whether technically feasible options exist for increasing transit capacity in the westbound direction of State Route 24 between the I-680 Interchange and the Caldecott Tunnel in the a.m. peak direction.

1.2.6.4 MASS TRANSIT

In the Comparative Assessment of Alternatives section of the *Route 24/Caldecott Tunnel Corridor Study*, the transit improvements package included increased feeder bus service to and from BART during the peak periods, new inter-county bus service through the Caldecott Tunnel, and direct Bay Point/Fremont BART service. The study found that the transit improvements would affect only a modest increase in transit patronage and minor congestion relief, and thus would not meet the purpose and need of this project. The Corridor Study suggested that MTC's implementation of the Regional

Express Bus Program, the Contra Costa County Express Bus Study, and ongoing corridor transit operator planning activities will help define how best to improve and expand corridor express and feeder bus service. However, MTC's Regional Express Bus Program did not provide new service for the Caldecott corridor. Similarly, the Contra Costa County Express Bus Study did not propose any new express bus service for the corridor.

1.2.6.5 BIKEWAY TUNNEL ALTERNATIVE (NEW BIKE TUNNEL OR RECONSTRUCT KENNEDY TUNNEL)

The Bikeway Tunnel alternatives were not project alternatives per se but were options that would have been added to the preferred alternative. By themselves, these alternatives would not meet the purpose and need of the project. Currently, bicyclists travel from one side of the tunnel to the other by using BART or local roads over the Oakland/Berkeley Hills (such as Tunnel Road and Caldecott Lane). Bicycles are allowed on BART during the non-peak commute hours but not on crowded trains at any hour. The two bicycle access options considered were to rehabilitate Kennedy Tunnel or build a new bike tunnel. Providing bicycle access through a new bore would be very costly, and more cost-effective ways to improve bicycle travel between both sides of the tunnel may be available. In addition, the Bikeway Tunnel alternatives are not practicable. Substantial community support for a separate Bikeway Tunnel alternative during the scoping process was not present.

Although the Bikeway Tunnel alternative is not part of the proposed Caldecott Improvement Project, the Alameda County Congestion Management Agency is currently developing a feasibility study to address various alternatives to improve bicycle and pedestrian crossing within the vicinity of the Caldecott Tunnel. The Department and the Contra Costa County Transportation Authority are working closely with the ACCMA to ensure that various alternatives are considered.

1.3 PROJECT COST, FUNDING AND SCHEDULE

1.3.1 Cost

The project cost estimate for Alternative 2N including construction, right-of-way easements, and support is estimated to be approximately:

Facility	**Construction Cost (value of $ in 2005 rounded to the nearest $5 million)**
Construction	
Tunnel and Structures	$ 186[5]-210[6] million
Roadway	$ 33[5]-36[6] million
Right-of-way	$ 142,000
Support	$ 64 million
Total Costs	**$ 285[5]-310[6] million**

[5] Contingency is based on risk analysis. This is based on the 50% confidence level representing the probability of one chance in two that costs will be equal or less than this amount.

[6] Contingency is based on risk analysis. This is based on the 80% confidence level representing the probability of one chance in two that costs will be equal or less than this amount.

The project cost estimate for Alternative 3N including construction, right-of-way easements, and support is estimated to be approximately:

Facility	**Construction Cost (value of $ in 2005 rounded to the nearest $5 million)**
Construction	
Tunnel and Structures	**$ 240[5]-270[6]million**
Roadway	$ 35[5]-39[6]million
Right-of-way	$ 163,000
Support	$ 64 million
Total Costs	**$ 340[5]-375[6]million**

The escalated costs using 2009-2013 dollars when construction for the proposed project is anticipated would be $350[5]-390[6] million for Alternative 2N and $425[5]-480[6] million for Alternative 3N. These costs are calculated at an escalation rate of 3.5% per year. These estimates do not include previously purchased right-of-way currently valued at approximately $1 million.

1.3.2 Funding

Current funding for the Caldecott Improvement Project includes $20 million allocated from the State Transportation Congestion Relief Program (TCRP), $18 million from the State Transportation Improvement Plan-Inter-regional Improvement Program (STIP-IIP) and $31 million from the State Transportation Improvement Plan-Regional Improvement Program (STIP-RIP). Regional Measure 2 allocates $50 million to "plan and construct a fourth bore at the Caldecott Tunnel between Contra Costa and Alameda Counties." Contra Costa County's Measure J identifies the Caldecott Tunnel as a regional transportation priority for Contra Costa County. The Caldecott Tunnel is programmed to receive $125 million (2005 dollars) to construct a fourth bore. The *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU), enacted in August 2005 as the reauthorization of the *Transportation Equity Act for the 21st Century* (TEA-21), provided the proposed project with $1.6 million. The available funds total $245,600,000.

1.3.3 Schedule

After receiving public and agency comments on the Draft EA/EIR, the FHWA and the Department will respond to comments and, as noted, may (1) give environmental approval to the proposed project, (2) undertake additional environmental studies, or (3) abandon the project. It is anticipated that the FHWA and the Department will approve the project and make the Final EA/EIR available to the public in 2007.

The Department expects to complete right-of-way activities following environmental compliance. Construction would follow and be completed by approximately 2013.

1.4 PERMITS AND APPROVALS NEEDED

The following permits, reviews, and approvals would be required for project construction:

Table 1.4-1 Permits and Approvals Needed

Agency	Permit/Approval	Status
United States Fish and Wildlife Service	Section 7 Consultation for Threatened and Endangered Species	Consultation to occur prior to final environmental document
East Bay Municipal Utility District	Water Discharge Permit	New permit needed and will be acquired during design phase
City of Orinda and City of Oakland	Freeway Agreement with the City of Orinda and the City of Oakland	Amendments or new Freeway Agreements may be needed. To be determined later in the design phase.
United States Army Corp of Engineers	Section 404-Nationwide Permit	Section 404 Nationwide Permit will be obtained prior to construction
Regional Water Quality Control Board	Section 401	To be acquired during project's design phase
State Water Resources Control Board	National Pollutant Discharge Elimination System Statewide Storm Water Permit	Best Management Practices will be incorporated into the project to reduce discharge of pollutants