VOLUME 1

Marin-Sonoma Narrows (MSN) HOV Widening Project

Final Environmental Impact Report/
Final Environmental Impact Statement

Along US 101, project begins 0.5 km (0.3 mi) south of the Route 37 interchange in the City of Novato (Marin County), and ends 0.5 km (0.3 mi) north of the Corona Road Overcrossing in the City of Petaluma (Sonoma County).

US 101
KP 30.0/44.5 (PM 18.6/27.7) in Marin County
KP 0.0/11.5 (PM 0.0/7.1) in Sonoma County
July 2009

SCH#2001042115
EA 264000

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04-MRN-101-KP 30.0/44.5 (PM 18.6/27.7)
04-SON-101-KP 0.0/11.5 (PM 0.0/7.1)
EA 264000

Marin-Sonoma Narrows HOV Widening Project

Final Environmental Impact Report
Final Environmental Impact Statement

Submitted Pursuant to the:

California Environmental Quality Act, Division 13, Public Resources Code and
National Environmental Policy Act 42 U.S.C. 4332(2)(c)

by the

U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION
and STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION
and the Cooperating Agency
U.S. Department of Homeland Security, United States Coast Guard, Eleventh District

7-16-09
Date of Approval

Bijan Sartipi
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7-21-09
Date of Approval

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Abstract: The California Department of Transportation and the Federal Highway Administration propose to relieve recurrent congestion along 16.1 miles of US 101 in Marin County from KP 30.0 (PM 18.6) to KP 44.5 (PM 27.7) and in Sonoma County from KP 0.0 (PM 0.0) to KP 11.5 (PM 7.1). Proposed alternatives include the No-Build and two Build Alternatives, which would widen and realign the existing mainline to improve overall traffic operations and access. Potential permanent impacts include land use, visual, cultural resources, farmlands, water quality, and natural resources. Short-term impacts include noise, air quality, and traffic associated with construction activities. However, through proper implementation of avoidance, minimization, and mitigation measures; and, ongoing coordination with regulatory agencies, most of these impacts would be reduced or eliminated.

Summary

S.1 What has been proposed?

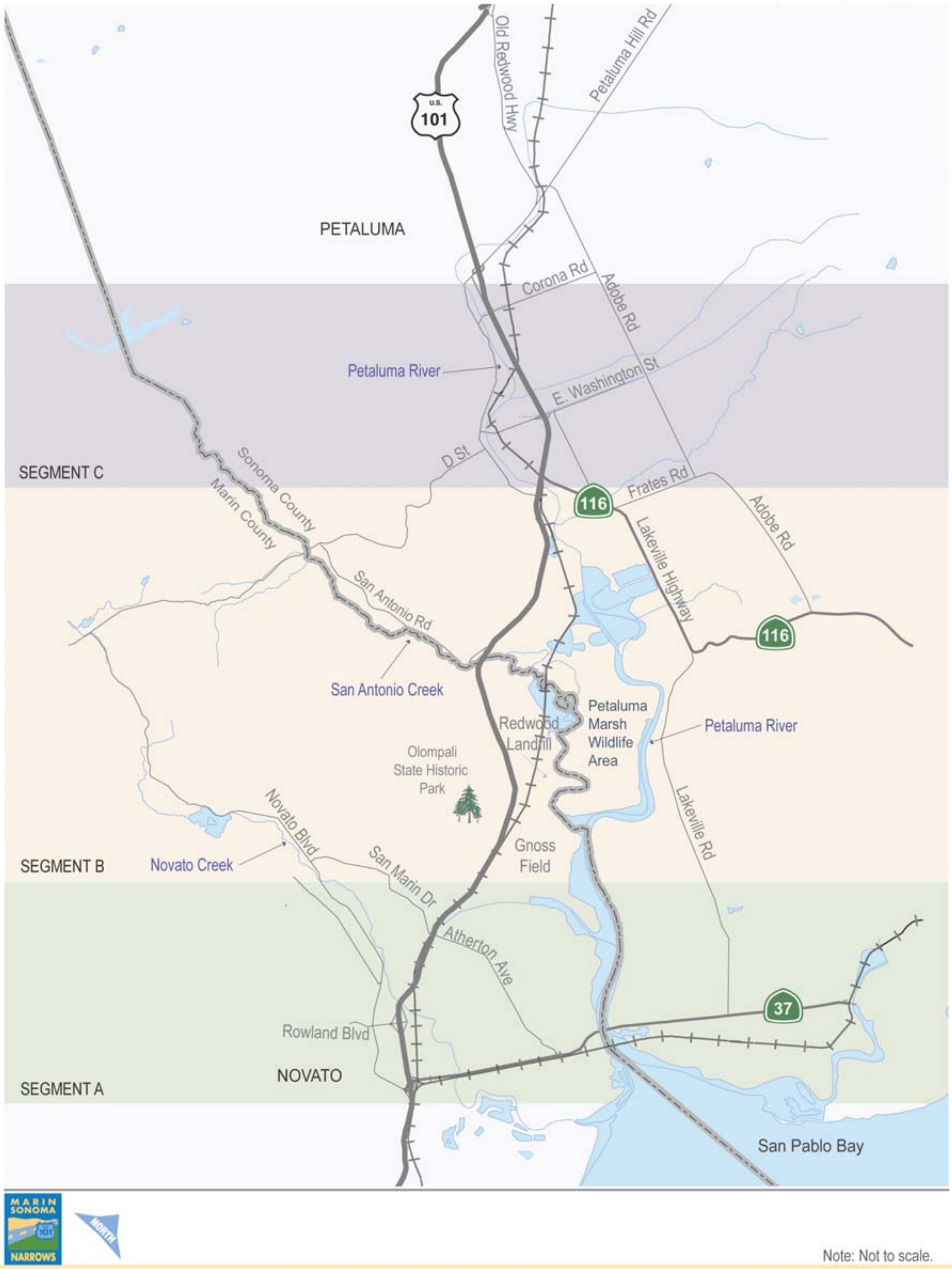
US 101 is the principal route in the coastal northwest region between the San Francisco Bay Area and Oregon, and provides a continuous north/south route through Marin and Sonoma Counties. As a result, long distance intercity traffic and even shorter intracity traffic use the freeway to get around. In the stretch around the City of Novato in northern Marin County (see Segment A in Figure S-1), US 101 consists of six travel lanes, three serving northbound traffic and three serving southbound traffic. North of the City of Novato to the Petaluma River in the City of Petaluma (Sonoma County), US 101 narrows to four lanes and traverses a rural, largely undeveloped area locally known as the "Novato Narrows" (see Segment B in Figure S-1). Most of US 101 is a freeway with controlled access, where travelers can get on or off at selected interchanges. However, the Novato Narrows is an expressway with a number of at-grade intersections and driveways that connect directly onto US 101. North of the Petaluma River and through the City of Petaluma, US 101 reverts to a four-lane freeway, with controlled access (see Segment C in Figure S-1).

In 1998, the California Department of Transportation (Caltrans) developed a Statewide System Management Plan which noted that US 101 in Marin and Sonoma counties could not handle projected traffic growth and that solutions were needed. One of the projects intended to implement congestion relief along US 101 is the **Marin-Sonoma Narrows (MSN) Project**. The MSN Project extends 26.0 kilometers (km), or 16.1 miles (mi), between State Route 37 (SR 37) in Novato and ends just north of the Corona Overcrossing in the City of Petaluma.

The proposed project would widen US 101 along the access-controlled southern and northern freeway portions (Segments A and C, respectively). This widening would occur primarily in the existing freeway median. The proposed project also includes widening and realigning the roadway in the central portion (Segment B), and upgrading the US 101 facility along its entire length. The various improvements that are being proposed include:

- Adding northbound and southbound High Occupancy Vehicle (HOV) lanes the entire project length of 26.0 km (16.1 mi) that would be restricted to vehicles carrying two or more people per vehicle (also referred to as carpool

Figure S-1 Location Map and Project Segments



lanes). These HOV lanes would be installed in the median of US 101 and directly connect to proposed HOV lanes south of the project limits near the SR 37 Interchange and to proposed HOV lanes to the north beginning at Old Redwood Highway in the City of Petaluma;

- Widening and realigning US 101 in Segment B (the Central Segment) along the Novato Narrows, which makes up 13.1 km (8.1 mi) of the entire project boundaries. This would result in converting the existing expressway to an access-controlled freeway. Access would be available through new interchanges and existing local roads, which would be reconfigured to connect to new interchanges in this segment.
- Replacing bridges and constructing new bridges across San Antonio Creek and replacing the Petaluma River Bridge;
- Constructing soundwalls along Segment A (the Southern Segment) and Segment C (the Northern Segment);
- Constructing bicycle and pedestrian paths within the Central Segment to replace bicycle access that currently exists along the expressway shoulder; and
- Upgrading drainage facilities.

Together, these improvements comprise the proposed project. The project is discussed as three segments because each has distinctive land use and environmental settings. Specific transportation improvements also correspond to these different segments (see Figure S-1):

- Segment A (the Southern Segment) extends from just south of SR 37 to north of Atherton Avenue in the City of Novato;
- Segment B (the Central Segment) extends from Atherton Avenue Interchange to south of SR 116 (East), crossing the Marin-Sonoma county line; and
- Segment C (the Northern Segment) covers SR 116 (East) to north of the Corona Overcrossing in the City of Petaluma.

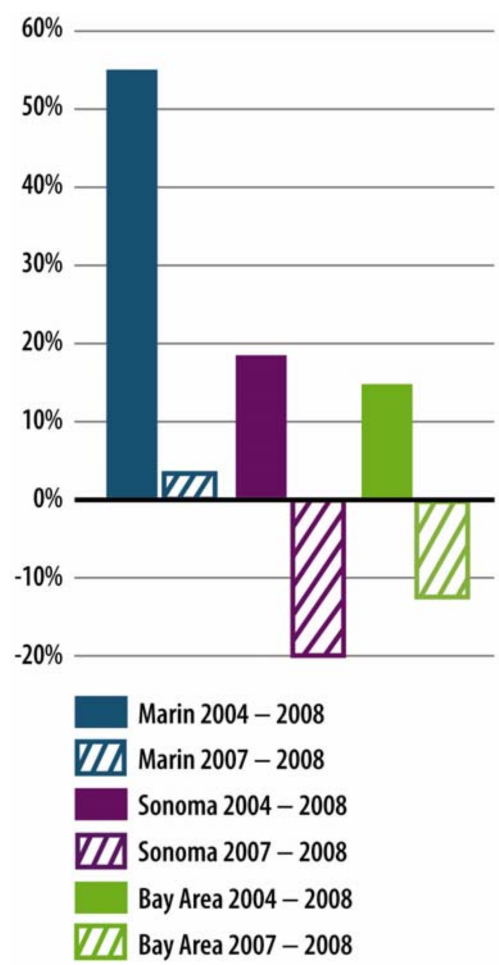
S.2 Why is this project needed?

The need to make improvements to US 101 has been documented in many transportation plans and studies by Marin and Sonoma counties individually, and by regional and state agencies such as the Metropolitan Transportation Commission (MTC) and Caltrans. In establishing the project boundaries, Caltrans defined rational, logical starting and ending points and ensured that the improvements would stand on their own and provide benefits to the public (see Chapter 1 for further details about the project boundaries). In other words, the improvements do not depend on other modifications to US 101 to offer congestion relief and operational improvements along this stretch of US 101.

A number of circumstances underscore the need for the MSN Project. Highlighted below are the principal reasons why this project is being proposed.

Existing Congestion. Recent monitoring by Caltrans reveals travel delays experienced by daily commuters along this stretch of US 101. Over the last 15 years, significant commercial and residential growth, along with expansion of the tourism industry, has led to a dramatic increase in travel demand along the corridor. US 101 is a crucial link for commuters and commerce, connecting the vital business centers of San Francisco and the East Bay with Marin, Sonoma, and the North Coast. According to MTC's Transportation 2030 Plan for the San Francisco Bay Area (2005), the narrow segment between Marin and Sonoma counties is one of the longest, continuously congested bottlenecks for truck traffic in the entire Bay Area.

Figure S-2 Change in Vehicles Hours of Delay on Freeway



The following discussion is based upon the Daily (Morning and Evening Peak-Period) Freeway Delay by Bay Area County, 2004-2008 that can be found at www.mtc.ca.gov/news/congestion/: There is an upward trend in vehicle hours of delay (VHD) in the Bay Area that is more pronounced in Marin and Sonoma counties. For instance, VHD increased in the Bay Area by 30 percent between 2004 and 2007. In Marin during this same period, VHD increased by 51 percent and by 49 percent in Sonoma.

More recently, the monitoring data shows that from 2007-2008 VHD was reduced, attributable to the economic downturn. Despite decreases of 12 percent for the Bay Area and 20 percent in Sonoma County, Marin County recorded a 3 percent increase (Figure S-2).

These decreases mute the effect of two major segments of the MSN Project limits that were among the top 50 most congested freeway locations in 2008 according to MTC. Number 21 was Sonoma 101 southbound from East Washington to Kastania Road in the AM peak period with 1880 VHD. Number 47 was Marin 101 northbound from De Long to South of Petaluma during PM peak period with 960 VHD (Top 50 Congested Locations 2008—Ordered by Rank, Caltrans and MTC).

Despite the economic downturn, the Bay Area, Marin, and Sonoma counties have experienced increases in VHD of 15, 55, and 19 percent, respectively, between 2004-2008 (Figure S-2). Reported decreases in VHD have been attributed to lowered employment (California Employment Development Department, Caltrans, MTC, Vehicle Hours of Delay vs. Employment San Francisco Bay Area, 1999-2008). The strong relationship between employment and VHD is evidence that congestion reduction would be even more dire once the economy and employment rebound.

Future Congestion. With congestion and hours of vehicle delay *already* substantial, future conditions are projected to become even worse. According to Caltrans, vehicle delays on US 101 in the southbound direction during the A.M. (morning) peak period are projected to increase about 50 percent between 2010 and 2030. In the northbound direction during the P.M. (afternoon/evening) peak period, vehicle delays are projected to increase similarly over the same period (Caltrans, 2005).

Operational Deficiencies. Similar to the Southern and Northern Segments, the Central Segment is also congested during peak travel demand periods. However, existing operational deficiencies along this the expressway facility worsen congested conditions. Examples of these deficiencies are illustrated in Figure S-3 and described below:

- Local traffic movements compete with mainline commuter traffic to cross US 101 along Segment B to access residential postal boxes or other low-density land uses. Existing at-grade intersections and driveways with direct access on either side of US 101 result in merging and exiting local traffic during peak demand periods. The current expressway makes it difficult to serve both mainline and local circulation needs;

- Shoulder widths do not meet current design standards and thus do not provide adequate pull-out areas for disabled vehicles; and

- Upgrading roadway features, such as horizontal curves (turning radii) and vertical curves (rate of incline and decline) would increase distant visibility of upcoming hazards or changing traffic conditions.

- Portions of US 101 historically flood, because existing culverts are undersized to handle current and predicted runoff during large storms.

Local Initiatives. A number of actions by public agencies have signaled support for the MSN Project. Sonoma County elected to direct local funds, including portions of its local sales tax measure (Measure M) passed in 2004, to support the project. A chief directive by the local voters in the passage of these tax initiatives was to improve mobility and reduce local congestion for everyone who lives or works in the counties by providing a variety of high quality transportation options designed to meet local needs. The support shown by each of these counties, in part, resulted in the recommendation by the MTC to include this project as one of the improvements that would enhance connectivity and safety. As a result, the MSN Project was awarded funding through the Corridor Mobility Improvement Account (CMIA) of the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B) that was passed by the California voters in the November 2006 election.

S.3 Who has proposed this project?

The MSN Project is a joint project by **Caltrans, District 4** and the **Federal Highway Administration** (FHWA), and their local partners in Marin and Sonoma counties. The local partner in Marin County, the **Transportation**

Figure S-3 Access Problems in the MSN Project Central Segment

Aerial view of open median

At-grade connection to US 101

At-grade connection to US 101

Authority of Marin (TAM), was created to administer the county's local sales tax Measure A, approved by the voters to support transportation projects in the county. The local partner in Sonoma County, the **Sonoma County Transportation Authority** (SCTA), was created to serve as the countywide planning and programming agency for transportation-related issues. Each of these local partners has collaborated with Caltrans and FHWA throughout the development of the project, sought funding for the project, and been vocal project advocates in their roles as transportation experts and spokespersons within the counties. Subsequent to a letter dated November 27, 2007, from the US Coast Guard (USCG) requesting to serve as a cooperating agency on the environmental document, FHWA has agreed to the agency's participation in this role (Appendix B). FHWA followed up with a letter formalizing the request on May 13, 2008 (see Appendix Q). On June 29, 2009, Melanie Brent communicated with USCG to confirm their acceptance of cooperating agency status (personal conversation Carl Hauser, USCG, Eleventh Coast Guard District, 6/29/09). This role will help to streamline the permit process for the Petaluma River Bridge over which the USCG has jurisdiction.

S.4 What is an EIR/EIS?

An **Environmental Impact Report** (EIR) is a document prepared pursuant to the California Environmental Quality Act (CEQA). Under CEQA, an EIR describes:

- the proposed project;
- the possible impacts of the project (particularly those considered "significant") on the physical environment;
- measures to reduce or eliminate identified significant impacts; and
- possible alternatives that could achieve the project's objectives and minimize some of the significant impacts.

The "lead agency" (the public agency with primary approval responsibility for the project) preparing the EIR for the MSN Project is Caltrans.

An **Environmental Impact Statement** (EIS) is a document prepared pursuant to the National Environmental Policy Act (NEPA). NEPA applies when a federal action is proposed. Such actions include federal funding, building on federal land, or issuing a federal permit. The EIS, like the EIR, is intended to describe:

- the proposed action and possible alternatives;
- the consequences of those alternatives on the biological, physical, and socioeconomic environments; and
- measures to reduce or eliminate the impacts.

The federal lead agency preparing the EIS for the MSN Project is the FHWA.

Because the MSN Project is a joint project by Caltrans and FHWA, it is subject to both state and federal environmental review requirements. Accordingly, the environmental analysis and documentation has been prepared in compliance with both CEQA and NEPA.

The Draft Environmental Impact Report/Environmental Impact Statement (DEIR/S) was available for public review from October 16 to December 14, 2007. Caltrans and FHWA have collected, reviewed, and responded to comments submitted on the DEIR/S. These comments and responses are reported in Volume 3 of this Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/S).

Caltrans and FHWA have also identified a Preferred Alternative. These efforts are disclosed in this FEIR/S. Caltrans and FHWA have also coordinated and consulted with state and federal agencies concerning the Preferred Alternative.

S.5 Who will use the FEIR/S?

Decision Makers. The lead agencies and their sponsoring partners must consider the impacts identified in the FEIR/S prior to acting on the project. It may be that, upon review of the FEIR/S, lead agencies decide to alter the proposed project or to identify an alternative.

The Public. In addition, the FEIR/S is prepared for public review and comment. In deliberating on the proposed project, the lead agencies will consider the opinion and concerns about the desirability of a project and its consequences. Thus, the FEIR/S allows the public to become more engaged in the review process and to offer more informed comments on the project to the lead agencies.

Public Agencies with Review, Approval, and Permit Responsibilities. There are a number of federal, state, regional, and local public agencies that have jurisdiction over resources that may be affected by the MSN Project. These agencies, listed below, will review the FEIR/S and use the analyses to understand the potential impacts on the resources they oversee, to make discretionary decisions on the project, or to exercise their review and permit authority over the project. All of the permits and regulatory reviews must be completed prior to construction.

- United States Fish and Wildlife Service (USFWS) – will review impacts of sensitive biological species and habitats, in accordance with the federal Endangered Species Act;
- California Department of Fish and Game (CDFG) – will review impacts on streambed alteration, in accordance with Fish and Game Code, Section 1602; and on sensitive biological species and habitats, in accordance with the California Endangered Species Act;
- United States Army Corps of Engineers (USACE) – will review impacts on fill or discharge to wetlands or waters of the U.S, in accordance with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Appropriation Act of 1899. This project is being reviewed under the NEPA/404 "Integration Memorandum of Understanding that seeks to streamline the NEPA and Section 404 Clean Water Act Processes. Part of this process is to determine the project's "Least Environmentally Damaging Practicable Alternative" (please see Chapter 6 Summary of Public/Agency Involvement Process/Tribal Coordination for more information on this topic);
- Regional Water Quality Control Board (RWQCB) – will review impacts on water quality standards, in accordance with Section 401 of the Clean Water Act;
- California Public Utilities Commission (CPUC) – will review potential of environmental impacts associated with the relocation of utility facilities necessary for project construction;
- National Oceanic and Atmospheric Administration, Fisheries (NOAA Fisheries) – will review effects on fish species and habitat, in accordance with the Endangered Species Act;

- State Historic Preservation Officer (SHPO) – will review effects on historic and prehistoric cultural resources, in accordance with the National Historic Preservation Act (NHPA);
- State Lands Commission (SLC) – will review impacts on lands under the public trust; and
- United States Coast Guard (USCG) – will review impacts on navigation and safety, in accordance with the General Bridge Act of 1946, as amended. A Clean Water Act Section 401 water quality certification must be issued or waived before the USCG can issue a permit for the bridge.

S.6 Are there different ways of fixing the problems?

Prior to preparing the DEIR/S, Caltrans completed a study in May 2000, referred to as Route 101 Marin-Sonoma Counties Major Investment Study,[1] which examined a range of alternatives to relieve congestion in the US 101 North Bay Corridor. Subsequently, TAM and SCTA requested that Caltrans conduct more detailed "Project Study Reports" to assist with programming and funding improvements in the corridor. The Project Study Reports investigated widening the existing facility for additional lanes, installing median barriers, widening interchange ramps, installing ramp metering equipment, adding new interchanges, correcting existing operational deficiencies, constructing access roads with bicycle and pedestrian paths, and widening bridges. Each of these individual improvements was important in fashioning the alternative packages of improvements that are studied in this FEIR/S (as explained further below).

The MSN Project is included in the MTC's Regional Transportation Plan (RTP), *Transportation 2030 Plan for the San Francisco Bay Area* (2005), which looks at multi-modal transportation improvement options throughout the bay area region. The EIR created for the RTP (2005) determined that the Transportation 2030 Plan should be selected over the No Build Alternative or the TRANSDEF Smart

[1] A Major Investment Study (MIS) is a comprehensive transportation planning study designed to identify and address the mobility needs in a particular corridor. It is used when there is a potential for major investment involving federal funds in the study area. The MIS proposes alternative sets of solutions; screens out solutions deemed infeasible; requires that technical analyses be performed on remaining solutions to determine their viability; and selects a preferred set of solutions. The MIS is an internal document and not circulated to the public. For additional information, please refer to Volume 3, Section 2.6.

Growth Alternative, as neither could provide the full transportation benefits that would be achieved through the range of projects proposed in the Transportation 2030 Plan.

S.7 Who helped suggest ways to fix the problems?

Caltrans has conducted public outreach through public scoping meetings and by forming a Policy Advisory Group to help develop alternatives that could be studied as part of the FEIR/S. Public input was solicited during early scoping meetings and through responses to public notices about Caltrans' intent to prepare an FEIR/S. The Mineta Transportation Institute convened a Regional Transportation Hot Spot Forum dedicated to the Marin/Sonoma 101 Corridor in April 2003. Representatives from the local jurisdictions, plus members of the public, brainstormed on ideas and actions to relieve congestion. These ideas further formed the solutions that Caltrans, its local partners, and the Policy Advisory Group were discussing.

The Policy Advisory Group, composed of local city and county officials, served as an advisory body to Caltrans, FHWA, TAM, and SCTA. In addition to policy guidance, Caltrans obtained technical guidance from groups such as the local public works officials; state and federal regulatory agencies; the Golden Gate Bridge, Highway, and Transportation District; the California Highway Patrol; the Sonoma Marin Area Rail Transit District; and a coalition of bicycle and pedestrian groups.

S.8 What alternatives are studied in the FEIR/S?

As noted earlier, the package of improvements varies by each segment. For Segments A and C, there are only two alternatives: "Build" or "No Build." These segments are already built to freeway standards, so the needed improvements are not as extensive as in Segment B (Central Segment), which is currently built to expressway standards and needs much more work. For Segment B, there are two build alternatives, as well as four freeway access options under consideration. The access options would work with either of the build alternatives. The alternatives are generally described below and detailed in Chapter 2.

No Build Alternative. The No Build Alternative is the no-action alternative. The No Build Alternative proposes no modifications to US 101 within the project boundaries, other than routine maintenance and rehabilitation to support the continuing operations of the existing roadway when needed.

Fixed HOV Lane Alternative. Under this alternative, two HOV lanes, one in each direction, would be constructed in the median of US 101 for the length of the MSN Project (26.0 km, or 16.1 mi). The HOV lanes would be restricted to vehicles carrying two or more people during specific hours, usually during the peak commute periods. Outside of these specified hours, the HOV lanes would be available to all vehicles, regardless of the number of passengers.

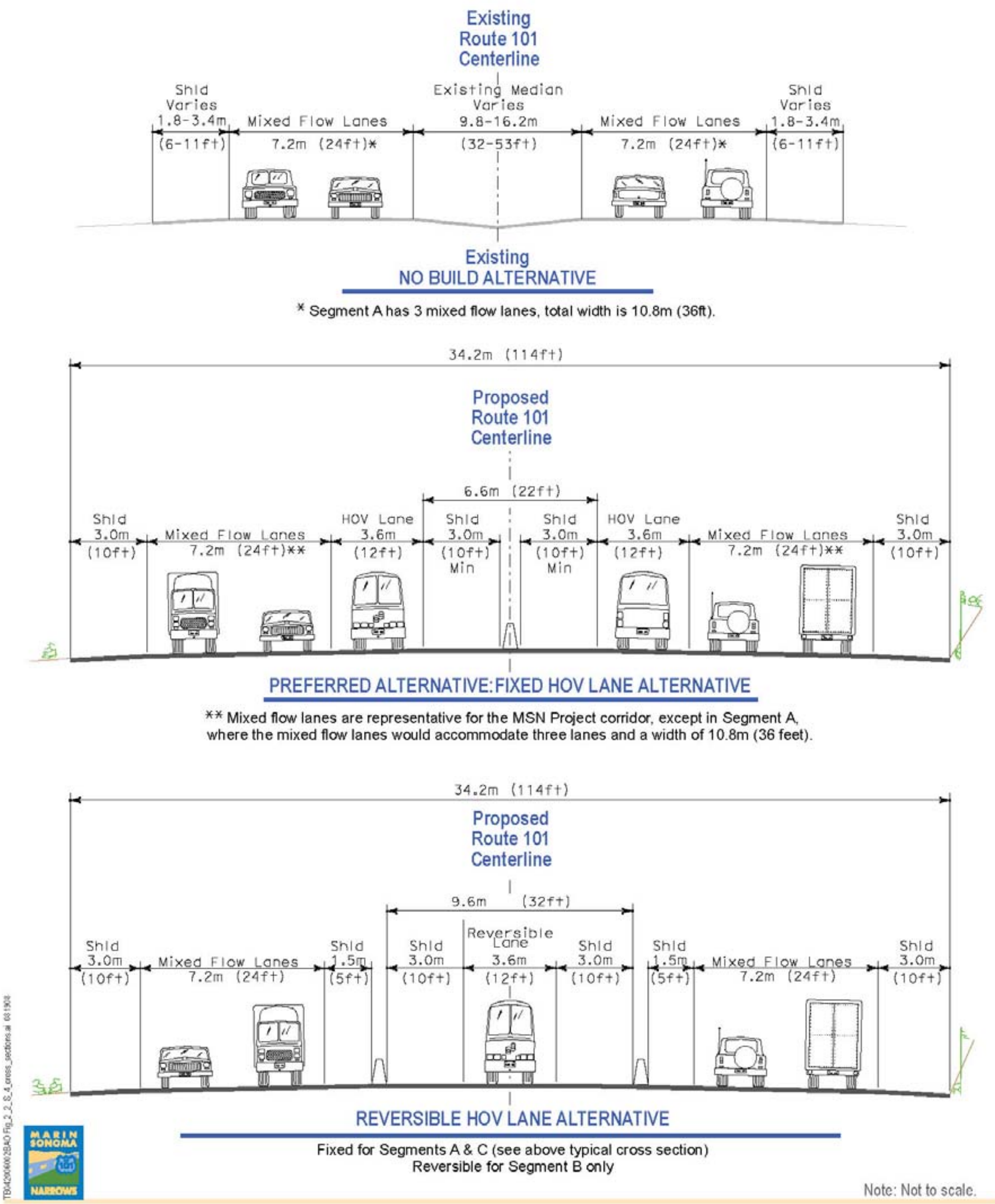
The HOV lanes would have a standard width of 3.6 meters (m), or 12 feet (ft), plus shoulders in the median that would allow vehicles to pull over if disabled or to let an emergency vehicle pass. A median barrier would be installed to separate the northbound and southbound lanes of traffic.

Reversible HOV Lane Alternative. This alternative is exactly the same as the previously described alternative for Segment A (from SR 37 to north of Atherton Avenue in Marin County) and Segment C (from SR 116 (East) to north of the Corona Overcrossing in the City of Petaluma (Sonoma County); i.e., there would be fixed HOV lanes, one in each direction in the median of US 101. Within Segment B (the Central Segment), a single reversible HOV lane would be constructed in the median of US 101. The US 101 median within this segment would be 9.6 m (32 ft) wide, which would provide sufficient room for the 3.6 m (12 ft) reversible HOV lane and shoulders. On either side of this HOV lane, barriers would separate the HOV lane from the existing “mixed flow” lanes. This HOV lane would be 10.5 km (6.5 mi) in length.

The key difference with this “reversible” alternative is that the HOV lane in this segment would only allow traffic in one direction, depending on the time of day. During the A.M. peak period, only southbound traffic could use the HOV lane; during the P.M. peak period, only northbound traffic could use the HOV lane. This “reversible” concept allows the HOV lane to accommodate traffic flow based on the predominant travel direction during the peak commute periods.

Figure S-4 shows a typical cross section across US 101 and highlights the differences among the three alternatives. It is noted that the width of the cross sections for the Fixed HOV Lane Alternative and the Reversible HOV Lane Alternative are the same at 114 ft and have the same alignments.

Figure S-4 Typical Cross Sections of No Build and Build Alternatives



Other Improvements Common to the Build Alternatives. In addition to widening the US 101 median to accommodate the HOV lanes that would enable HOV traffic to flow continuously through the project boundaries, there are a number of other improvements that would be constructed as part of either build alternative. These features are noted below by segment.

- Segment A (the Southern Segment)
  - Ramp metering and retaining walls at SR 37
  - HOV bypass lanes at existing on-ramps
  - Bridge widenings
  - Sound walls and retaining walls
  - Upgraded drainage facilities
  - Speed changing lanes (aka auxiliary lanes)

- Segment B (the Central Segment)
  - Roadway realignment
  - Modifications to US 101 access roads (described separately below)
  - Bicycle/pedestrian path
  - Retaining walls
- Segment C (the Northern Segment)
  - Ramp metering
  - HOV bypass lane at existing on-ramps
  - Bridge widening
  - Soundwalls
  - Retaining walls
  - Upgraded drainage facilities
  - Speed changing lanes (aka auxiliary lanes)

Access Options in Segment B (Central Segment). In addition to the roadway realignment, the proposed freeway upgrade in Segment B (Central Segment) would eliminate direct at-grade access to US 101. During the alternative development phase, Caltrans identified 15 different packages of improvements to maintain access to property owners in this segment, to serve Olompali State Historic Park, to allow construction of a bicycle/pedestrian path, and to control access to US 101 through construction of new interchanges.

These different options were evaluated, considering a variety of factors, and ranked. The top four ranked access options are included in this FEIR/S. The access options vary in their proposals for the Redwood Landfill Road Overcrossing, a potential new interchange near the existing southerly San Antonio Road intersection, and the location and extent of new access roads on either side of US 101.

S.9 Identification of the Preferred Alternative for Marin-Sonoma Narrows (MSN) HOV Widening Project

Caltrans and FHWA have identified the Fixed HOV Lane Alternative as the Preferred Alternative. The following is a summary of the reasons behind identifying this alternative.

- While both alternatives are projected to provide similar throughput (the number of vehicles passing through a given stretch of road) in the predominant peak direction (a.m. southbound and p.m. northbound), the Fixed HOV Lane Alternative would be available during all periods, while the Reversible HOV Lane would be closed during off-peak periods. The Fixed HOV Lane Alternative would be compatible with Marin County's city-centered corridor and Sonoma County's city-centered growth policies.

- The Fixed HOV Lane Alternative would be more efficient than retrofitting the Reversible HOV Lane to a Fixed HOV Lane in the future. Availability during off-peak periods would be important for potential job and population growth within Marin and Sonoma counties, which would be available with the Fixed HOV Lane Alternative.

- The Reversible HOV Lane would require switching devices, safety devices, and message signs. More monitoring and staff would be needed to operate the Reversible HOV Lane Alternative, making it a more costly system to operate and maintain.

- Removing disabled vehicles from the HOV Lane and providing emergency vehicle access along US 101 would be more difficult with the Reversible HOV Lane Alternative because of the limited access to the center HOV Lane.

- The Fixed HOV Lane Alternative at $429.7 would be more cost effective. According to the MSN Project Report, the total estimated construction cost for the Fixed HOV Lane Alternative would be $2.4 million less than the Reversible HOV Lane Alternative million (not including support costs). The totals displayed reflect the total estimated costs with the preferred Access Option 12b; which is discussed in the following paragraphs.

Although any of the Access Options would be compatible with either mainline alternative, Caltrans and FHWA have identified Access Option 12b. The following is a summary of the reasons behind identifying Access Option 12b over the others:

- Although all the access options would result in similar adverse visual impacts to motorists, bicyclists, and pedestrians, Access Option 12b will be less visually intrusive because of the utilization of existing interchanges rather than building new larger interchanges. Thus, a high level of visual quality will be maintained with Access Option 12b; in which scenic view corridors of hillsides will provide a predominantly natural visual appearance.

- Access Option 12b will also take advantage of existing interchanges reducing the projects footprint and conserving more right-of-way over the other proposals.

- Access Option 12b would provide direct access to US 101 from the Redwood Landfill, which generates more traffic compared to the other surrounding low-density land uses.

- According to Caltrans Project Report, the total estimated construction cost of the Access Options all within 5 percent of each other. Therefore, cost was not as important compared to other considerations.

At its meeting on February 18, 2008, the Project Advisory Group (PAG) and the Project Leadership Team (PLT), which includes Transportation Authority of Marin (TAM) and Sonoma County Transportation Authority (SCTA), accepted the recommendation of the Fixed HOV Lane Alternative with Access Option 12b as the Preferred Alternative. Caltrans and FHWA have also identified this Preferred Alternative as the Preliminary Least Environmentally Damaging Preferred Alternative (LEDPA). Caltrans and FHWA have also received concurrence from the participating NEPA/404 regulatory agencies on the identification of the Fixed HOV Lane Alternative as the Preliminary LEDPA.

S.10 What are the consequences of building this project?

This FEIR/S describes the potential impacts associated with each of the alternatives. It should be noted that there are differences between CEQA and NEPA. A key distinction is in determining the "magnitude," or severity, of an impact. NEPA acknowledges adverse effects and recommends consideration of mitigation measures to reduce the effects. CEQA emphasizes adverse effects that are considered "significant" or "substantial" in that they exceed defined criteria. If an impact is declared significant under CEQA, mitigation measures must be identified.

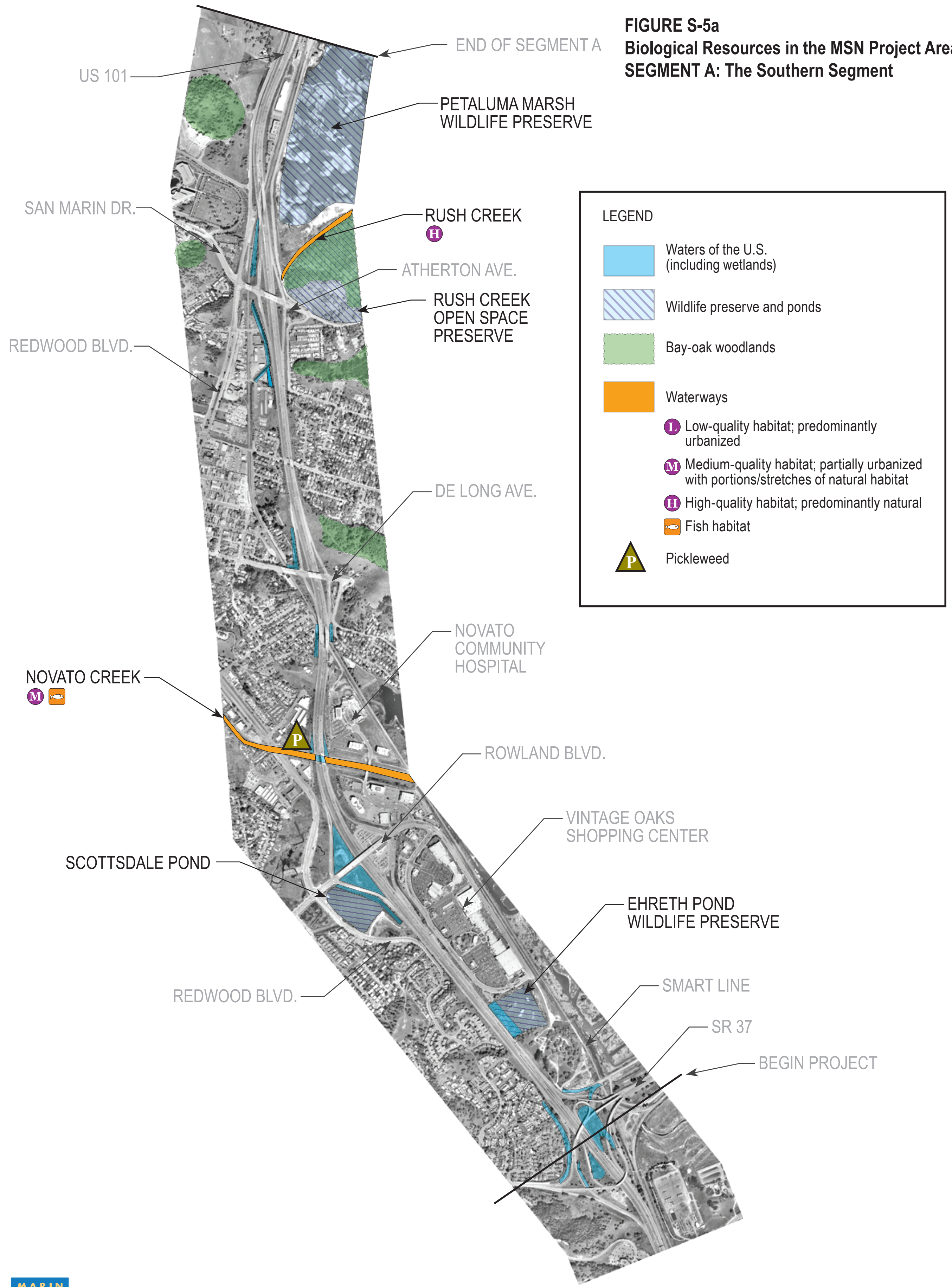
During the scoping and alternatives development process, concerns arose regarding the environmental sensitivity of the corridor, particularly in relation to Segment B. Figures S-5a-d provides an overview to some of the major biological resources in the MSN Project area. During the Access Options evaluation process in Segment B, the Caltrans sought to avoid impacts to various environmental resources. Nevertheless, some of these resources would be impacted should the project be constructed, and these potential impacts are highlighted in Table S-3 at the end of the Summary.

It is important to note that the widths of the cross sections for the two Build Alternatives and their alignments are the same. Therefore the area taken up by the freeway improvements (also known as the "footprints") are the same. Consequently, the impacts of the Build Alternatives on resources like cultural, geology, and hydrology do not differ. Similarly, exposure to potential hazards like noise, air emissions, and hazardous materials would also be identical. However, the primary difference between the two Build Alternatives is their effect on traffic and circulation. In contrast, there are more differences in impacts among the Access Options associated with the expressway to freeway upgrade proposed in Segment B.

Table S-2, at the end of this Summary, describes the impacts for each of the alternatives, as well as the mitigation measures proposed to minimize adverse impacts. Some of the key impacts are noted below by alternative.

No Build Alternative. The No Build Alternative proposes no modifications to US 101 within the project boundaries other than routine maintenance and rehabilitation to support the continuing operations of the existing freeway when

FIGURE S-5a
Biological Resources in the MSN Project Area
SEGMENT A: The Southern Segment



Note: Not to Scale

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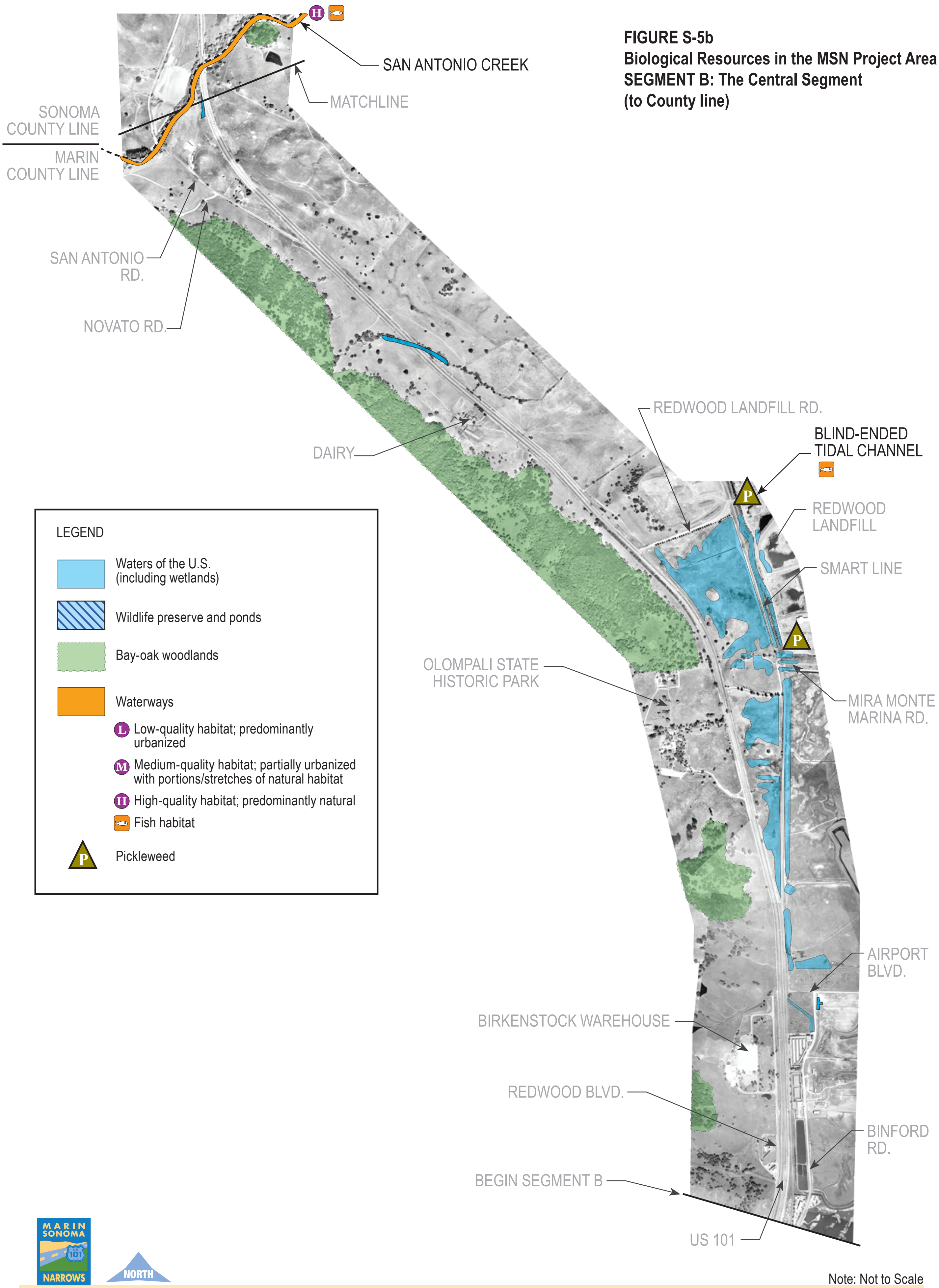
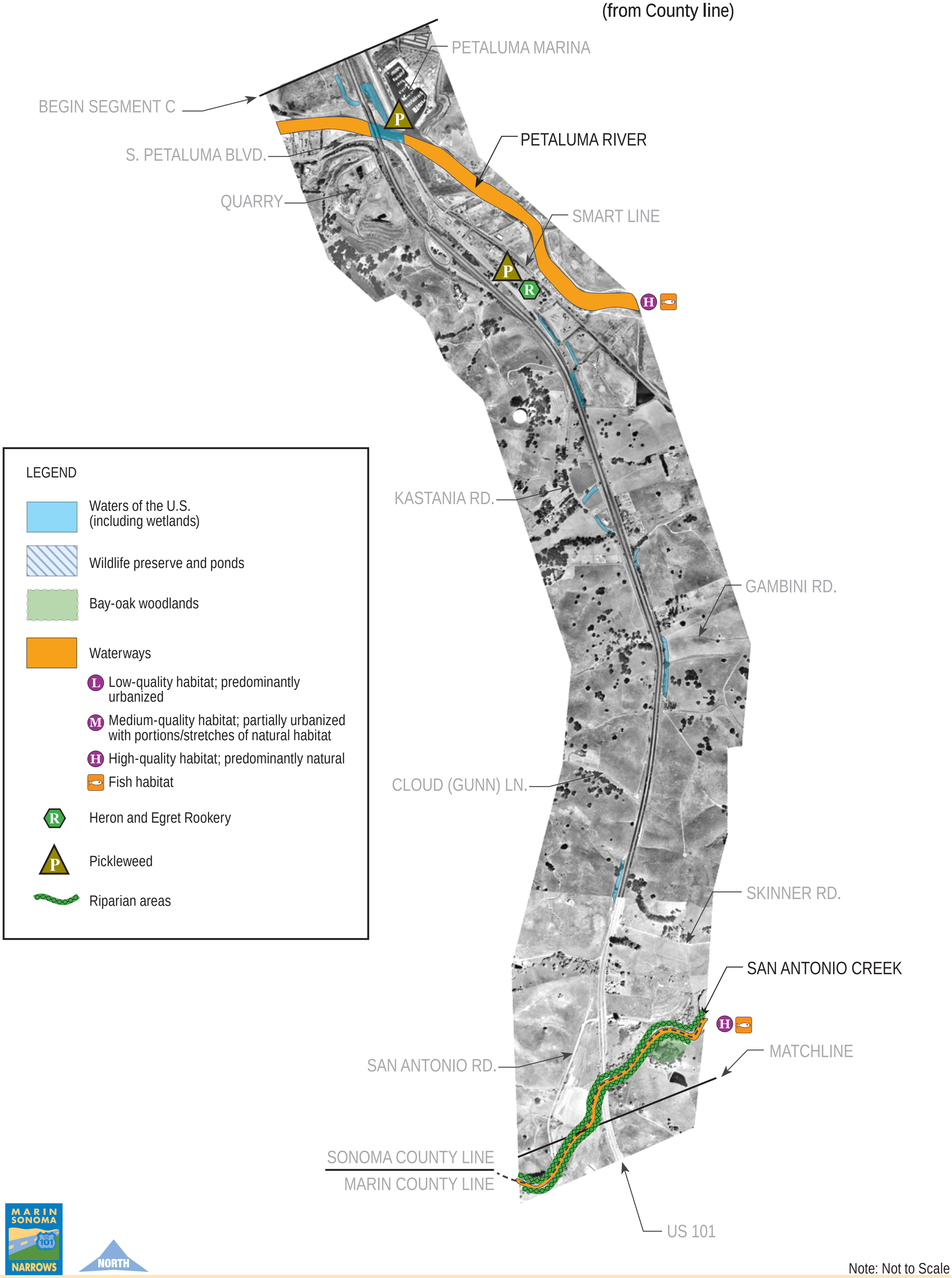
FIGURE S-5b
Biological Resources in the MSN Project Area
SEGMENT B: The Central Segment
(to County line)



Note: Not to Scale

FIGURE S-5c
Biological Resources in the MSN Project Area
SEGMENT B: The Central Segment
(from County line)



Note: Not to Scale

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FIGURE S-5d
Biological Resources in the MSN Project Area
SEGMENT C: The Northern Segment

Note: Not to Scale

TB042006002BAO_MSN_basemaps_BiologicalResources.indd 10-11-07

needed. As such, this alternative would produce no immediate environmental impacts; and, consequently, no mitigation measures would be required.

Build Alternatives. Both the Fixed HOV Lane Alternative and the Reversible HOV Lane Alternative involve impacts to the physical environment. During the alternatives development process, Caltrans and FHWA sought to avoid or minimize potential impacts as much as possible. However, complete avoidance of impacts was not possible. Some of the impacts, including temporary impacts, for both Build Alternatives are identified below. A complete listing of impacts is contained in Table S-2:

- displacement of one residential unit because of the additional right-of-way required;
- conversion of agricultural lands because of the additional right-of-way and realignment of the roadway through Segment B;
- disturbance to archeological resources because of roadway and bridge construction;
- disturbance to biological resources including trees and bird habitat, wetlands, other Waters of the US, and habitat of sensitive wildlife and rare plant species known to occur in the area, because of additional right-of-way and realignment of the roadway through Segment B;
- alteration to the visual setting because of the increased views of roadways and soundwalls, modifications to major landforms, and vegetation removal;
- light and glare on nearby residents because of vegetation removal;
- increased runoff and potential water quality degradation because of additional impervious surfaces and stormwater pollutant loading on the roadway surfaces; and
- construction impacts including traffic delays, temporary detours to the Olompali SHP entrance, relocation of utility lines in the Caltrans right-of-way, temporary closure of parking facilities, temporary disruption to transit services, prolonged views of unsightly construction equipment, increased erosion and sedimentation, exposure to hazardous materials or contaminated

soils or ground water, air and noise emissions, and disturbance to biological resources and habitats.

The MSN Project will provide the following positive benefits to traffic, infrastructure and energy efficiency, air quality, and the environment:

Traffic:

- Reduces congestion along US 101; thereby improving mobility for motorists who use US 101 for home-to-work trips, tourism and recreational trips;
- Improves mobility for goods movement to support the region's economic vitality.
- Improves efficiency of system to provide less incentive for traffic to bypass US 101 via local streets and roads.
- Increases highway system reliability for all users, including express bus services and carpoolers, providing incentives for alternatives to Single Occupancy Vehicle (SOV) commuting.

Infrastructure and Energy Efficiency:

- Standardizes horizontal and vertical curves, sight distances, and roadway shoulders, thereby improving overall traffic operations, particularly during peak travel demand;
- Corrects existing drainage problems and reduce roadway flooding,
- Improves efficient use of the existing roadway system without adding substantial new capacity, which is in conformity with the local general plans;
- Upgrades Segment B (the Novato Narrows) from expressway to full freeway, conforming to freeways in Segments A and C.
- Will retain and incorporate large portions of the existing US 101 roadway, optimizing right of way and reducing land use conversion.
- Reduces vehicles miles traveled (VMT) and promote more efficient energy consumption through system reliability.

Air Quality:

- In conformity with the Metropolitan Transportation Commission's 2035 Regional Transportation Plan, implements the State Implementation Plan for improving regional air quality and meets project-level attainment requirements for CO, NO2, O3, and particulate matter.

- Implements construction of carpool/express bus lanes on freeways, also known as Transportation Control Measure 8 of the Bay Area Air Quality Management District 2000 Clean Air Plan to achieve air quality standards.

Environmental:

- Provides Class 1 and 2 bicycle lanes from northern Novato to southern Petaluma.

- Provides freespan bridge structures over waterways to reduce structural intrusions in fish and wildlife habitat areas.

- Provides up to 5 decibels in noise abatement to 168 homes within the project area.

- Increases storm water treatment for freeway runoff.

- In conformity with city and county land use and growth policies, limits frontage road construction.

The analysis of impacts, which is contained in Chapter 3 of this FEIR/S, also describes the varying effects of the four Access Options. A summary of some of the impacts by Access Option is provided in Table S-3.

S.11 Are there ways to reduce these adverse consequences?

The FEIR/S is required to identify measures to minimize or reduce impacts that would result from building a project. The proposed measures in this FEIR/S would minimize or reduce identified adverse impacts, and, in some cases, replace disturbed resources.

During the construction period, there are a number of existing regulations that define standard practices, procedures, and "best management practices" (BMPs). These regulations and a menu of standard practices are effective at minimizing the effects of air emissions, erosion and sedimentation, noise, disturbance to cultural and biological resources, geologic hazards, and exposure to hazardous materials from construction activities. In addition, there are established management plans that Caltrans prepares to ensure that traffic disruption and safety hazards are minimized during the construction of roadway and bridge improvements. Such plans address traffic detours, signage, hours of construction, and other practices and procedures to ensure the safety of the construction workers and the public and to minimize the amount and duration of disruption to circulation and access.

For permanent impacts that may result from the Build Alternatives, there are other measures that can reduce the severity of the potential impacts. For example:

- for displacement of homes, there are state and federal programs to assist with relocation;
- for loss of archeological resources, there are requirements of the SHPO that define methods for data recovery and recordation;
- for loss of biological resources, there are requirements and permits that define compensation for harm under the supervision of USFWS, USACE, NOAA, CDFG, and other agencies;
- for noise, soundwalls can be constructed to protect residential areas, and other sensitive noise receptors; and
- for excessive light and glare, landscaping and screening can shield viewers.

With the implementation of these measures, it is anticipated that all adverse effects would be sufficiently addressed, except for the alteration to the visual setting. In other words, in spite of all avoidance, minimization and mitigation measures, construction of the Build Alternatives could result in substantial permanent visual effects.

S.12 Is there any controversy over building the project?

The MSN Project would involve disturbance to a number of sensitive environmental resources, some of which are illustrated in Figures S-5a-d. The Policy Advisory Group, the public, and the resource agencies have expressed concern over disturbance to archeological resources, potential loss of wetlands and habitat for threatened and endangered species, and trees. Similarly, the Hot Spot Forum that was sponsored by the Mineta Institute echoed concerns over disturbance to the natural resources. The overarching recommendation emerging from the forum was the need to take a “modest approach that protects baylands,” rather than a buildout solution that would transform the unique neighboring communities to look like other communities, with access roads on either side and multiple interchanges.

Changes to the visual setting, particularly in the Central Segment, which is largely rural and undeveloped, are a cause for concern. The construction of roadways, interchanges, and retaining walls could diminish open space sceneries and views of major landforms and trees.

In the urban areas of the project, issues over the likelihood of increased noise pollution have been raised. Nearby residents have requested the construction of soundwalls, in addition to the ones currently proposed.

Realignment of the US 101 mainline the Central Segment would involve the construction of new interchanges and overcrossings. The controlled access provided at selected locations in this stretch of US 101 raises concerns about growth inducement and attracting new, more urbanized land uses, not reflective of the predominantly rural land use character of the Central Segment.

The disturbance to natural resources, the loss of the natural rural setting, and the fear of unwanted growth are all concerns that have been raised by the public. As a result, there have been calls for traffic congestion relief solutions that rely less on roads and more on transit opportunities. Specifically, there is a belief among some groups that public funds would be better invested in transit and commuter rail services.

The inclusion of pedestrian/bicycle access ways in the project has been mentioned in reference to pedestrian and bicyclist safety concerns. With the addition of bike paths throughout the Central Segment, maintaining pedestrian and bicyclist safety is a main concern and ties into issues of maintenance, access and separation from traffic.

In light of the above, a resolution has been made as to which alternative and which Access Option would best accomplish the project purpose and satisfy the identified needs in this portion of the US 101 corridor. Also, as noted earlier in the description of how this joint document will be used, there are other public agencies that will use this report to make regulatory and permitting determinations. Caltrans and FHWA have taken the public's and regulator's comments into consideration in the identification of a Preferred Alternative.

S.13 Are there other transportation projects underway?

The MSN Project is one of a number of transportation improvements that are under consideration or construction in the project area. These related projects are shown in Figure S-6 and summarized from south to north in Table S-1.

S.14 What are the next steps?

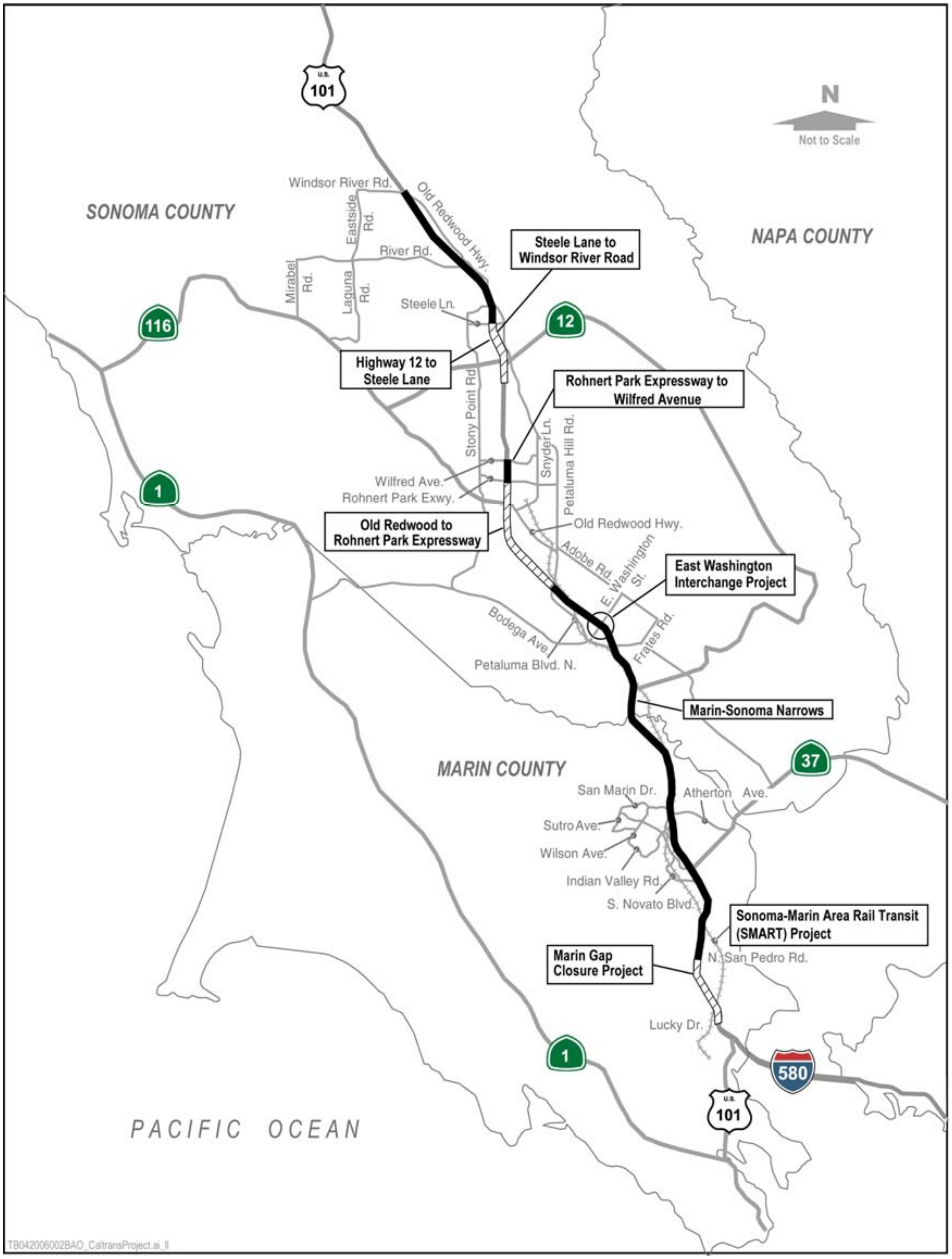
There are several key steps to complete the environmental review process, and. these steps are summarized below.

Public Review and Comment. In accordance with CEQA and NEPA, Caltrans and FHWA distributed the DEIR/S and received public comments from October 16, 2007, to December 14, 2007, from many public agencies, interested organizations, and interested members of the public. Additionally, meetings were held where the public could ask questions, view design display boards and visual simulations, and provide comments on the DEIR/S. The public meeting announcement and notices of availability appeared in local newspapers (see Chapter 6 for proofs of publication) and all individuals and organizations on the project mailing list were notified. The comments received and their responses are presented in Volume 3 of this FEIR/S.

Some of the Comments addressed include, but are not limited to:

- the merits of the alternatives;
- preferences for a particular alternative or variant; the accuracy of the description of existing environmental baseline conditions;
- the sufficiency of the document at identifying impacts;
- suggestions for other impacts to consider;
- the adequacy of the identified mitigation measures; and
- suggestions for other mitigation measures to consider.

Figure S-6 Related Projects in MSN Study Area



In accordance with CEQA, a Notice of Determination will be filed with the State Clearinghouse. Under NEPA, however, FHWA needs to approve the Preferred Alternative through a Record of Decision (ROD) in which the rationale for identifying the Preferred Alternative is discussed and substantive comments are addressed. After approval of the ROD, this project can proceed to final design and construction.

Identification of a Preferred Alternative. Based on public comments received on the DEIR/S and federal and state requirements, Caltrans and FHWA identified a Preferred Alternative that is still subject to further design and refinement. In making this decision, FHWA and Caltrans, consulted with regulatory agencies through the NEPA/404 process (see Section 6.3.1), and with its local partners, TAM and SCTA. These consultations led to the determination that the Preferred Alternative would also serve as the Preliminary LEDPA.

Preparation of the FEIR/S. Caltrans and FHWA reviewed all of the comments received on the DEIR/S. Responses to these comments have been prepared and are presented in Volume 3 of this FEIR/S. Updates and changes have been made to the environmental document where appropriate. This FEIR/S also identifies the Preferred Alternative.

Approval of the FEIR/S. The FEIR/S will be distributed to agencies, organizations, and individuals who commented on the DEIR/S. The FEIR/S will inform those commenting on the DEIR/S how their comments were addressed and what changes may have been made to the project.

To complete the FEIR/S documentation, Caltrans would approve or “certify” that the document complies with CEQA and FHWA would approve the document under NEPA.

Decision on the Project. Only after formal approval can federal and state agencies take action on the MSN Project. In accordance with CEQA, Caltrans would issue a Notice of Determination (NOD) that identifies the decision to certify the FEIR/S. In accordance with NEPA, FHWA would issue and publish a Record of Decision (ROD) identifying the Preferred Alternative and approving the project. The Preferred Alternative would then advance to the design stage and be constructed based on available funding.

Phase 1 of the Project. Currently, Phase 1 of the project has been identified and construction will begin in late 2010. The scope of work under Phase 1 was constrained by the available funding. The Phase 1 improvements were identified to extend the existing HOV lanes in Novato northward while also addressing the access issues in Segment B. The Phase 1 proposed improvements include constructing a northbound and southbound HOV lane in Segment A between SR 37 and north of Rowland Boulevard, and a northbound HOV lane between north of Rowland to north of Atherton Avenue. Also in Segment A, sound walls will be constructed and the existing on-ramps will be widened for an HOV bypass lane and ramp meters installed. In Segment B, the Petaluma Boulevard South Interchange will be reconstructed and the Redwood Landfill Overcrossing will be converted into an interchange. A portion of US 101 would be reconstructed to correct nonstandard roadway geometry and inadequate drainage. A portion of the proposed frontage road network will be constructed. A continuous bike path through Segment B would also be constructed. The Phase 1 improvements in Segment B will allow the closure of 27 of the existing 37 access points along US 101.

Phase 2 of the Project. Phase 2 of the Project would construct a southbound HOV lane in Novato between north of Rowland Boulevard to north of Atherton Avenue by widening the existing median. Between north of Atherton Avenue and north of the North Novato Overhead, a northbound and a southbound HOV lane would be constructed by widening within the existing median. Between north of the North Novato Overhead and the Petaluma River Bridge, US 101 would be widened and realigned to provide an HOV lane in both directions while correcting nonstandard roadway geometry in Segment B. In the City of Petaluma, the Petaluma River Bridge would be replaced with a wider structure and US 101 would be widened to provide an HOV lane in each direction. Both inside and outside widening would be done to accommodate the additional lanes. The new HOV lanes would terminate south of the Old Redwood Highway Interchange, or tie into planned HOV lanes to the north, if that project is constructed first. The roadway north and south of the North Petaluma Overhead would be reconstructed to improve sight distance. Existing on-ramps at the SR 116 and East Washington Interchanges would be widened to provide an HOV bypass lane and ramp meters installed. Sound walls would be constructed in Petaluma. Phase 2 will close the remaining uncontrolled access points within the MSN Project boundaries.

Table S-1 Related Transportation Projects in the MSN Project Area

Project	Description	Status
Marin Gap Closure	Caltrans proposal to close the gap in the HOV lane system on US 101 with a northbound/southbound HOV lane in Marin County between Lucky Drive in Corte Madera and North San Pedro Road in San Rafael.	Three segments are complete and the fourth will be completed in summer 2009.
Redwood Landfill Road Overcrossing	A private facility for truck traffic accessing southbound 101 from the at-grade intersection on the northbound side of US 101.	Completed summer 2006.
US 101/SR 116 Separation and Overhead Project	Demolition, replacement, and widening of the southbound 101/116 separation and overhead; additional widening for staging; a mechanically stabilized embankment (MSE) wall and retaining wall; minor paving and restriping.	Completed construction.
Southbound Auxiliary Lane in Petaluma	A southbound speed change lane from Caulfield Lane Overcrossing to East Washington Street Interchange by paving the median; replacement of existing median barrier with a concrete median barrier.	Completed construction.
East Washington Interchange Improvement Project in Petaluma	Reconfiguring the northbound and southbound on-ramp and adding a new northbound diagonal on-ramp with a new bridge to free-span Washington Creek; replacement tree planting.	Undergoing final design.
Central Sonoma HOV Lane Project	Proposed by Sonoma County Transportation Authority to construct HOV lanes in both directions from Old Redwood Highway to Rohnert Park Expressway.	Environmental studies underway. Anticipate going to construction mid 2010.
Wilfred Avenue Interchange and HOV Widening	New bridge undercrossing structure linking Wilfred Avenue to Golf Course Drive and modifying the existing ramps; realignment and widening of US 101 from 4 lanes to 6 lanes for HOV from the Rohnert Park Expressway Overcrossing to the Santa Rosa Avenue Overcrossing.	Under construction.
US 101 Widening and Soundwall Construction from North of the Wilfred Avenue Interchange to US 101/SR 12 Separation	Widening project to add HOV lanes and construction of soundwalls to reduce noise for adjacent sensitive receptors.	HOV lanes completed December 2003; Completed construction.
US 101/Steele Lane Interchange	Addition of HOV lanes from Steele Lane to north of Steele Lane.	Ready for construction pending funding. Under construction.

Table S-1 Related Transportation Projects in the MSN Project Area

Project	Description	Status
US 101 from SR 12 to Steele Lane	Addition of northbound and southbound HOV and speed change lanes on US 101 from the SR 12 Interchange to the Steele Lane Interchange.	Under construction.
US 101 Steele Lane to Windsor River Road	Proposal by Sonoma County Transportation Authority to add HOV lanes in both directions.	Under construction.
Sonoma Marin Area Rail Transit (SMART)	Provision of passenger train service along the Northwestern Pacific (NWP) rail corridor that generally parallels to US 101. Phase I would provide rail service from Cloverdale in Sonoma County to San Rafael in Marin County. Phase II would connect SMART to a ferry terminal. Proposal also includes the North Coast Rail Authority (NCRA) freight service from Cloverdale to Ignacio Wye.	Environmental and engineering studies underway. Final FSEIR adopted July 2008. Cal Park Tunnel under construction due for completion in fall/winter 2009/2010. Undergoing NEPA review.

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
HUMAN ENVIRONMENT					
Land Use					
Compatibility with existing land uses	Compatible with overall land use pattern, even though some conversion of land uses would occur.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required.	3.1.1
Consistency with adopted plans	Beneficial effect; supportive of local, regional, and state land use, transportation, and air quality plans.	Impacts would be the same as Fixed HOV Lane Alternative.	Adverse effect; would not support adopted plans.	None required.	3.1.1
Growth	Would have minimal growth-inducing potential; would accommodate projected growth in traffic, not induce it.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required.	3.1.4
Farmland	Depending on the access option, conversion of approximately 63.22 ha (156.23 ac) to 73.52 ha (181.67 ac) of farmland to transportation uses; including 8.53 ha (21.09 ac) to 16.18 ha (39.98 ac) of land under Williamson Act contracts, and 1.3 ha (3.3 ac) to 1.7 ha (4.2 ac) of prime, unique, statewide, or locally important farmlands. No impact to operation or function of agricultural lands that are not converted.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	During project development, reduced project footprint to avoid large areas of farmlands Compensation for converted land consistent with state and federal laws.	3.1.5

Note:
[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Community Character, Cohesion, and Socioeconomics					
Public and cultural facilities	No negative impact; enhanced access because of reduced congestion and reduced diversion to surface streets in the long term. Temporary impact due to inconvenience and restricted access during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Preparation of a transportation management plan, including Intelligent Transportation Systems, to provide the public with pre-trip and on-route roadway conditions and information during construction.	3.1.6
Parks and recreational facilities	Temporary impact to Olompali State Historic Park entrance while new access via Redwood Boulevard is constructed. Beneficial effect from Caltrans' deeding right-of-way to Olompali, a portion of which would be used for a bicycle/pedestrian path.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Development and implementation of temporary signage and routing to assist motorists.	3.1.3
Acquisitions and Relocations	Acquisition of approximately 0.25 ha (0.63 ac) in Segment A, 143.58 ha (354.82 ac) to 168.40 ha (416.15 ac) in Segment B, depending on the access option. 1.94 ha (4.80 ac) in Segment C.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Compensation for acquired land consistent with state and federal laws. Construction Traffic Management Plan. In order to minimize access impacts to public and cultural facilities during the construction period, a transportation management plan shall be developed.	3.1.2

Note:
[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Temporary alteration of Olompali SHP access.			Temporary access to Olompali SHP. Caltrans shall plan construction activities and staging with state park officials to ensure public access and park operations are not disrupted.	3.1.5
	Relocation of one residential unit.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Compliance with state and federal laws regarding relocation assistance.	
Environmental justice	No disproportionate impact to environmental justice communities (i.e., those with greater ethnic minorities and/or low income households).	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required.	3.1.7
Utilities	Relocation of lines in Caltrans right-of-way.	Impacts would be the same as Fixed HOV Lane Alternative.	Relocation of lines in Caltrans right-of-way (but to a lesser extent than the Build Alternatives).	Build/No Build Alternatives: Development of utility relocation plans during the design phase to ensure no interruption of local services.	3.1.8
Emergency services	No negative impact in the Southern and Northern Segments and improved access to areas in the Central Segment in the long run.	Impacts would be the same as Fixed HOV Lane Alternative.	This alternative would not offer any congestion relief along US 101 in the future, resulting in lengthier response times by emergency vehicles, compared to the Build Alternatives.	Build/No Build Alternatives: Coordination with emergency service providers to prepare and implement a transportation management plan to ensure that emergency services would not be disrupted during construction.	3.1.8

Note:
[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Temporary impact due to delays and restricted mobility during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	Temporary impact due to delays and restricted mobility during construction (but to a lesser extent than the Build Alternatives).	Build/No Build Alternatives: Provision of advanced notice of road closures and detour routes to emergency service providers.	3.1.8
Access and Circulation					
Transit	Beneficial effect from reduced travel times and improved transit schedule reliability in the long run. Temporary impact due to delays and restricted mobility during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Coordination with transit providers to determine detour routes, post flyers and signs, and inform media to notify commuters.	3.1.9
Parking and park and ride facilities	Temporary closure of some facilities during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Reconfigure parking at Plaza North Shopping Center for no net loss of parking. Notification to users and the public about temporary closures.	3.1.9

Note:
[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Traffic and Transportation					
US 101 travel (long term and construction related)	Reduced bottlenecks, congestion and delays in 2010; a minor increase in vehicle miles traveled and intersection operations, compared to No Build.	Reduced bottlenecks, congestion and delays in 2010 (less delay reduction than non-reversible alternative in southbound P.M. and northbound A.M.); virtually no change in vehicle miles traveled and intersection operations, compared to No Build. Two bottlenecks that would not occur under the Fixed HOV Lane Alternative: (1) Segment C southbound in the P.M. peak period and (2) northbound 101 at Atherton Avenue during the A.M. peak period.	Queues would be longer and vehicle delays would increase; new northbound P.M. peak-hour bottleneck.	Transportation Management Plan (TMP) will be prepared in consultation with emergency service providers, coordination with providers during construction to develop detour plans. Intelligent Transportation Systems will also be included in TMP to provide the public with pre-trip and on-route roadway conditions and information during construction.	3.1.10 and 3.1.9
	Temporary traffic delays during peak and off-peak periods during construction.	Temporary traffic impacts would be the same as the Fixed HOV Lane Alternative.			
Bicycle and pedestrian facilities	Beneficial effect from improved access in the long term. Temporary lack of access due to street closures and detours during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Construction of access roads prior to mainline in Segment B.	3.1.10

Note:
[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Visual and Aesthetics					
Segment A (City of Novato)	Moderate impact from increased roadway visual dominance due to HOV lane center widening and center median barriers. Adverse effect from new soundwalls and accompanying tree and vegetation removal.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	No mitigation required for roadway dominance due to highly urbanized existing character. Minimization of vegetation removal; replacement planting in combination with standard project landscaping; vine planting to cover walls on highway and community sides.	3.1.11
	Potential impairment of community use of pedestrian undercrossings at Olive Avenue and Franklin Overhead Bridge due to center bridge widening and accompanying loss of light.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Installation of lights underneath; architectural and landscape design determined with Policy Advisory Group.	3.1.11

Note:
[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Segment B (Novato Narrows)	Adverse impact from increased roadway visual dominance due to center widening, center median barriers, and access roads.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Minimization of vegetation removal; replacement planting in combination with standard project landscaping; center median design treatments. All disturbed areas shall be provided with permanent erosion control grasses and appropriate locally native annual shrub and tree species. Areas of disturbed native vegetation shall be replaced at a 5 to 1 ratio wherever feasible. Where in-place planting is not practical, planting will be replaced, where feasible, off site in the visual foreground of the corridor.	3.1.11
	Adverse impact from new interchanges, major grading, tree removal, and overcrossings.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.		
	Adverse impact from major landform alteration due to mainline realignment.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Minimization of artificial, engineered appearance of slopes to blend with natural topography; plantings and revegetation to screen slope transitions; revegetation of removed native vegetation at 5:1 ratio.	3.1.11
	Minor effect from replacement of Petaluma River Bridge. Minor effect from exposure of new bike path users to traffic and views of mainline.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required, but consider landscaping bridge embankments, aesthetic treatment of retaining walls, and pattern texture railings.	3.1.11

Note:
[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Potential headlight impacts to residences near new interchanges.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Plant tree and shrub screening to block glare.	3.1.11
Segment C (City of Petaluma)	Moderate impact from increased roadway visual dominance due to HOV lane center widening and center median barriers.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	No mitigation required for roadway dominance due to highly urbanized existing character.	3.1.11
	Minor impact from bridge replacement or widenings since little change perceived by motorists and absence of adjacent sensitive off-road viewers.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	No mitigation required for bridge replacement or widenings.	
	Adverse impact from new soundwalls, interchange ramp improvements, and speed change lane due to substantial decline in motorists' views and community character and to loss of tree hedgerows.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Plant clinging vines to soften appearance of soundwalls; apply architectural design measures determined with Policy Advisory Group; if possible, locate soundwalls at project right-of-way, retain trees, and replace landscaping on the highway side of soundwalls.	3.1.11
	Potential impairment of community use of pedestrian/bicycle undercrossings at Lynch Creek Bridge due to center bridge widening and accompanying loss of light.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Installation of lights underneath; architectural and landscape design determined with Policy Advisory Group.	3.1.11

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Adverse impact from tree removal and introduction of soundwall at Lynch Creek Bridge.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Plant clinging vines to soften appearance of soundwalls; apply architectural design measures determined with Policy Advisory Group.	3.1.11
	Temporary headlight glare impacts to adjacent residents after removal of tree hedgerows and prior to completion of soundwall construction.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Installation of temporary opaque screen.	3.1.11
Construction impacts related to Visual/ Aesthetics (all segments)	Temporary impact of exposure to unsightly construction equipment and materials.	Impacts would be the same as Fixed HOV Lane Alternative.	Temporary impact of exposure to unsightly construction equipment and materials (but to a lesser extent than the Build Alternatives).	Build/No Build Alternatives: Locate equipment and materials outside the freeway visual foreground wherever feasible; construction activity phasing; visual screening of staging areas.	3.1.11
	Temporary glare impact of nighttime construction on motorists and off-site viewers.	Impacts would be the same as Fixed HOV Lane Alternative.	Temporary glare impact of nighttime construction on motorists and off-site viewers (but to a lesser extent than the Build Alternatives).	Build/No Build Alternatives: Limit construction lighting to area of work; avoid direct light trespass through directional lighting, shielding, and other measures as needed.	3.1.11

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Cultural Resources					
Archaeology	Loss of five archaeological sites considered eligible for inclusion in the National Register of Historic Places; loss of two additional sites that might be eligible pending further investigation. Adverse effect on Olompali and San Antonio complexes.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Enter into Memorandum of Agreement to provide mechanisms to recover significant data that will be destroyed; archaeological monitoring during construction.	3.1.12
Architectural History	No adverse effect to any of three historic properties (Olompali State Historic Park, San Antonio Road Bridge, Freeman-Parker Residence).	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required.	3.1.12
PHYSICAL ENVIRONMENT					
Hydrology and floodplains	Increased runoff from improvements that contribute additional storm waters to areas historically affected by flooding in Segments B and C.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Resizing and upgrading of culverts; consideration of ditches above significant cut faces, perforated underdrains, horizontal pipe drains, and detention ditches. Design and implementation of detention facilities.	3.2.2
	Does not contribute to flood hazard risk, negligible alteration to 100-year plain.	Impacts would be the same as Fixed HOV Lane Alternative.	Does not contribute to flood hazard risk, negligible alteration to 100-year flood plain (but to a lesser extent than the Build Alternatives).	None required.	3.2.2

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[1] In most instances, mitigation measures will minimize impacts of the Build Alternatives. See Chapter 3 for further discussion of each resource and Chapter 4 for CEQA evaluation of the project. The Mitigation Monitoring and Reporting Plan is provided in Appendix J.

Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Would replace existing corroded culverts to meet the current minimum standard of 600 mm; would not adversely alter drainage patterns, but would improve existing conditions	Impacts would be the same as Fixed HOV Lane Alternative.	Would not replace culverts resulting in greater flooding risk than the Build Alternatives.	None required.	3.2.2
Water quality	Increased pollutant loading due to an additional 83 ha (205 ac) of impervious surface areas.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Implementation of Permanent Design Pollution Prevention Best Management Practices that employ landscaping and drainage elements to reduce runoff and erosion; Permanent Treatment Best Management Practices such as biofiltration strips and swales and detention devices.	3.2.3
	Potential water quality impact due to approximately 216.44 ha (534.83 ac) of soil disturbance during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Comply with NPDES permit that requires implementation of a Stormwater Pollution Prevention Plan that identifies an applicable list of Construction Site Best Management Practices.	3.2.3
Groundwater	Potential exposure to contaminated groundwater in saturated areas and where bridge crossing work is proposed during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Testing of ground water for potential contamination; proper handling and disposal of contaminated ground water.	3.2.3
	Minimal long-term effect on direction, rate, or quality of ground water.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required.	

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Geology	Some hazard due to ground shaking and lateral spreading during an earthquake.	Impacts would be the same as Fixed HOV Lane Alternative.	Impacts would be the same as Fixed HOV Lane Alternative.	Build/No Build Alternatives: Design of structures to withstand the largest expected magnitude earthquake on Rodgers Creek Fault.	3.2.4
	Erosion of 216.36 ha (534.64 ac) of erodible soils.	Impacts would be the same as Fixed HOV Lane Alternative.	Erosion of soils in Segment C.	Build/No Build Alternatives: Application of erosion controls, as specified in Caltrans NPDES permit.	3.2.4
	Risk of potential slope instability in Segment B.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Application of standard specifications for embankments and foundations.	3.2.4
	Potential settlement of structures overlying soft clay layer of Bay mud.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Application of standard practices to address soil settlement problems, such as removal of soft soils, soil mixing, wick drains, lightweight fill, grouting, or stone columns.	3.2.4
	Risk from potential expansive soils.	Impacts would be the same as Fixed HOV Lane Alternative.	Some hazard due to expansive soils during an earthquake.	Build/No Build Alternatives: Expansive soil control measures include removing the soils or mixing with other materials such as lime.	3.2.4

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Risk from potential liquefaction.	Impacts would be the same as Fixed HOV Lane Alternative.	Some hazard due to liquefaction during an earthquake.	Build/No Build Alternatives: Risk can be reduced by use of vibro or dynamic compaction methods on less cohesive soil. Use of specifically designed foundations for structures and the removing of liquefiable materials are among the possible mitigation measures. Dewatering Procedures to Reduce Groundwater.	3.2.4
Paleontology	Potential discovery of fossils in the marine Wilson Grove Formation due to construction excavations.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Avoidance whenever possible. Periodic monitoring during excavations. In the event that fossils are discovered, proper procedure will be followed, including: data recovery, analysis, preparation of a data recovery report, and accession of the recovered fossil material to an accredited paleontology repository.	3.2.9
Hazardous materials and waste	Potential to encounter contaminated soil and/or groundwater during construction.	Impacts would be the same as Fixed HOV Lane Alternative.	Potential to encounter contaminated soil and/or groundwater during construction (but to a much lesser extent than the Build Alternatives).	Build/No Build Alternatives: Avoid acquisition of contaminated soils; if not possible, then prepare Phase I Environmental Site Assessments, and if necessary, Phase II Environmental Site Assessments, to determine extent of contamination and clean-up recommendations.	3.2.5

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
				Inclusion in construction contracts provisions to comply with regulations governing the transport and disposal of hazardous wastes, including a Waste Management and Disposal Plan, a Health and Safety Plan, and a Stormwater Pollution Prevention Plan.	
	Potential to encounter naturally occurring asbestos that may have migrated into streams and other waterways during construction for the bridge replacement/widenings and other waterway crossings.	Impacts would be the same as Fixed HOV Lane Alternative.	No Impact.	Sampling and testing for naturally occurring asbestos; if detected, compliance with Asbestos Airborne Toxic Control Measures for Construction, Grading, Quarrying, and Surface Mining Operations.	
	Potential to encounter asbestos-containing materials during demolition or modification of structures, such as bridges and overcrossings.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Sampling and testing for asbestos; if detected, compliance with the Bay Area Air Quality Management District's regulations for removal and disposal of materials with asbestos.	3.2.5
	Potential for exposure to mercury in mine tailings that may be encountered.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Testing and sampling; if detected, compliance with state special handling and disposal requirements.	

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Potential release of lead-contaminated material during the transport and disposal of yellow traffic striping and soils with aerially deposited lead.	Impacts would be the same as Fixed HOV Lane Alternative.	Potential release of lead-contaminated material during the transport and disposal of yellow traffic striping and soils with aerially deposited lead (but to a much lesser extent than the Build Alternatives).	Build/No Build Alternatives: Testing and sampling; if detected, compliance with state special handling and disposal requirements.	
Air quality	No impact from emissions of criteria pollutants, including particulates, or greenhouse gases.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required.	3.2.6
	Beneficial effect from reduced congestion and an increase in vehicle speeds that result in reduced Mobile Source Air Toxics.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required.	3.2.6
	Temporary impact during construction due to dust emissions, construction vehicle exhaust, and possible release of asbestos that occurs both naturally and in structures with ultramafic and serpentine rock.	Impacts would be the same as Fixed HOV Lane Alternative.	Impacts would be the same as Fixed HOV Lane Alternative (but to a lesser extent).	Build/No Build Alternatives: Application of standard measures recommended by the Bay Area Air Quality Management District (BAAQMD); compliance with BAAQMD and state asbestos regulations, including preparation of an Asbestos Dust Mitigation Plan and minimizing dust through use of water or dust palliatives.	3.2.6

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Noise and vibration (long term and construction-related)	No impact since exterior noise levels are projected to increase by 1-2 dBA hourly Leq; however, existing noise levels in some residential areas in Novato and Petaluma already exceed statutory levels.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	None required; project includes construction of soundwalls to abate existing excessive noise exposure.	3.2.7
	Temporary impact from demolition and construction equipment.	Impacts would be the same as Fixed HOV Lane Alternative.	Temporary impact from construction equipment (but to a lesser extent than the Build Alternatives).	Preparation of detailed noise control plan will include feasible measures to ensure compliance with noise limits of 90 dBA during daytime hours.	3.2.7
Energy	Beneficial effect from reduced congestion and delays that results in less energy consumption and allows transit to maintain schedule reliability.	The Reversible HOV Lane would only operate in one direction at any given time; motorists traveling in the opposite direction of the reversible HOV lane would continue to travel in mixed flow and would not experience congestion relief, resulting in a greater consumption of energy than the Fixed HOV Lane Alternative, but less consumption that the No Build Alternative.	No support for reducing energy use.	None required.	3.2.8

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
BIOLOGICAL ENVIRONMENT					
Natural communities	Potentially result in the removal of about 1,343 to 1,706 native and non-native trees, including about 804 to 1,164 native trees, 439 to 569 of which would be native oaks, depending on the Access Option.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	During project development, project footprint was reduced to avoid large areas of oak woodland and oak savannah; for native and non-native trees that cannot be avoided, replacement based on mitigation ratios to be determined with California Department of Fish and Game. Potential off-site mitigation at California State Parks and through private conservation covenants.	3.3.2
Wetlands and other waters of the U.S.	Temporary wetland impact of 0.07 ha (0.17 ac) in Segment A, 0.78 ha - 0.89 ha (1.92-2.19 ac) in Segment B depending on the Access Option and 0.014 ha (0.35 ac) in Segment C.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Project requires Individual Permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act and a 1602 Lake and Streambed Alteration Agreement from the California Department of Fish and Game. During final design/mitigation phase, determine replacement ratios. Potential off-site mitigation through Burdell Mitigation Bank or private conservation covenants.	3.3.3

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Permanent wetland impact of 0.037 ha (0.092 ac) in Segment A, 2.75-2.94 ha (6.80-7.3 ac) in Segment B depending on the Access Option and 0.08 ha (0.19 ac) in Segment C.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.		
	Temporary impact to other waters of the U.S. of 0.003 ha (0.007 ac) in Segment A, 0.23-0.27 ha (0.56-0.66 ac) in Segment B depending on the Access Option, and 0.003 ha (0.007 ac) in Segment C.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	See above mitigation for wetland impacts.	3.3.3
	Permanent impact to other waters of the U.S. of 0.04 ha (0.1 ac) in Segment A, 1.07-1.20 ha (2.66-2.96 ac) in Segment B depending on the Access Option, and 0.03 ha (0.07 ac) in Segment C.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.		
Plant species and vegetation	No impact to special-status, non-listed plant species.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.		3.3.4

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Contra Costa goldfields, Burke's goldfields, Sonoma alopecurus, and Baker's larkspur have been inferred as being present in the MSN Project area. Potential impacts may include 0.3 ha (0.7 ac) of suitable habitat for Baker's larkspur, 0.09 ha (0.22 ac) of Contra Costa goldfields, and 0.35 ha (0.88 ac) of Sonoma alopecurus. Incomplete surveys have not identified any listed plants in the project area. There are no impacts to Baker's goldfields.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Preconstruction surveys will be conducted according to USFWS, CNPS and CDFG protocols within suitable habitat areas. If identified during surveys, Caltrans will make design modifications to avoid effects to species. Caltrans will also show the locations of all ESAs on project construction drawings and monitoring them during construction.	3.3.6
Animal species	Disturbance to Sacramento splittail habitat in Novato Creek, Lynch Creek, and Petaluma River, totaling 0.257 ha (0.63 ac).	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Avoidance measures listed below for threatened and endangered fish species would help mitigate impacts to the Sacramento splittail.	3.3.5
	Potential temporary impact to bat roosting habitat under San Antonio Creek Bridge.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Demolition of bridge when bats are not present; if not possible, exclusionary netting to prevent bat roosting; installation of bat structure in new bridge.	

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Caltrans and FHWA determined that there would be an adverse affect to Chinook salmon Essential Fish Habitat (EFH), due to improvements around the Novato Creek, San Antonio Creek, and the Petaluma River. The area of impact would be 0.47 ha (1.16 ac) of salmonid habitat for fall run Central Valley Chinook salmon. NOAA Fisheries concluded in EFH consultation that conservation measures in the project description and Terms and Conditions in the BO would minimize adverse affects to Chinook salmon EFH.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Restriction of work during migrating season; installation of silt fences to reduce erosion; proper maintenance of construction site.	3.3.6
	Potential disturbance to nesting birds.	Impacts would be the same as Fixed HOV Lane Alternative.	Potential disturbance to nesting birds (but to a lesser extent than the Build Alternatives).	Build/No Build Alternatives: Nesting surveys; use of exclusionary netting; replacement of removed habitat.	

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Threatened and endangered species	Caltrans and FHWA determined in the BA that the project may affect and is likely to adversely affect salt marsh harvest mouse through increased disturbance and habitat destruction The USFWS has determined in the BO that the project is not likely to result in jeopardy to the continued existence of the SMHM and has provided an Incidental Take Statement in the BO. Loss of 0.02 ha (0.05 ac) of potential salt marsh harvest mouse habitat near Petaluma River.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Avoidance of salt marsh harvest mouse habitat during construction by restricting construction zones, using exclusionary fencing, properly maintaining the construction site, and applying erosion control measures. At Petaluma River Bridge, maintenance and enhancement of tidal influence through channel realignment and channel construction to improve habitat. Potential mitigation sites along the Petaluma River.	3.3.6

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Caltrans and FHWA determined in the BA that the project may affect, but is not likely to adversely affect the Central California Coast steelhead. However, NOAA Fisheries disagreed with the BA finding and determined that the project may affect and is likely to adversely affect the steelhead due to improvements and year-round pile-driving around Novato Creek, San Antonio Creek, Lynch Creek and the Petaluma River. NOAA has determined in the BO that the project is not likely to jeopardize the continued existence of the Central California Coast steelhead and has provided an Incidental Take Statement in the BO. Potential to disturb 0.46 ha (1.14 ac) of salmonid habitat for Central California Coast steelhead. Critical habitat for this species is present in the project area, however, NOAA concluded in the BO that the work would not adversely modify designated critical habitat.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Restriction of work during migrating season; installation of silt fences to reduce erosion; proper maintenance of construction site. Pile driving only during daylight hours. Monitoring of underwater sound during pile driving. Implementation of sound attenuation devices. If unable to meet sound attenuation criteria, then pile driving will only occur from May 15 to November 30 to allow adult and smolt steelhead migration to their natal streams and the ocean.	3.3.6

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Caltrans and FHWA determined in the BA that the project may affect and is likely to adversely affect the California red-legged frog. The USFWS has determined in the BO that the project is not likely to result in jeopardy to the existence of the CRLF and has provided an Incidental Take Statement in the BO based on habitat impacts. Construction within the project area would permanently impact approximately 82.47 ha (203.78 ac) and temporarily impact approximately 1.34 ha (3.16 ac) of upland habitat.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Restriction of work to avoid critical time periods; use of exclusionary fencing; application of erosion control measures; preconstruction surveys; and monitoring by U.S. Fish and Wildlife Service-approved biologists during construction. Potential off-site mitigation through private conservation covenants.	3.3.6

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
	Caltrans and FHWA initially determined in the BA that the project may affect, but is not likely to adversely affect the green sturgeon. Caltrans and FHWA subsequently modified that determination to may affect and is likely to adversely affect the species due to improvements around the Petaluma River. However, NOAA Fisheries concluded in the BO that the effects are discountable and the chance of encountering green sturgeon during construction activities is very low. NOAA Fisheries further determined in the BO that the project is not likely to jeopardize the continued existence of green sturgeon. Potential to disturb 0.20 ha (0.49 ac) of habitat for green sturgeon. Critical habitat was proposed for this species in Sept. 2008. However, NOAA Fisheries concluded in the BO that the proposed work would not adversely modify critical habitat.	Impacts would be the same as Fixed HOV Lane Alternative.	No impact.	Restriction of work during migrating season; installation of silt fences to reduce erosion; proper maintenance of construction site.	

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Invasive species	Potential to introduce invasive, noxious weeds.	Impacts would be the same as Fixed HOV Lane Alternative.	Potential to introduce invasive, noxious weeds (to a lesser extent than the Build Alternatives).	Build/No Build Alternatives: Worker training; avoidance of sensitive communities; cleaning of construction machinery restoration/revegetation of disturbed areas will reduce the potential for introduction of invasive, noxious weeds.	3.3.7
Irreversible and Irretrievable Resources	Right-of-way could be converted should greater need arise or if highway facility is no longer needed. Natural, physical, human and fiscal resources used would be irretrievable. Fossil fuels, labor and materials used in construction would not be retrievable.	Impacts would be the same as Fixed HOV Lane Alternative.	Irretrievable fiscal and human resources would be required to maintain facility, but amounts needed would be considerable less than under the Build Alternatives.	Not applicable	3.4

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Table S-2 Summary of Build and No Build Alternative Impacts and Avoidance, Minimization and Mitigation Measures

Impact Category	Fixed HOV Lane Alternative	Reversible HOV Lane Alternative	No Build Alternative	Proposed Mitigation Measures[1] (applicable to both Build Alternatives unless otherwise noted)	Section
Short-term vs. Long-term	Short-term losses: construction impacts such as noise, motorized and non-motorized traffic delays or detours, and recreational impact such as access inconveniences to Olompali SHP. Short-term benefits: increased jobs and revenue generated during construction. Long-term losses: permanent loss of plant and wildlife resources, open space, visual impacts, use of construction materials and energy, and archaeological site values lost. Long-term gains: reduced congestion, improved goods movement, improvement in highway operations, safer access to US 101, and net gains in wetlands and wildlife habitat through project mitigation.	Impacts would be the same as Fixed HOV Lane Alternative	Would offer none of the gains or have the losses. It would, however, not resolve worsening congestion on US 101.	Not applicable	3.5

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Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
HUMAN ENVIRONMENT				
Land Use				
Compatibility with existing land uses	Compatible with overall land use pattern, even though some conversion of land uses would occur.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Consistency with adopted plans	Beneficial effect; supportive of local, regional, and state land use, transportation, and air quality plans.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Growth	No impact; would accommodate, not induce, planned growth.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Farmland	Conversion of 65.67 ha (162.27 ac) of farmland to transportation use, including 9.08 ha (22.43 ac) of Williamson Act Contract lands.	Conversion of 63.22 ha (156.23 ac) of farmland to transportation use, including 8.53 ha (21.09 ac) of Williamson Act Contract lands.	Conversion of 63.61 ha (157.17 ac) of farmland to transportation use, including 13.54 ha (33.45 ac) of Williamson Act Contract lands.	Conversion of 73.52 ha (181.67 ac) of farmland to transportation use, including 16.18 ha (39.98 ac) of Williamson Act Contract lands.
Community Character, Cohesion, and Socioeconomics				
Public and cultural facilities	No negative impact; enhanced access because of reduced congestion and reduced diversion to surface streets in the long term.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Parks and recreational facilities	Beneficial effect; reduced congestion and reduced diversion to surface streets in the long term.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
	Temporary and permanent impacts due to construction of new Olompali State Historic Park entrance. Access detours during construction. Long-term beneficial effect from Caltrans' deeding right-of-way to Olompali, a portion of which would be used for a bicycle/pedestrian path.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Acquisition and Relocation	Acquisition of approximately 154.72 ha (382.31 ac).	Acquisition of approximately 143.58 ha (354.82 ac).	Acquisition of approximately 154.02 ha (380.59 ac).	Acquisition of approximately 168.4 ha (416.15 ac).
	Relocation of one residential unit.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Environmental justice	No disproportionate impact to environmental justice communities (i.e., those with greater ethnic minorities and/or low income households).	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Utilities	Relocation of electrical, gas, water, telephone, cable TV and sewer lines to out side of Caltrans right-of-way.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Emergency services	No impact in Segments A and C; improved access to areas in Segment B in the long run.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Temporary impact due to delays and restricted mobility during construction.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
Access and Circulation				
Transit	No impact to transit service because transit is not offered along access roads in Segment B.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Temporary impact due to delays and restricted mobility during construction.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Parking and park and ride facilities	No impact to park and ride facilities because none existing in Segment B.	Impacts would be the same as Access Option 4b.	Impacts same as Access Option 4b.	Impacts same as Access Option 4b.
Traffic and Transportation				
US 101 travel	Fixed HOV Lane Alternative: reduced bottlenecks, congestion, and delays in 2010; virtually no change in vehicle miles traveled and intersection operations, compared to No Build Alternative.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Reversible HOV Lane Alternative: reduced bottlenecks, congestion and delays in 2010 (less delay reduction than non-reversible alternative in southbound P.M. and northbound A.M.); virtually no change in vehicle miles traveled and intersection operations, compared to No Build Alternative.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Temporary traffic delays during peak and off-peak periods during construction.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
	Highest rated for providing access to the three major areas: Redwood Landfill, San Antonio Creek, and Cloud Lane/Kastania Road.	Excellent for major traffic movements around the Redwood Landfill, good for main access around San Antonio Creek, and poor for local access to the uses around San Antonio Creek. Good local access to residents and businesses around Cloud Lane/ Kastania Road.	Poor for major traffic movement around Redwood Landfill, but excellent in terms of serving land uses around San Antonio Creek. Good local access to residents and businesses around Cloud Lane/Kastania Road.	Poor for major traffic movement around Redwood Landfill, but excellent in terms of serving land uses around San Antonio Creek. Good local access to residents and businesses around Cloud Lane/Kastania Road.
Bicycle and pedestrian facilities	Beneficial effect from improved access in the long run.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Temporary lack of access due to street closures and detours during construction.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Visual and Aesthetics				
Segment B (Central Segment)	Adverse impact from increased views of roadway and new overpasses and access roads.	Impacts would be less than the other Access Options, because Access Option 12b does not include a new San Antonio Road Interchange.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.
	Adverse impacts to intact oak woodland and grassland landscape from new interchanges, major grading, tree removal, and overcrossings. Removal of 1,401 trees.	Impacts would be similar to Access Option 4b, with removal of 1,706 trees.	Impacts would be similar to Access Option 4b, with removal of 1,378 trees.	Impacts would be similar to Access Option 4b, with removal of 1,343 trees.
	Access Option 4b would have no impact related to mainline realignment.	No impact.	No impact.	No impact.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
	Minor effect from replacement of Petaluma River Bridge. Minor effect from exposure of new bike path users to traffic and views of mainline.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.
	Potential headlight impacts to residences near new interchanges.	Impacts would be less than the other Access Options, because Access Option 12b does not include a new San Antonio Road Interchange.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Construction impacts	Temporary impact of exposure to unsightly construction equipment and materials.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Temporary glare impact of nighttime construction on motorists and off-site viewers.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Cultural Resources				
Archaeology	Loss of five archaeological sites considered eligible for inclusion in the National Register of Historic Places; loss of two additional sites that might be eligible pending further investigation.	Slightly less impact than Access Option 4b because it would not include a San Antonio Road Interchange or a frontage road on the east side of US 101 between the Redwood Landfill Overcrossing and San Antonio Creek.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Architectural History	No adverse effect to any of three historic properties (Olompali State Historic Park, San Antonio Road Bridge, Freeman-Parker Residence).	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
PHYSICAL ENVIRONMENT				
Hydrology and floodplains	Increased storm water runoff due to additional 11.5 ha (28.3 ac) of impervious surface areas.	Increased storm water runoff due to additional 14.0 ha (34.6 ac) of impervious surface areas.	Increased storm water runoff due to additional 13.6 ha (33.6 ac) of impervious surface areas.	Increased storm water runoff due to additional 13.4 ha (33.1 ac) of impervious surface areas.
	Does not contribute to flood hazard risk, negligible alteration to 100-year plain.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Would replace existing corroded culverts to meet the current minimum standard of 600 mm, improving existing conditions.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.
Water quality	Increased pollutant loading due to additional 11.5 ha (28.3 ac) of impervious surface areas.	Increased pollutant loading due to additional 14.0 ha (34.6 ac) of impervious surface areas.	Increased pollutant loading due to additional 13.6 ha (33.6 ac) of impervious surface areas.	Increased pollutant loading due to additional 13.4 ha (33.1 ac) of impervious surface areas.
	Potential water quality impact from soil disturbance during construction.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.
Groundwater	Potential exposure to contaminated groundwater in saturated areas and where bridge crossing work is proposed during construction.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Minimal long-term effect on direction, rate, or quality of ground water.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Geology	Some hazard due to ground shaking and lateral spreading during an earthquake.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Some disturbance of erodible soils.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
	Risk of potential slope instability.	Involves a deeper cut to accommodate a proposed access road on the west side of US 101.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.
	Potential settlement of structures overlying soft clay layer of Bay mud.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.
Hazardous materials and waste	Potential to encounter contaminated soil and/or groundwater during construction.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Potential to encounter naturally occurring asbestos that may have migrated into streams and other waterways during construction for the bridge replacement/widenings and other waterway crossings.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Potential to encounter asbestos-containing materials during demolition or modification of structures, such as bridges and overcrossings.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Potential for exposure to mercury in mine tailings that may be encountered.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Potential release of lead-contaminated material during the transport and disposal of yellow traffic striping and soils with aerially deposited lead.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Air quality	No long-term impact from emissions of criteria pollutants, including particulates.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
	Beneficial effect from reduced congestion and an increase in vehicle speeds that result in reduced emissions of Mobile Source Air Toxics.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Temporary impact during construction due to dust emissions, construction vehicle exhaust, and possible release of asbestos that occurs both naturally and in structures with ultramafic and serpentine rock.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Noise and vibration	No impact since exterior noise levels are projected to increase by only 1-2 dBA hourly Leq.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Temporary impact from demolition and construction equipment.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Energy	No effect on energy consumption.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
BIOLOGICAL ENVIRONMENT				
Natural communities	Potentially result in the removal of about 962 native and non-native trees, and 712 native trees.	Removal of about 1,267 native and non-native trees, and 1,017 native trees.	Removal of about 939 native and non-native trees, and 691 native trees.	Removal of about 904 native and non-native trees, and 657 native trees.
Wetlands and other waters of the U.S.	Temporary impact to wetlands of the U.S. of 0.89 ha (2.19 ac).	Temporary impact to wetlands of the U.S. of 0.85 ha (2.10 ac).	Temporary impact to wetlands of the U.S. of 0.78 ha (1.92 ac).	Temporary impact to wetlands of the U.S. of 0.89 ha (2.19 ac).
	Permanent impacts to wetlands of 2.94 ha (7.3 ac).	Permanent impacts to wetlands of 2.89 ha (7.15 ac).	Permanent impacts to wetlands of 2.75 ha (6.8 ac).	Permanent impacts to wetlands of 2.94 ha (7.3 ac).
	Temporary impact to other waters of the U.S. of 0.23 ha (0.56 ac).	Temporary impact to other waters of the U.S. of 0.25 ha (0.62 ac).	Temporary impact to other waters of the U.S. of 0.27 ha (0.66 ac).	Temporary impact to other waters of the U.S. of 0.25 ha (0.62 ac).

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
	Permanent impact to other waters of the U.S. of 1.17 ha (2.90 ac).	Permanent impact to other waters of the U.S. of 1.19 ha (2.93 ac).	Permanent impact to other waters of the U.S. of 1.07 ha (2.66 ac).	Permanent impact to other waters of the U.S. of 1.20 ha (2.96 ac).
Plant species and vegetation	Removal of some trees.	Would have the greatest number of tree removal.	Impacts would be similar to Access Option 4b.	Impacts would be similar to Access Option 4b.
	Similar to 12b.	Potential permanent impact to 0.10 ha (0.24 ac) of Sonoma alopecurus and Contra Costa goldfields habitat. In accordance with the USFWS Biological Opinion, plant surveys will be conducted prior to construction.	Similar to 12b.	Similar to 12b.
Animal species	Disturbance of 0.257 ha (0.63 ac) of Sacramento splittail habitat along the Petaluma River.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Potential temporary impact to bat roosting habitat under San Antonio Creek Bridge.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Disturbance to fall-run Chinook salmon in San Antonio Creek and the Petaluma River, totaling 0.47 ha (1.16 ac)	Impacts similar to Access Option 4b, although Access Option 12b would require removal of the most trees. Impacts would be the same as Access Option 4b.	Impacts similar to Access Option 4b. Impacts would be the same as Access Option 4b.	Impacts similar to Access Option 4b. Impacts would be the same as Access Option 4b.
Threatened and endangered species	Impacts would be the same as Access Option 12b.	Not likely to result in jeopardy to the salt marsh harvest mouse habitat. Loss of 0.02 ha (0.05 ac) of potential salt marsh harvest mouse habitat near Petaluma River.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
	Impacts would be the same as Access Option 12b.	Not likely to jeopardize the continued existence of the Central California Coast steelhead, due to improvements around the Novato Creek, San Antonio Creek, Lynch Creek and the Petaluma River. Potential to disturb 0.46 ha (1.14 ac) of habitat for Central California Coast steelhead. Critical habitat for this species is present in the project area.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
		Not likely to jeopardize the continued existence of the green sturgeon, due to improvements around the Petaluma River. Potential to disturb 0.20 ha (0.49 ac) of habitat for green sturgeon. Critical habitat was proposed for this species in Sept. 2008.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
	Impacts would be the same as Access Option 12b.	Not likely to result in jeopardy to the California red legged frog. Construction within the project area would permanently impact approximately 82.47 ha (203.78 ac) and temporarily impact approximately 1.34 ha (3.16 ac) of upland habitat.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

Table S-3 Summary of Impacts Associated With Access Options

Impact Category	Access Options			
	4b	12b	14b	14d
Invasive species	Potential to introduce invasive, noxious weeds.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.
Irreversible and Irretrievable Resources	Commitment of human, physical, and fiscal resources would be irretrievable. Facility could be converted to other uses should greater need arise.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.	Impacts would be the same as Access Option 4b.

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Acronyms and Abbreviations

μg/m³	micrograms per cubic meter
AADT	average annual daily traffic
ac	acre, a measurement of land area
A/C	asphalt concrete
ABAG	Association of Bay Area Governments
ADA	Americans with Disabilities Act
ADL	Aerially Deposited Lead
A.M./P.M.	morning/afternoon and evening
APE	Area of Potential Effects
AST	above ground storage tank
ATCM	Asbestos Airborne Toxic Control Measures
BA	Biological Assessment
BAAQMD	Bay Area Air Quality Management District
Basin Plan	Water Quality Control Plan
BAT	Best Available Technology
BCT	Best Conventional Technology
BMP	best management practice
BO	Biological Opinion
Cal-IPC	California Invasive Plant Council
Calthorpe Study	Sonoma/Marin 1997 Multi-Modal Transportation & Land Use Study
Caltrans	California Department of Transportation
CA NFA	California No Further Action
CARB	California Air Resources Board
CA SLIC	California Spills, Leaks, Investigations and Cleanups
CA WDS	California Water Resources Control Board - Waste Discharge System
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCCS	Central California coast steelhead
CDFG	California Department of Fish and Game
CDP	California Department of Parks
CEQA	California Environmental Quality Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Project
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRLF	California red-legged frog
CO	carbon monoxide

CO_2	carbon dioxide
CWA	Clean Water Act
dBA	A weighted decibel, the measurement of noise that best represents human perception
dbh	diameter at breast height
DEED	Deed Restriction Program
DEIR/S	Draft Environmental Impact Report/Environmental Impact Statement
diesel PM	diesel particulate matter
DPR	California Department of Parks and Recreation
DPS	distinct population segment
DTSC	California Department of Toxic Substances Control
EDR	Environmental Data Resources
EFH	essential fish habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
ESA	environmentally sensitive areas
FEIR/S	Final Environmental Impact Report/Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FIGR	Federated Indians of Graton Rancheria
FIRM	Flood Insurance Rate Maps
FPPA	Farmland Protection Policy Act
ft	foot/feet
GGBHTD	Golden Gate Bridge, Highway and Transportation District
GHG	greenhouse gases
ha	hectare, a metric measurement of land area
HIST UST	Historic Underground Storage Tank Registered Database
HOV	high occupancy vehicle
HOV Lane	high occupancy vehicle lane
HRER	Historic Resources Evaluation Report
IPCC	Intergovernmental Panel on Climate Change
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation Statement
km	kilometer(s)
km/h	kilometers per hour
KP	kilometer post

L10 (h)	statistical descriptor, signifies the noise level that is exceeded 10% of the time
Leq	equivalent steady-state sound level
Leq(h)	equivalent steady-state sound level hourly
LEDPA	Least Environmentally Damaging Preferred Alternative
LOS	level of service
LUST	leaking underground storage tanks
m	meter(s)
m^2	square meters
MALT	Marin Agricultural Land Trust
MCDEH	Marin County Department of Environmental Management
MCE	maximum credible earthquake
mg/l	milligrams per liter
mg/m^3	milligrams per cubic meter
mi	mile(s)
MIS	Major Investment Study
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	miles per hour
MS4	Municipal Separate Storm Sewer System
MSAT	Mobile Source Air Toxics
MSE	mechanically stabilized embankment
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSN	Marin-Sonoma Narrows
MTA	Mendocino Transit Authority
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NAC	Federal/State Noise Abatement Criteria
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NOAA Fisheries	National Oceanographic and Atmospheric Administration’s National Marine Fisheries Service
NOD	Notice of Determination
NOI/NOP	notice of intent/notice of preparation
NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWP	Northwestern Pacific Railroad
O_3	ozone

OSHA	Occupational Safety and Health Administration
OWCEQ	Oak Woodlands Conservation Environmental Quality Act
PA	Programmatic Agreement
PAG	Policy Advisory Group
Pb	particulate matter, lead
PM	post mile
PM_{10}	Fine particulate matter (less than 10 microns in diameter)
PM_{25}	Fine particulate matter (2.5 microns in diameter or less)
PPDG	Caltrans Project Planning and Design Guide
ppm	parts per million
PRC	California Public Resources Code
PS and E	plans, specifications and estimates
PSI	Preliminary Site Investigation
PSR	Project Study Report
RAP	Relocation Assistance Program
RIP	Regional Implementation Program
ROD	Record of Decision
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SAP	Sampling and Analysis Plan
SCDEH	Sonoma County Department of Environmental Management
SCTA	Sonoma County Transportation Authority
SCWA	Sonoma County Water Agency
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLC	State Lands Commission
SMART	Sonoma Marin Area Rail Transit
SMHM	Salt Marsh Harvest Mouse
SO_2	sulfur dioxide
SOV	single occupancy vehicles
SR	State Route
STIP	State Transportation Improvement Program
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAM	Transportation Authority of Marin
TCM	Transportation Control Measures
TCRP	Transportation Congestion Relief Program
TEA-21	Transportation Equity Act for the 21st Century, 1998
TENS	Technical Noise Supplement
TIP	Transportation Implementation Plan

600	TNAP	Traffic Noise Analysis Protocol
601	TKN	Total Kjeldahl Nitrogen
602	Treatment Plan	Historic Property Treatment Plan
603	TSM	Transportation Systems Management
604	TSS	Total Suspended Solids
605	USACE	United States Army Corps of Engineers
606	USEPA	United States Environmental Protection Agency
607	USFWS	United States Fish and Wildlife Service
608	USCG	United States Coast Guard
609	UST	underground storage tanks
610	VCP	Voluntary Cleanup Program
611	VIA	Visual Impact Assessment
612	VMT	vehicle miles traveled
613	WCB	Wildlife Conservation Board

Chapter 1 Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) propose to improve a 26.0-kilometer (km), or 16.1-mile (mi) segment of US 101, generally from the City of Novato (in Marin County) northward to the City of Petaluma (in Sonoma County) (see Figure 1-1). The improvements involve, among other upgrades, constructing High Occupancy Vehicle (HOV) lanes,[1] widening and realigning portions of the roadway, construction of new interchanges, upgrading drainage systems, and construction of new frontage roads and bikeways. At the southern end of the project boundary, which starts 0.5 km (0.3 mi) south of the junction of US 101 and State Route (SR) 37 in the City of Novato, US 101 is a six-lane freeway. In the central portion of the project corridor, US 101 narrows to a four-lane expressway with multiple access points from neighboring properties. The roadway then transitions to a four-lane freeway. The northern end of the project boundary is 0.5 km (0.3 mi) north of the Corona Road Overcrossing in the City of Petaluma (see Figure 1-2). The narrowing of the freeway to an expressway, which extends for 13.1 km (8.1 mi) and is locally known as the "Narrows," creates a traffic bottleneck and worsens bottlenecks further north and south of the project boundaries.[2] In addition, the multiple access points in the narrow expressway section result in vehicles are entering and exiting US 101, which further impedes steady traffic flow.

Prior to preparing this Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/S), Caltrans completed a draft Major Investment Study (MIS)[3] in May 2000, which discusses a range of alternatives to relieve congestion in the US 101 North Bay Corridor. Subsequently, Caltrans' local partners, the Transportation Authority of Marin (TAM) and the Sonoma County

[1] High Occupancy Vehicle lanes, often called carpool lanes, are intended for use by vehicles with two or more passengers, motorcycles, or clean air vehicles during peak commute hours.

[2] A "bottleneck" refers to a section of roadway where the traffic demand exceeds the roadway's capacity. Traffic flowing through the bottleneck section operates at capacity and is relatively smooth flowing with average speeds ranging from 35 to 52 miles/hour. Congestion and backups, or queuing, occurs upstream of the bottleneck.

[3] The MIS is an internal informational document prepared by Caltrans in anticipation of requests for federal funding under ISTEA (1991). Public review was not required. The MIS is no longer a federal requirement, under TEA-21 (1998).

Figure 1-1 Vicinity Map

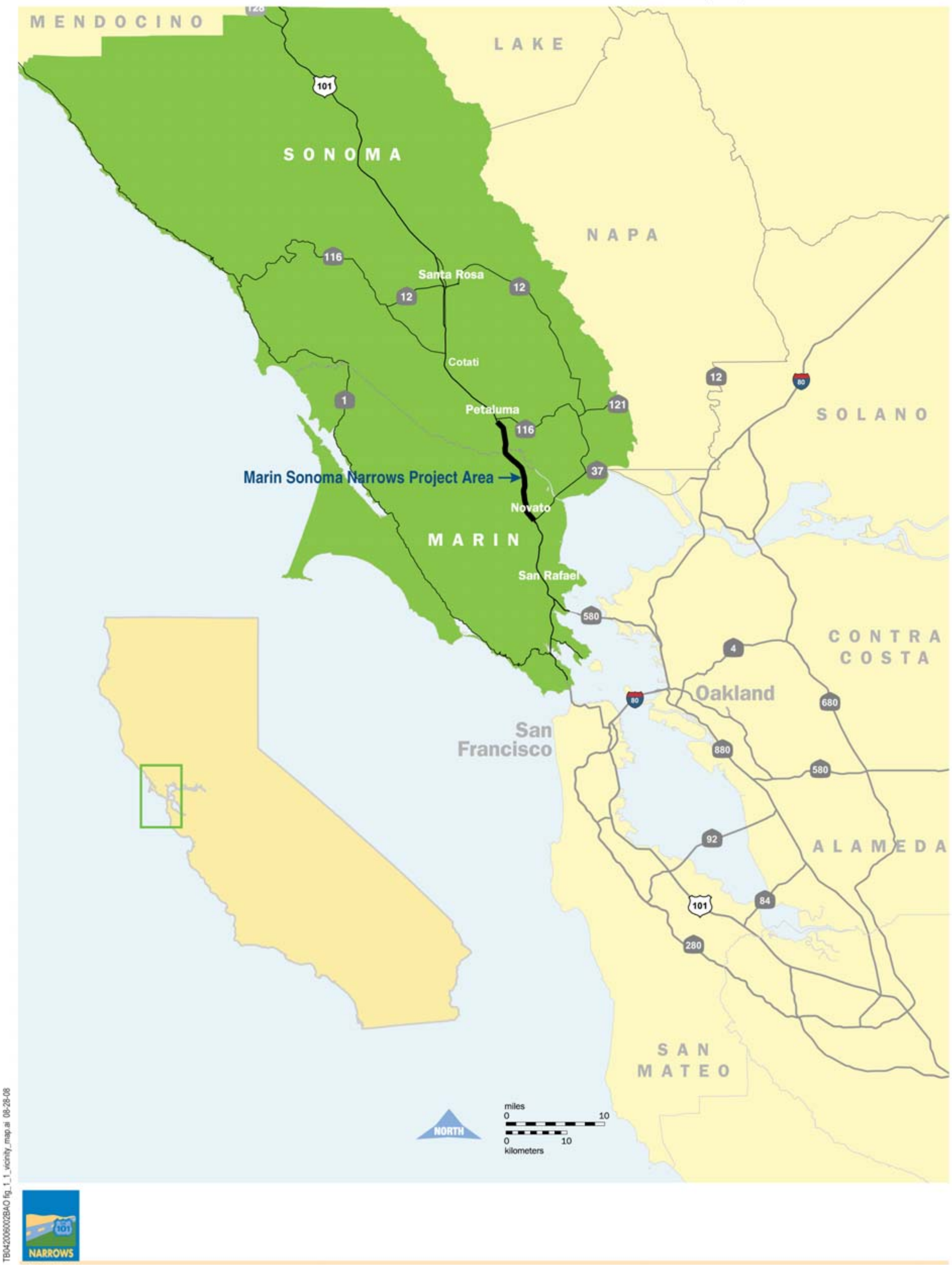
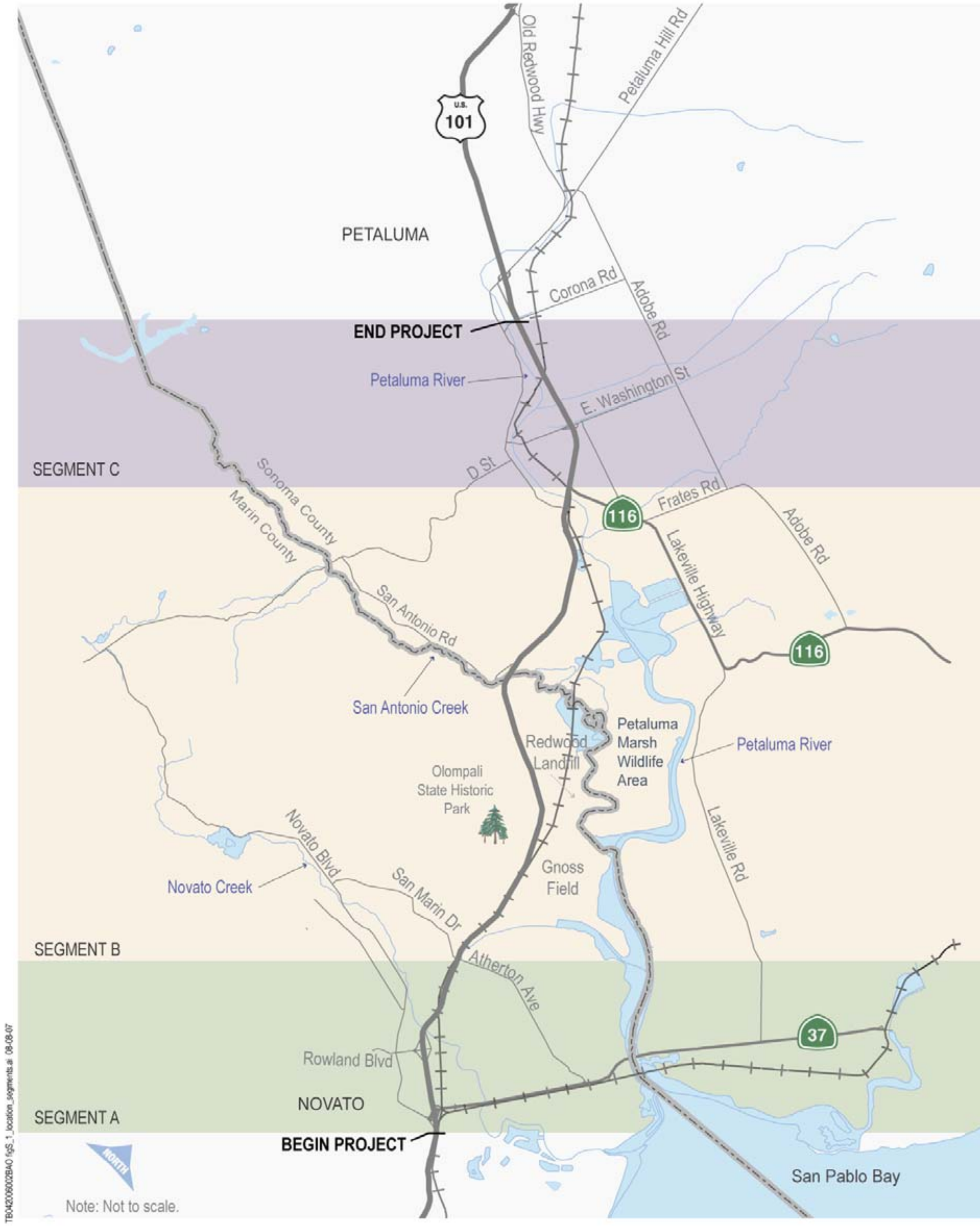


Figure 1-2 Location Map and Project Segments



Transportation Authority (SCTA) requested that Caltrans conduct more detailed "Project Study Reports" (PSRs) to assist with programming and funding improvements in this corridor. Three PSRs covering the approximate boundaries of the three segments evaluated in this FEIR/S were produced. The PSRs investigated widening the existing facility for additional lanes (including mixed flow and HOV); installing median barriers, widening interchange ramps; installing ramp metering equipment; adding new interchanges; standardizing travel lanes, median widths, and shoulders; standardizing horizontal and vertical curves; existing operational deficiencies; constructing frontage roads; and widening bridges.

Each of the project segments has independent utility, meaning that operational improvements can be implemented within each segment and completion of other projects would not be required in order to realize the operational benefits of the proposed improvements. Also, each project has logical starting and ending points or termini. Caltrans, TAM, and SCTA collectively decided to combine these three segments in this FEIR/S to provide more operational consistency in this interregional corridor. Consequently, it follows that the MSN Project boundary established by the combined segments has logical termini and independent utility.[4]

1.2 Project Need and Purpose

US 101 is a crucial link for commuters and commerce, connecting the vital business centers of San Francisco and the East Bay with Marin, Sonoma, and the North Coast. As the only continuous north/south roadway serving Marin and Sonoma counties and their main cities and towns, US 101 serves long-distance interregional travelers, as well as shorter, inter- and intra-city travelers. The narrowing of the freeway to a four-lane expressway in an area known locally as the "Narrows," constricts travel and results in local congestion and delays. The Narrows portion has historically served neighboring property owners. As a result, there are multiple points where vehicles can enter or exit US 101 along this

[4] The southern boundary is set at the end of the HOV system in Marin County, just south of the SR 37 Interchange. The northern boundary is set to just north of Corona Overcrossing in Sonoma County. Extending an HOV lane further north would cause weaving movements for traffic approaching the Old Redwood Highway Interchange ramps, primarily due to an existing horizontal curve just south of this interchange. Thus, the northern terminus was selected to avoid this maneuver and to ensure a smooth transition from the HOV lane to the existing mainline, in accordance with Caltrans design standards.

segment that further impedes traffic flow. Projected growth of population, housing, the tourism industry, and goods movement along the US 101 corridor all point to even lengthier delays in the future. The existing facility within the expressway segment does not contain pull-out areas for disabled vehicles or other emergency purposes. In addition, disabled vehicles and traffic subject to changing conditions during peak periods are more difficult for motorists to anticipate due to existing roadway's horizontal curves (turning radii) and vertical curves (rates of incline and decline). In short, existing and future congestion and delays are serious problems facing travelers along US 101. The following sections further explain the existing needs in this stretch of US 101.

1.2.1 Need to Address Existing Congestion

Over the last 15 years, significant commercial and residential growth, along with growth in tourism, has led to severe traffic increases along the corridor. It is natural to expect that the number of miles traveled would have increased because of growth in population and employment. However, when the number of miles traveled *by person* is considered, the miles per day driven by each individual climbed from approximately 27 miles to approximately 33 miles. Therefore, not only are there more individuals driving, they are driving more (Marin Economic Commission, November 2007). In Sonoma County, these same trends have been observed. In addition to the traditional components of growth (e.g., jobs and housing), Sonoma County tourism is a $1 billion industry and accounts for 6 percent of the County's workforce (Sonoma County Economic Development Board, January 2007). The growth in the tourism industry associated with wine and special event industries has contributed to the substantial increase in weekend travel along US 101 (Sonoma County, 2006).

Given the above forces contributing to travel demand, it is not unexpected that traffic congestion and delay[5] along US 101 have continued to escalate. There is an upward trend in vehicle hours of delay (VHD) in the Bay Area that is more pronounced in Marin and Sonoma counties. For instance, VHD increased in the

[5] Vehicles traveling freely, without impedances, experience no delay and enjoy "free flow" travel time through a road segment. "Vehicle delay" refers to additional travel time over free flow travel time experienced by a motorist through the same road segment. Daily vehicle hours of delay refers to the accumulated hours of delay (additional travel time over free flow conditions) experienced by motorists over the course of a day.

Bay Area by 30 percent between 2004 and 2007. In Marin during this same period, VHD increased by 51 percent and by 49 percent in Sonoma.

More recently, the monitoring data shows that from 2007-2008 VHD was reduced, attributable to the economic downturn. Despite decreases of 12 percent for the Bay Area and 20 percent in Sonoma County, Marin County recorded a 3 percent increase (Figure S-2).

These decreases mute the effect of three major segments of the MSN Project limits that were among the top 50 most congested freeway locations in 2008 according to MTC.

- In the morning (in the southbound direction), traffic backs up from East Washington to Kastania. In this location, daily vehicle hours of delay total 1880 hours and congestion lasts from about 5:35 A.M. to 8:20 A.M. This was No. 21 among the top 50 most congested locations in the Bay Area in 2008.

- In the morning (in the southbound direction), traffic backs up from around Lincoln Avenue in San Rafael (south of the project boundaries) as far north as Rowland Boulevard in the City of Novato. This bottleneck caused 6,770 hours of delay in 2008 and became No. 2 in the regional top 10 congestion delays.

- In the evening (in the northbound direction), traffic backs up from the beginning of the expressway section to about De Long Avenue. In this

Figure 1-3 Change in Vehicles Hours of Delay on Freeway

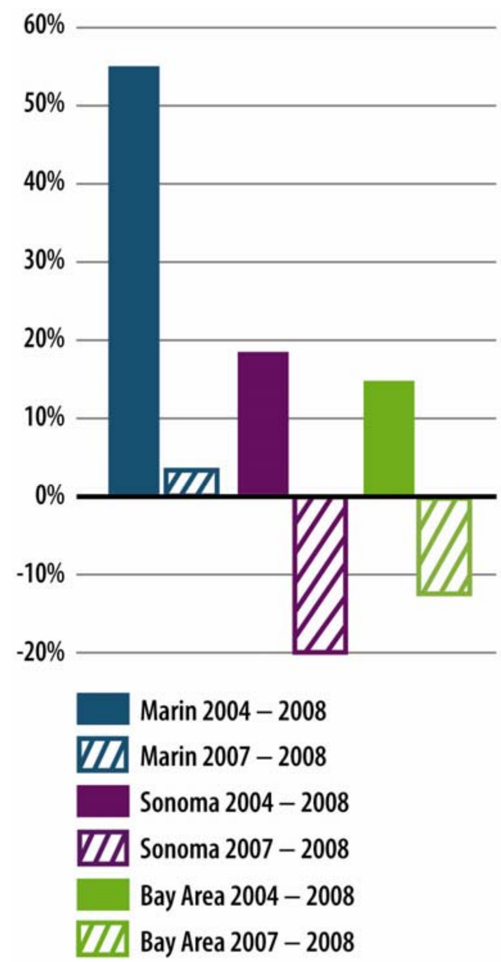
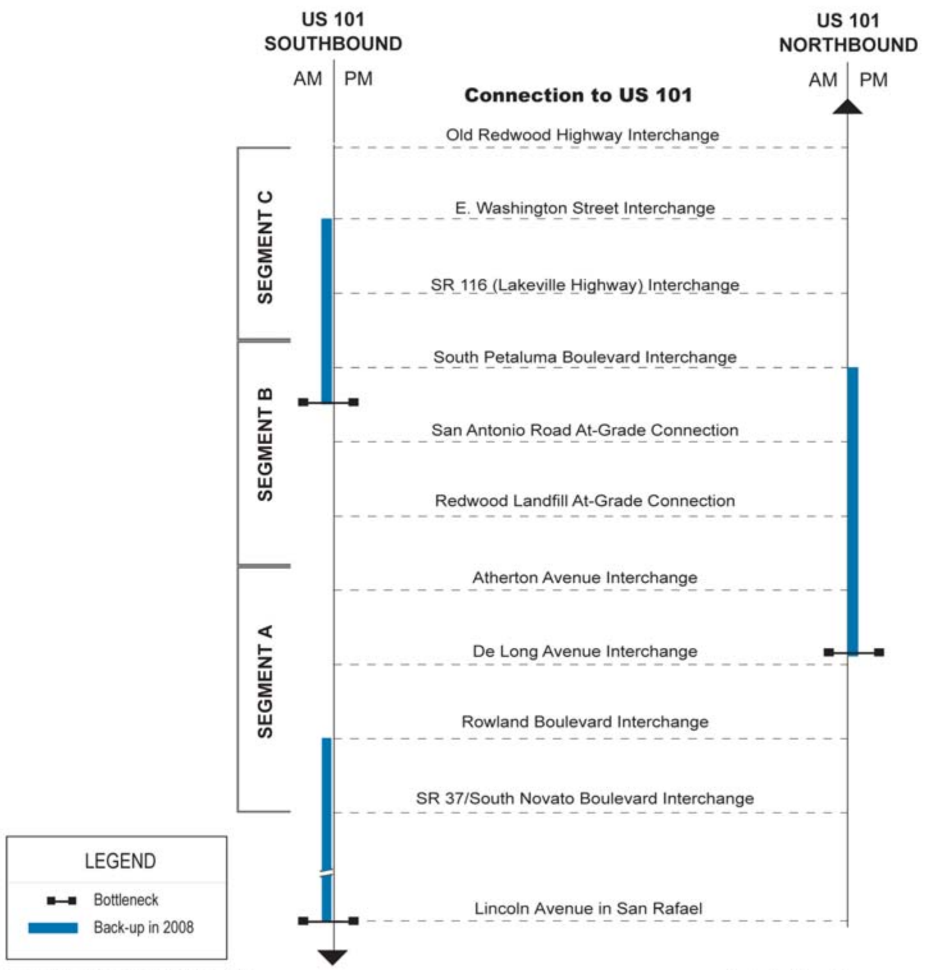


Figure 1-4 2008 Bottlenecks and Delays in MSN Project Corridor

Bottlenecks Among Top 50 Peak-Period Congested Locations

RANK	LOCATION	2008 DAILY (WEEKDAY) VHD
#2	Southbound AM - North of Route 37 to South of Lincoln Avenue	6,770
#21	Southbound AM - East Washington Street to Kastania Road	1,880
#47	Nothbound PM - De Long Avenue to South of Petaluma	960



Source: Caltrans District 4, MTC, 2008.

Note: Not to scale.

location, daily vehicle hours of delay total 960 hours and the congestion lasts from about 3:20 P.M. to 6:25 P.M. This bottleneck was No. 47 among the top 50 most congested locations in the Bay Area in 2008.

The above findings of delay and queues were based on Caltrans' 2008 congestion monitoring studies that showed regular delays occur within the study limits during the A.M. peak traffic period on southbound US 101 and during the P.M. peak traffic period on northbound US 101. Southbound traffic congestion within the study limits typically occurs between 6:30 and 9:30 A.M. in Marin County and between 5:30 and 8:30 A.M. in Sonoma County. Northbound traffic congestion generally develops between 3:00 and 6:30 P.M. primarily in Marin County. These studies by Caltrans indicate that traffic demands for some study area roadway sections are either at, or exceed their existing capacities during peak demand periods.

Despite the economic downturn, the Bay Area, Marin, and Sonoma counties have experienced increases in VHD of 15, 55, and 19 percent, respectively, between 2004 and 2008 (Figure S-2). Reported decreases in VHD have been attributed to lowered employment (California Employment Development Department, Caltrans, MTC, Vehicle Hours of Delay vs. Employment San Francisco Bay Area, 1999-2008). The strong relationship between employment and VHD is evidence that congestion reduction would be even more dire once the economy and employment rebound.

1.2.2 Need to Anticipate Future Congestion

Projections for Marin County show continued increases in daily vehicle miles per capita, from about 33 miles per day in 2005 to about 38 miles per day in 2020 (Marin Economic Commission, November 2005). Added to Marin County residents' own travel patterns, a growing percentage of Marin's work force is projected to be Sonoma County residents. According to the study by the Marin Economic Commission, 12 percent of Marin's work force in 1990 was from Sonoma; by 2000, it was 15 percent; and by 2020, it is projected to exceed 17 percent. Thus, the travel demand in the southbound direction in the A.M. peak period is expected to grow. Notably, Sonoma County in its General Plan update is forecasting an increasing travel demand in the northbound direction in the A.M. period (Sonoma County, 2006). A major contributor to this travel demand in the "reverse" direction is linked to Sonoma's expanding tourism industry.

Specifically, the County's wine industry is expected to grow substantially because of increased sales abroad and expanding consumer interest. It is anticipated that most of the new jobs over the next few years will be in tourism and business services (The Press Democrat, June 17, 2005). These travel, commute, and local growth trends all point to continued reliance on US 101 for commuting, commerce, and recreation.

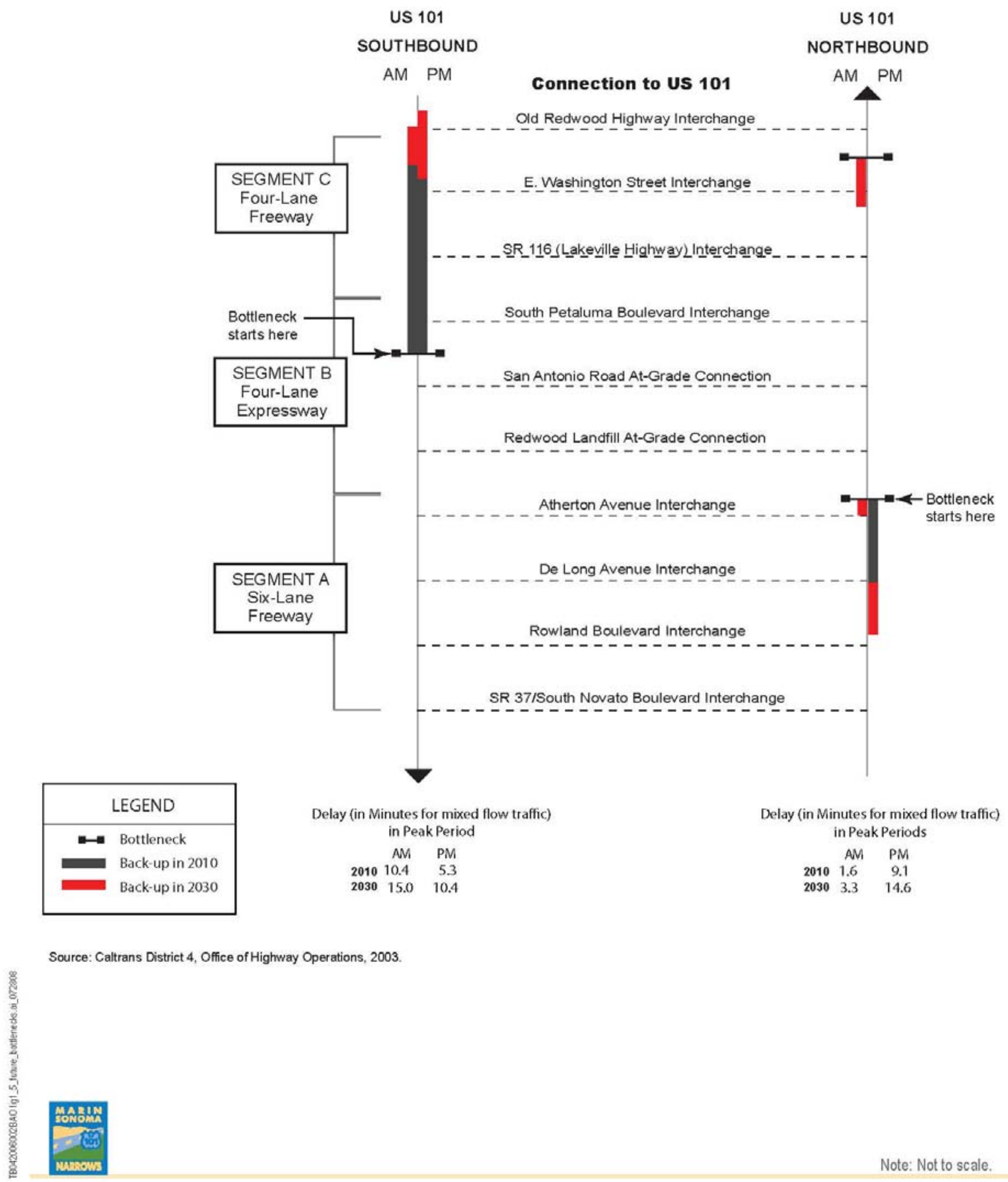
To better assess how these future conditions would affect congestion and delays on US 101, particularly in the project area, the Caltrans District 4 Modeling and Forecasting Unit prepared traffic forecasts for the years 2010 and 2030 (Caltrans, Office of Highway Operations, February 2005). The only changes that were assumed to the existing street and freeway system are those projects that are programmed, or that congestion management agencies expect to be funded. These projects are included in MTC's Regional Transportation Plan.

Figure 1-5 shows the projected travel delays in 2010 and 2030, indicating that congestion would worsen over the next 20 years. For both southbound and northbound directions, and for both the A.M. and the P.M. peak hour, delays experienced by individual drivers are expected to increase by 50 percent to 100 percent. Under all scenarios investigated, the four-lane expressway segment would continue to be the principal bottleneck location. It should be noted that peak hour analyses do not account for congestion accumulated during previous hours. The calculated delays for these future years reflect only operations from a peak-hour demand, assuming free flow conditions during preceding hours. Traffic congestion over a cumulative multi-hour peak period would be higher than indicated by the peak hour analysis. Consequently, the results cannot be directly compared to the existing observed travel times and delays presented in Figure 1-4.

Key conclusions from the Caltrans Traffic Operations Analysis Report (2005) are:

- In the southbound direction during the A.M. peak hour, queues in 2010 would extend from the expressway back to East Washington Avenue and in 2030 queues would extend nearly to Old Redwood Highway.
- Although the southbound direction in the A.M. peak hour is recognized to be the predominant travel direction, it is noteworthy that the expressway portion also becomes a bottleneck for southbound travel in the P.M. peak hour. Queues in 2010 in the P.M. would extend back to East Washington Avenue,

Figure 1-5 Year 2010 and 2030 Bottlenecks and Delays in MSN Project Corridor



similar to the A.M. period. However, by 2030, the queues would extend past Old Redwood Highway.

- No queues would form in 2010 in the northbound direction in the A.M. and delays would be less than two minutes. However, by 2030, queues would extend from the expressway back to the Atherton interchange.

- In the northbound direction in the P.M. peak hour, queues in 2010 would extend from the expressway back to the Atherton interchange. By 2030, the queues would have grown to past the De Long Avenue interchange.

Highway Design Manual Section 103.2

Caltrans Highway Design Manual Section 103.2 states that, “Geometric design of new facilities and reconstruction projects,” such as Marin Sonoma Narrows Project, “should normally be based on estimated traffic 20 years after completion of construction. With justification, design periods to other than 20 years may be approved by the District Director with concurrence by the Design Coordinator.”

As a policy, Caltrans District 4 adheres to the 20-year design period in the preparation of traffic analyses. The Route 101 Marin-Sonoma Narrows Widening Project Traffic Operational Analysis Report (February 2005) assumed that the project would be constructed by 2010, therefore, traffic operations were projected to the year 2030.

Caltrans has stated that the availability of funding for construction of the entire project at one time is unlikely. The Project Development Team now estimates that Phase 1 of the MSN Project will begin in fiscal year 2010/2011 and be completed in fiscal year 2013/2014. Project phases are described in Section S.14, and funding is more thoroughly discussed in Section 2.4.

It is estimated that Phase 2, which would construct the remainder of the project, could begin in fiscal year 2015/2016 and end in 2018/2019, however, this is primarily dependent upon availability of funding. Because funds have not yet been committed for Phase 2, an operational analysis projected to 2039 would be highly speculative. Therefore, Caltrans plans to update the MSN Project traffic analysis during PS&E for Phase 2 to make sure it adheres to the 20-year design policy when a construction schedule is more certain.

In the meantime Caltrans has prepared the following analysis to demonstrate that the MSN Project meets the 20-year design year criteria for Phase 1.

Figure 1-6, on page 1-13, shows the total population, total households, total employed residents, and total employment in Sonoma and Marin Counties based upon two different land use projections: one is the Associated Bay Area Governments (ABAG) projections from 2002, upon which the Marin-Sonoma Narrows traffic analysis was based; the other is the same information from the ABAG 2007 projections.

The changes in land use over time are the major cause of changes in the amount of travel over time. Additional residents, jobs, and services in an area will cause additional traffic volumes. As expected, the projections demonstrate a general increase in population, households, employed residents and employment over time between 2002 and 2007 in Sonoma and Marin Counties. One would also generally expect that the 2034 projections based upon 2007 data would be greater than the 2030 projections based upon 2002 assumptions; however, the opposite appears to be true. As can be seen in Figure 1-6, the ABAG 2002 projections are greater than ABAG 2007 projections.

Based upon this analysis, Caltrans is confident that the overestimates in the 2002 projection support the 20-year design period forecast to 2034 for Phase 1, and that the project adheres to Section 103.2 of the Highway Design Manual.

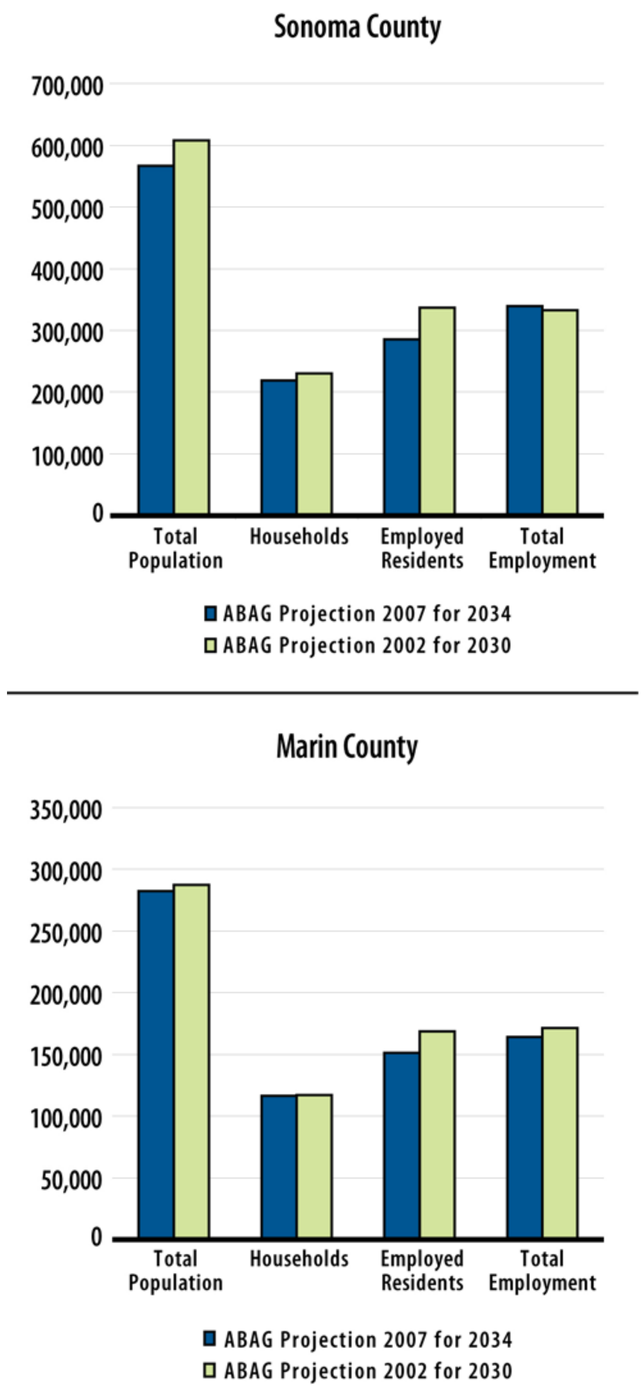
1.2.3 Need to Improve Highway Operations

Various design features of US 101 within the project boundaries contribute to interruptions in traffic flow and congestion. The need to alleviate congestion by upgrading Segment B from expressway to freeway standards would allow Caltrans and FHWA to also correct features that are below Caltrans' current operational standards. In effect, Caltrans and FHWA would upgrade the expressway portion of the corridor to an access-controlled freeway. Other design features that would be addressed throughout the project boundaries include narrow shoulder widths and nonstandard horizontal and vertical curvatures.

Uncontrolled At-Grade Points of Entry and Exit

Along the Novato Narrows, where US 101 crosses the Marin/Sonoma County line, motorists can enter and exit US 101 via non-signalized, at-grade intersections, or driveways on both sides of the expressway. Table 1-1 identifies the location of each of these at-grade road connections and Figure 1-7 illustrates two of these connections.

Figure 1-6 Sonoma and Marin Counties ABAG Projections



Source: ABAG 2002, 2007 Land Use Assumptions

261 Figure 1-7 Access Problems in the MSN Project Central Segment

Aerial view of open median

At-grade connection to US 101

262 At-grade connection to US 101

Table 1-1 At-Grade Connections to US 101 in the MSN Project Area

Connecting Road	Location KP (PM)	Connection
Olompali State Park Entrance Ramp	MRN-101-39.4 (24.48)	Southbound
Olompali State Park Exit Ramp	MRN-101-39.5 (24.53)	Southbound
Redwood Sanitary Landfill Road	MRN-101-40.9 (25.44)	Northbound/Southbound
San Antonio Road	MRN-101-43.3 (26.90)	Southbound
San Antonio Road	SON-101-0.30 (0.19)	Southbound
Kastania Road	SON-101-2.9 (1.80)	Southbound
Kastania Road	SON-101-3.6 (2.232)	Southbound
Source: Caltrans District 2, Office of Traffic Management, Transportation Management Plan Data Sheet, October 25, 2005.		

During the 1950s, these at-grade intersections and driveways functioned adequately and provided access to the agricultural and residential land uses that dominate this segment. However, given the volumes of daily traffic passing through this Central Segment, local traffic needs are no longer well served. Congested commuter traffic conflicts with cars entering and exiting from these at-grade connections.

In addition, the current at-grade open medians provide the only direct means to cross US 101 in the Central Segment. The South Petaluma Boulevard Undercrossing and paved open medians at San Antonio Road and Kastania Road provide the only public means for motorists to cross the 13.1-km (8.1-mi) expressway segment (that is, to get to the west side from the east side or vice versa). Motorists' ability to use the open medians is hampered by congestion and aggravated by inadequate sight distance (see Figure 1-7). The alternative to using the open medians that is often chosen by residents is to travel northbound, up to seven miles, to the South Petaluma Boulevard Undercrossing to be able to then go southbound for routine tasks such as picking up their mail at residential postal boxes on the opposite side of the expressway. This is a 32-km (20-mi) roundtrip in some cases.

Until recently, Redwood Landfill Trucks used a paved open median at Sanitary Landfill Road to cross US 101 from the east side of the expressway to proceed to southbound routes. An approved expansion of their operations indicated that these crossings would become increasingly hazardous due to high traffic volumes, a problem the landfill operators solved by constructing a private overcrossing.

There is currently no northbound access to Olompali State Historic Park (SHP) along the Novato Narrows, except to follow the much longer route that residents do to access their postal boxes on the opposite side of the expressway. Access to the Gas ‘N’ Shop on Kastania Road is also dependent upon motorists’ ability to cross the expressway from northbound lanes.

Other land uses and businesses in the project area includes Birkenstock®, Gnoss Field Marin County Airport, Buck Institute, Mira Monte Marina, Petaluma Marsh Wildlife Preserve, Equine Veterinarian Hospital, Marin Municipal Water District, North Marin Water District, Sonoma County Water Agency, and others.

Narrow Roadway Shoulders

Standard roadway shoulders would provide adequate pull-out areas for disabled vehicles and improve maneuverability by emergency service vehicles. Caltrans requires that shoulders on the outside of travel lanes be at least 3.0 m (10 ft) to accommodate these safety considerations. However, in the southern portion of the MSN Project in the City of Novato, outside and inside shoulder widths of 2.4 m (8 ft) and 1.5 m (5 ft) do not meet these standards. In addition, in the expressway section of the project corridor, existing shoulder widths range between 0.6 m (2 ft) and 2.4 m (8 ft).

Nonstandard Roadway Curves

Incorporating Caltrans standard vertical (rates of incline and decline) and horizontal (turning radii) roadway curves would provide motorists with increased sight distance to look ahead and prepare for hazards or changing traffic conditions (e.g., bottlenecks or accidents). Roadway curves would also allow motorists to maintain a more consistent speed under clear traffic conditions. At Redwood Landfill Road in the Central Segment of the project, vertical curves currently provide 120 m (400 ft) of stopping sight distance compared to the standard 400 m (1,310 ft). South of San Antonio Creek, horizontal curves provide 160 m (525 ft) of horizontal sight distance compared to the standard 220 m (720 ft) (see Table 1-2).

Table 1-2 Vertical and Horizontal Sight Distance Deficiencies in the MSN Project Area

Feature	Existing Conditions	Standard
Vertical Sight Distance at Sanitary Landfill Road		
Curve Length	120 m (400 ft)	400 m (1,310 ft)
Grade Entering	1.89%	1.89%
Grade Exiting	5.12%	5.12%
Design speed	75 km/h (47 mph)	110 km/h (68 mph)
Horizontal Sight Distance South of San Antonio Creek		
Sight Distance	160 m (525 ft)	220 m (720 ft)
Curve Radius	900 m (3,000 ft)	900 m (3,000 ft)
Design Speed	95 km/h (59 mph)	110 km/h (68 mph)
Source: Sean Charles, PE and Caltrans Highway Design Manual, Fifth Edition. Caltrans District 3 North Region presentation to Policy Advisory Group on Design Standards, May 17, 2002.		

Other locations along the MSN Project corridor with nonstandard curves occur in the vicinity of Gambini Road, Kastania Road, South Petaluma Boulevard, and the North Petaluma Overhead.

1.2.4 Need to Address Drainage Problems and Recurring Flood Hazards

Caltrans hydraulics staff have conducted interviews with local public works, water, and maintenance staff and visually reviewed the size and condition of the drainage facilities in the MSN Project area. Excluding the bridges, a total of 181 existing drainage crossings were surveyed. There are several areas where high runoff volumes result in localized flooding and can contribute to erosion problems. The following areas were identified by Caltrans as needing improvements to address drainage concerns:

- **Birkenstock Area.** At the southern end of Segment B in Marin County, commercial development on the western side of US 101 has resulted in substantial increased runoff. Local attempts to remedy this condition have included redirecting some of the natural channels in the area, which in turn has caused occasional flooding at several locations along US 101 where existing culverts are undersized and cannot efficiently handle the increased flows. Consequently, the northerly intersection of old San Antonio Road has historically overtopped during large storm events, becoming an ongoing maintenance problem.

- **San Antonio Creek Area.** Flooding occurs on US 101 just north of the Marin/Sonoma county line in Segment B. This condition results from either infrequent, large-volume flows in San Antonio Creek or more frequent, but less intense, storms that cause local runoff to concentrate at the northerly intersection of San Antonio Road. In general, the flooding is primarily the result of inadequate highway drainage facilities.

- **Petaluma Urban Area.** Localized flooding has historically been a problem in the City of Petaluma, especially in the region westward from US 101 to the Petaluma River. However, there are a number of creeks and tributaries on the east side of US 101 that drain the east side of the city, as well as to US 101. The stormwaters must then be conveyed to the west under the freeway.

1.2.5 Need to Serve Goods Movement

In December 2004, MTC completed the Regional Goods Movement Study for the San Francisco Bay Area. The study was updated in February 2009 with the Goods Movement Initiatives. That study described the growing importance of ensuring quick and efficient goods movement to maintain the region's economic vitality. As reported by MTC, goods movement in the Bay Area can be thought of as serving three primary markets or functions: local distribution/pickup/delivery and service markets; long haul domestic trade markets; and international trade. A primary function of goods movement in the Bay Area is to support households and commercial establishments. Much of the local goods movement is putting consumer goods on the shelves of retail stores, or in offices and service businesses throughout the region.

Expected increases in population and a resurgent economy will contribute to increased truck movement throughout the region, especially near the Bay Area's major airports and seaports. In terms of volume, more than 80 percent of the goods movement in the Bay Area involves trucking in several major corridors: Interstates 80, 580, and 880, and US 101, according to the MTC study. Both congestion of key freight routes and the reliability of trip times have become major concerns for those that move freight within, into and out of the Bay Area. The existing and future congestion identified earlier in this chapter for the US 101 corridor in Marin and Sonoma counties contributes to the escalating costs of moving freight in the region.

Trucks contribute to the existing congestion along US 101 because they use more capacity per vehicle than autos. In 2006, annual average daily trips in the MSN Project area were at a high of about 155,000 trips around the SR 37 junction to around 90,000 trips in Petaluma around Old Redwood Highway. Trucks accounted for 4.1 percent to 5.7 percent of these trips (Caltrans, December 2007). In the past this was less of a problem than it is today, because trucks could avoid the periods of peak congestion, since most of their pickups and deliveries occur during business hours. However, as described earlier, peak periods now extend over three hours in the A.M. and P.M., making it difficult to avoid peak periods of congestion. The Regional Goods Movement Study identifies poor reliability due to incident-related delays as a fact of life in many goods-movement corridors.

Because US 101 serves as a major corridor for goods movement, there is a need to improve US 101 capacity and operations in the MSN Project area.

1.2.6 Need to Meet Public Demand for Transportation Improvements

According to Bay Area residents, transportation is the most important problem facing the region, with 35 percent of residents identifying it as the region's top concern in the 2006 Bay Area Council Poll of 600 residents (February 23, 2006 press release). Notably, 54 percent of those in the North Bay counties of Marin, Sonoma, Napa and Solano said traffic was their biggest problem. In recognition of this challenge, Sonoma County elected to direct local funds, including portions of its local sales tax measure (Measure M) passed in 2004, to support improvements in this portion of the US 101 corridor. A chief directive by the local voters in the passage of this tax initiative was to improve mobility and reduce local congestion for everyone who lives or works in the counties by providing a variety of high quality transportation options designed to meet local needs.

The support shown by SCTA and TAM, in part, resulted in the recommendation by the MTC to include this project as one of the improvements that would enhance connectivity and safety. As a result, the MSN Project has been awarded funding through the Corridor Mobility Improvement Account of the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B) that was passed by the California voters in the November 2006 election. The overwhelming support for Proposition 1B comes from the voters' frustration with traffic delays and with high expectations that Caltrans and its local partners will deliver these projects as expeditiously and efficiently as possible.

In recognition of these needs demonstrated above, Caltrans seeks to:

- Reduce congestion along US 101;
- Correct operational deficiencies that nonstandard horizontal and vertical curves and narrow shoulders present, particularly during peak travel demand;
- Improve mobility for motorists who use US 101 for home-to-work trips, goods movement, tourist, and recreational purposes; and
- Correct existing drainage and flood hazards and reduce future drainage problems.

Chapter 2 Project Alternatives

2.1 Introduction

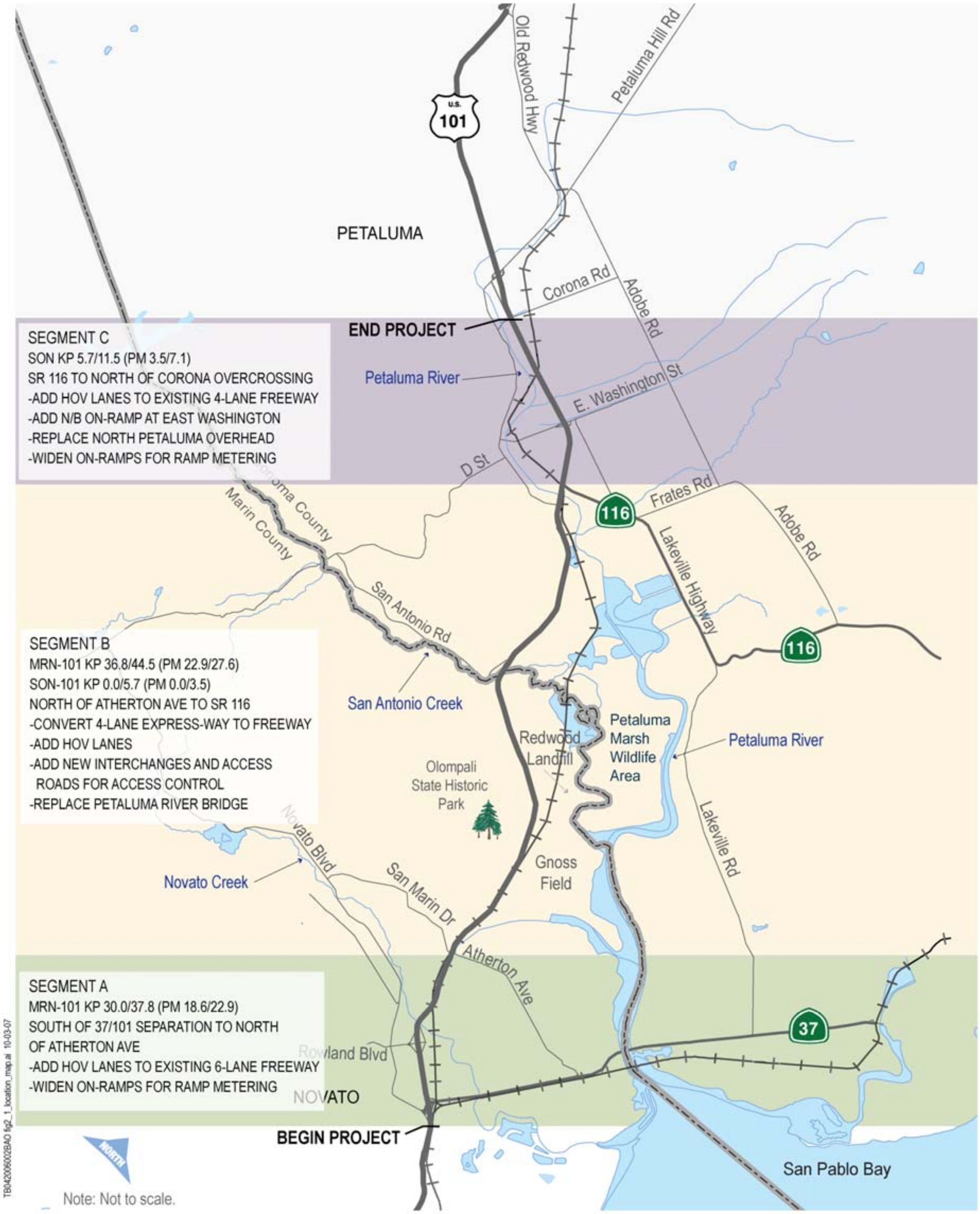
This chapter identifies the various alternatives that were developed by Caltrans in consultation with the FHWA, its local partners (TAM and the SCTA), local officials, other state and federal regulatory agencies, and interested members of the public. The alternatives are intended to address existing and future congestion, operational deficiencies, recurring flood hazards, uncontrolled access points in the Central Segment, and local and state initiative to enhance local and regional connectivity and safety. There are two Build Alternatives, the Fixed High Occupancy Vehicle (HOV) Lane[1] Alternative and the Reversible HOV Lane Alternative. In addition to these Build Alternatives, Caltrans has investigated the No Build Alternative.

The project involves a portion of US 101 in Marin and Sonoma counties in the San Francisco Bay Area. Specifically, the project extends 25.7 km (16.0 mi) from the US 101 junction with SR 37 in the City of Novato (Marin County) northward to the vicinity of the Corona Road Overcrossing in the City of Petaluma (Sonoma County). The project, referred to as the Marin-Sonoma Narrows HOV Widening Project (MSN Project), has been programmed into three distinct segments (see Figure 2-1).

- **Segment A (the Southern Segment).** This is the southerly freeway segment of the project through the City of Novato. It is approximately (6.9 km) in length and begins just south of the SR 37 junction and ends 1.4 km (0.9 mi) north of the Atherton Avenue Interchange. Segment A is a six-lane freeway. South of this segment, US 101 is a six-lane facility with HOV lanes.

[1] A High Occupancy Vehicle (HOV) lane, also known as a carpool lane, is dedicated to vehicles carrying two or more people, motorcycles, or clean air vehicles, during posted hours, usually peak commute periods. Outside of these posted hours, HOV lanes can be mixed-flow, meaning that they are available for use by all vehicles.

Figure 2-1 Location Map and Proposed MSN Project



- **Segment B (the Central Segment)**. This is the middle segment of the project and traverses a rural area of Marin and Sonoma counties, locally known as the "Novato Narrows." It is approximately 13.1 km (8.1 mi) in length and begins 1.4 km (0.9 mi) north of the Atherton Avenue Interchange and ends just north of the Petaluma River Bridge. Segment B is a four-lane expressway.[2]

- **Segment C (the Northern Segment).** This is the northerly freeway segment of the project through the City of Petaluma. It is approximately (5.8 km) in length and begins just south of the US 101 and SR 116 connection and ends 0.5 km (0.3 mi) north of the Corona Road Overcrossing.

The improvements for Segments A (the Southern Segment) and C (the Northern Segment) are similar and include:

- widening the median to accommodate the HOV lanes;
- widening bridges;
- installing ramp metering;
- installing a concrete median barrier and soundwalls; and
- upgrading drainage.

In Segment B, the modifications would be more extensive, because they involve converting this stretch of US 101 from an expressway to a freeway. The conversion would require the roadway to be widened and realigned. Because direct, at-grade access to US 101 would be eliminated, four Access Options involving new interchanges and changes to the existing access roads have been identified for evaluation. Like Segments A and C, Segment B would also be improved with a concrete median barrier and upgraded drainage facilities.

Details on these alternatives follow. Other alternatives that were considered by Caltrans, TAM, SCTA, and PAG but withdrawn from further consideration are also described later in Section 2.5.

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[2] A freeway is a high-volume roadway with full control of access to the facility, a divider separating traffic moving in opposite directions, and grade separations at intersections. An expressway is a high-volume roadway with at least partial control of access, but may or may not have a divider to separate traffic moving in opposite directions or grade separations at intersections.

2.2 Overview to Project Alternatives

This section generally describes the two "Build" Alternatives and the No Build Alternative. Figure 2-2 presents typical cross sections of US 101 under each of the alternatives.

2.2.1 Fixed HOV Lane Alternative

Under this alternative, two HOV lanes, one in each direction, would be constructed in the existing median of US 101 through all three segments of the project boundary. The HOV lane would have a standard width of 3.6 m (12 ft) with inside shoulders of 3.0 m (10 ft). A 0.6 m (2 ft) median barrier would separate the northbound and southbound lanes of traffic. The HOV lanes would extend a distance of 25.7 km (16.0 mi).

2.2.2 Reversible HOV Lane Alternative

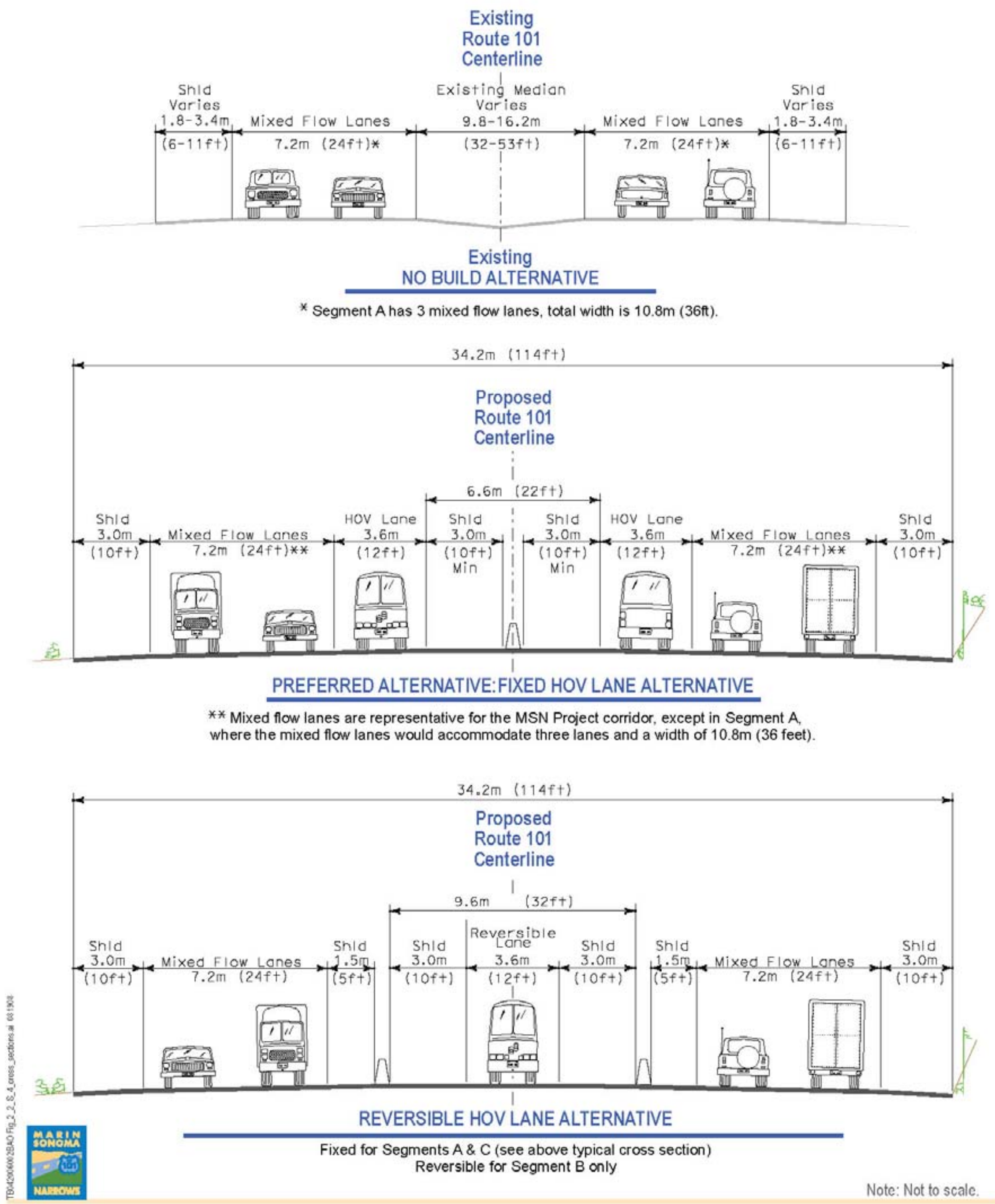
Under this alternative, an HOV lane in each direction would be constructed in the median of US 101 through Segment A, a distance of 6.8 km (4.3 miles). In this alternative, the improvements proposed for Segment A are identical to those of the Fixed HOV Lane Alternative.

In Segment B, a single HOV lane would be constructed in the median of US 101 a distance of 13.1 km (8.1 mi). The dimensions of the median in this segment would be 9.6 m (32 ft) for the HOV lane to allow for a 3.6 m (12 ft) HOV lane, a 3.0 m (10 ft) shoulder on each side, and on either side of the shoulder a barrier (0.6 m (2 ft)) to separate the shoulder from the adjacent mixed flow lanes. The HOV lane barriers would be adjusted to permit southbound travel during the A.M. peak period and northbound travel during the P.M. peak period. In other words, the HOV lane in this segment would be "reversible," compared to the fixed directional HOV lanes of the Fixed HOV Lane Alternative.

In Segment C, HOV lanes in each direction would resume in the median of US 101 for 5.8 km (3.6 mi). For this alternative, the improvements proposed for Segment C are identical to those of the Fixed HOV Lane Alternative.

As in the previous alternative, the northbound and southbound HOV lanes would be available to mixed-flow during non-HOV hours; however, no travel would be allowed in the reversible lane during these times. Entry to and exit from this lane would be controlled at two points near the northern and southern termini.

Figure 2-2 Typical Cross Sections of No Build and Build Alternatives



2.2.3 No Build Alternative

The No Build Alternative is the no-action alternative. The No Build Alternative proposes no modifications to US 101 within the project boundaries other than routine maintenance and rehabilitation to support the continuing operations of the existing freeway when needed. The No Build Alternative provides a point of comparison with the potential impacts of the MSN Project.

In Segment A, the No Build Alternative reflects the existing conditions. Specifically, in the northbound direction, there are three mixed-flow lanes and two exit-only speed change lanes that carry traffic to eastbound SR 37. In the northbound direction, there is also a speed change lane from the westbound SR 37 on-ramp to the Rowland Boulevard off-ramp. In the southbound direction, there are three mixed-flow lanes and one HOV lane, and a speed change lane that begins at the South Novato Boulevard on-ramp.

In Segment B, the No Build Alternative is defined by the existing expressway facility. US 101 would remain a four-lane facility with at-grade intersections at San Antonio Road and Kastania Road. These two intersections have merging lanes and left/right turning lanes in the median. At-grade access would continue at Olompali State Historic Park and at several private properties via driveways. Bicycle access would also continue along the shoulder of the expressway. The existing access roads would remain unchanged: Redwood Boulevard on the west side of US 101 between the Atherton Avenue Interchange and a Birkenstock Warehouse, and Binford Road on the east side of US 101 between the Atherton Avenue Interchange and Airport Road.

In Segment C, US 101 would remain a freeway with two mixed-flow lanes in each direction.

Other improvements to US 101 would be consistent with currently planned and programmed projects along US 101 (see Figure S-6 and Table S-1 in the Summary for a description of these improvements).

2.3 Build Alternatives

From the overview to the Build Alternatives, above, there are a number of common features between the two HOV alternatives. The principal differences occur in Segment B (the Central Segment) and focus on the fixed versus reversible HOV lanes, the modifications to the frontage roads, and new interchange and overcrossing locations. This section highlights the similarities and differences between the Build Alternatives.

2.3.1 Common Design Features of the Build Alternatives

Caltrans initiated an extensive outreach effort to solicit public and agency comments during the formulation of the design alternatives. Especially valuable was the creation of a Policy Advisory Group, composed of local city and county officials. This group met regularly and served as an advisory body to Caltrans, FHWA, TAM, and SCTA. Their input, combined with public comment from the public scoping meetings held in August 2001, resulted in several guiding principles that were followed in the development of the alternatives. These principles were further strengthened by comments received on the DEIR/S and are summarized below.

- In order to reduce the need for additional right-of-way in Segments A and C, use the existing mainline (i.e., the major roadway and its features such as travel lanes, speed change lanes, medians, and shoulders) as much as possible. Lane additions under the Build Alternatives are proposed in the existing highway median.

- In order to reduce the extent of the project (i.e., the Project's footprint) and, thus, the amount of disturbance to environmentally sensitive areas, design the MSN Project with minimal use of cuts and fills, and span bridgework over waterways (rather than placing supports within waterways), all to the practicable extent possible.

- In order to reduce the need for additional right-of-way and disruption of local circulation and to protect sensitive resources in Segment B, use the existing service roads and the existing mainline in designing the new mainline and access roads.

- In order to replace bicycle and pedestrian access in Segment B, design Class 1 and Class 2 bicycle/pedestrian paths along with the access roads, to provide direct access to Olompali SHP, San Antonio Creek, and to points east and west of US 101.

Table 2-1 depicts improvements to the US 101 facility that are common to both Build Alternatives. Please refer to Volume 2 of this FEIR/S for drawings of the mainline and other improvements within the project boundary. These improvements are also described below.

Ramp Metering. Ramp metering is proposed for all of the on-ramps throughout the project limits to control the flow of vehicles entering the mainline. All of these ramps, except the northbound Delong on-ramp, will be widened to provide an HOV bypass lane. The Delong northbound on-ramp already has a two-lane section that will be restriped for a bypass lane.

Freeway Mainline. Under both Build Alternatives, the proposed HOV lanes would be mostly accommodated within existing US 101 median in Segments A and C. Additional widening outside the existing mainline would be necessary in Segments B and C.

Segment B would require major modifications because this stretch of US 101 would require upgrading from an expressway to a freeway under both Build Alternatives. Therefore, the facility would undergo outside widening and realignment. The new mainline would crisscross the existing mainline as follows:

- In the area of Olompali SHP, US 101 would shift eastward 0-27.4 m (0-90 ft).
- Nearing Silveira Dairy, the roadway would shift westward 0-21.3 m (0-70 ft). Roadway work would involve replacing the cattle undercrossing and San Antonio Road.
- From the existing San Antonio Road to South Kastania Road, US 101 would shift westward 0-79.2 m (0-260 ft). The San Antonio Creek Bridge would also be replaced under the new alignment.
- Between South and North Kastania, the roadway would shift to the east 0-21.3 m (0-70 ft).
- From North Kastania to the Petaluma River, US 101 would shift to the west 0-33.5 m (0-110 ft).

In Segment C, portions of the project that involve widening outside of the existing mainline occur around SR 116/Lakeville Highway, East Washington Interchange, and Lynch Creek.

Table 2-1 Common Improvements under Both of the Build Alternatives

Area	From/To	Ramps		Freeway				Miscellaneous			
From South to North	KP/(PM)	Ramp Metering	HOV Bypass	Median Widening	Outside Widening	Roadway Realignment	Concrete Median Barrier	Bridge Widening	Noise Barrier	Retaining Walls	Upgrade Drainage
Segment A (Southern Segment)											
State Route 37	29.9 (18.6) / 32.0 (19.8)	✓	✓	✓			✓		✓	✓	✓
Novato Creek Bridge	R 33.0 / R 20.5			✓			✓	✓	✓		✓
Franklin Overhead	R 33.6 / R 20.9			✓			✓	✓	✓		✓
Olive Undercrossing	R 34.6 / R 21.5			✓			✓	✓	✓		✓
North Novato Overhead	R 35.8 / R 22.2			✓			✓	✓	✓		✓
Rowland I/C	32.0 (19.8) / 33.5 (20.8)	✓	✓	✓			✓		✓		✓
De Long OC	33.5 (20.8) / 35.0 (21.7)	✓	✓	✓			✓		✓		✓
Atherton	35.0 (21.7) / 36.7 (22.8)	✓	✓	✓			✓		✓		✓
Segment B (Central Segment)											
Olompali SHP	36.7 (22.8) / 40.0 (24.8)					✓	✓				✓
Sanitary Landfill Road	40.0 (24.8) / 41.5 (25.7)		✓			✓	✓			✓	✓
Silveira Dairy	41.5 (25.7) / 42.1 (26.1)				✓	✓	✓				✓
San Antonio Road	42.1 (26.1) / 43.5 (27.0)				✓		✓				✓
San Antonio Creek	43.5 (27.0) / 44.5 (27.6)					✓	✓				✓
Marin/Sonoma County Line	44.5 (27.6) / 0.0				✓	✓	✓				✓
Gunn Way	1.0 (0.6) / 2.7 (1.6)				✓	✓	✓				✓
Kastania Road	2.7 (1.6) / 3.8 (2.4)				✓		✓				✓

Table 2-1 Common Improvements under Both of the Build Alternatives

Area	From/To	Ramps		Freeway				Miscellaneous			
From South to North	KP/(PM)	Ramp Metering	HOV Bypass	Median Widening	Outside Widening	Roadway Realignment	Concrete Median Barrier	Bridge Widening	Noise Barrier	Retaining Walls	Upgrade Drainage
Segment C (Northern Segment)											
South Petaluma Blvd.	3.8 (2.4) / 5.2 (3.2)	✓	✓			✓	✓			✓	✓
Petaluma River	5.2 (3.2) / 5.8 (3.6)					✓	✓			✓	✓
SR 116/Lakeville Highway	5.8 (3.6) / 7.0 (4.3)	✓	✓	✓	✓		✓		✓	✓	✓
E. Washington I/C	7.0 (4.3) / 8.4 (5.2)	✓	✓	✓	✓		✓		✓	✓	✓
Lynch Creek	8.4 (5.2) / 8.6 (5.3)			✓	✓		✓	✓	✓		✓
N. Petaluma OH	8.6 (5.3) / 10.3 (6.4)			✓		✓	✓				✓
Corona OC	10.3 (6.4) / 11.6 (7.2)			✓			✓		✓	✓	

Note:
More accurate noise barrier locations are described in Section 3.2.6.
OC = Overcrossing, UC = Undercrossing, OH = Overhead, I/C = interchange; R = Previously Realigned

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Other Improvements. Retaining walls would be used along various portions of the project. In some instances, their use would help confine the footprint of the project, avoid encroachment or use of adjacent parcels, or avoid impacts to biological resources. For instance, a retaining wall proposed on the east side of the northbound off ramp at South Petaluma Boulevard would minimize encroachment into adjacent sensitive biological habitat.

Caltrans would also widen several bridges by constructing and connecting parallel bridge structures and closing the median gap. Caltrans would construct the widened portions of the bridge similar to the existing structure so that widened portions match the existing structure in strength, durability, and flexibility.

Caltrans has concluded that it would be more efficient to replace the Petaluma River Bridge than to retain and widen the existing structure. Based on engineering studies and consultation with the US Coast Guard, Caltrans is studying two bridge design alternatives, cast-in-place or pre-cast concrete structures. Caltrans would replace the columns that support the existing structure, including the four columns that are located in the Petaluma River. In order to avoid impacts to the waterway, Caltrans would construct the new bridge with the same number of columns that currently support the existing bridge over Petaluma River. Caltrans would also replace the fenders that protect the columns in the waterway. The existing Petaluma Boulevard Undercrossing Bridges would be removed under the Build Alternatives.

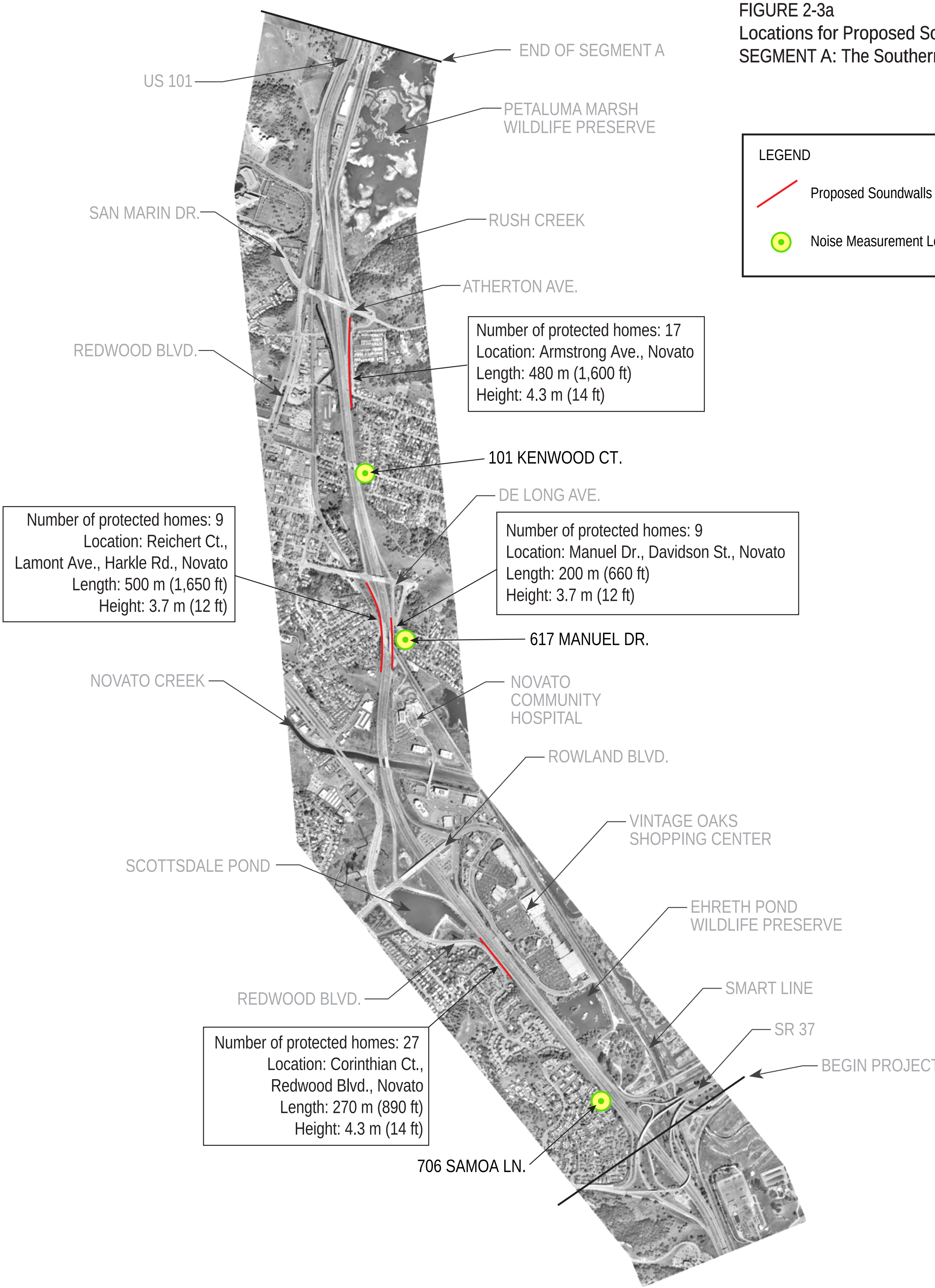
Noise barriers, or soundwalls, are proposed along various portions of the project, where land uses are particularly sensitive to changes in the noise environment. Specifically, eight different barriers, four in the City of Novato and four in the City of Petaluma, are included under the Build Alternatives along residential areas adjacent to US 101. The locations for the proposed sound walls are generally illustrated in Figures 2-3a and b. They vary in length from 200 m (660 ft) to 1,760 m (5,770 ft) and in height from 3.7 m (12 ft) to 4.3 m (14 ft). The longest barrier would be constructed in the City of Petaluma, along the east side of US 101 between Ponderosa Drive and E. Washington Street. Additional details on these soundwalls are in Section 3.2.7, Noise and Vibration, in Chapter 3.

FIGURE 2-3a
Locations for Proposed Soundwalls
SEGMENT A: The Southern Segment

LEGEND

Proposed Soundwalls

Noise Measurement Locations



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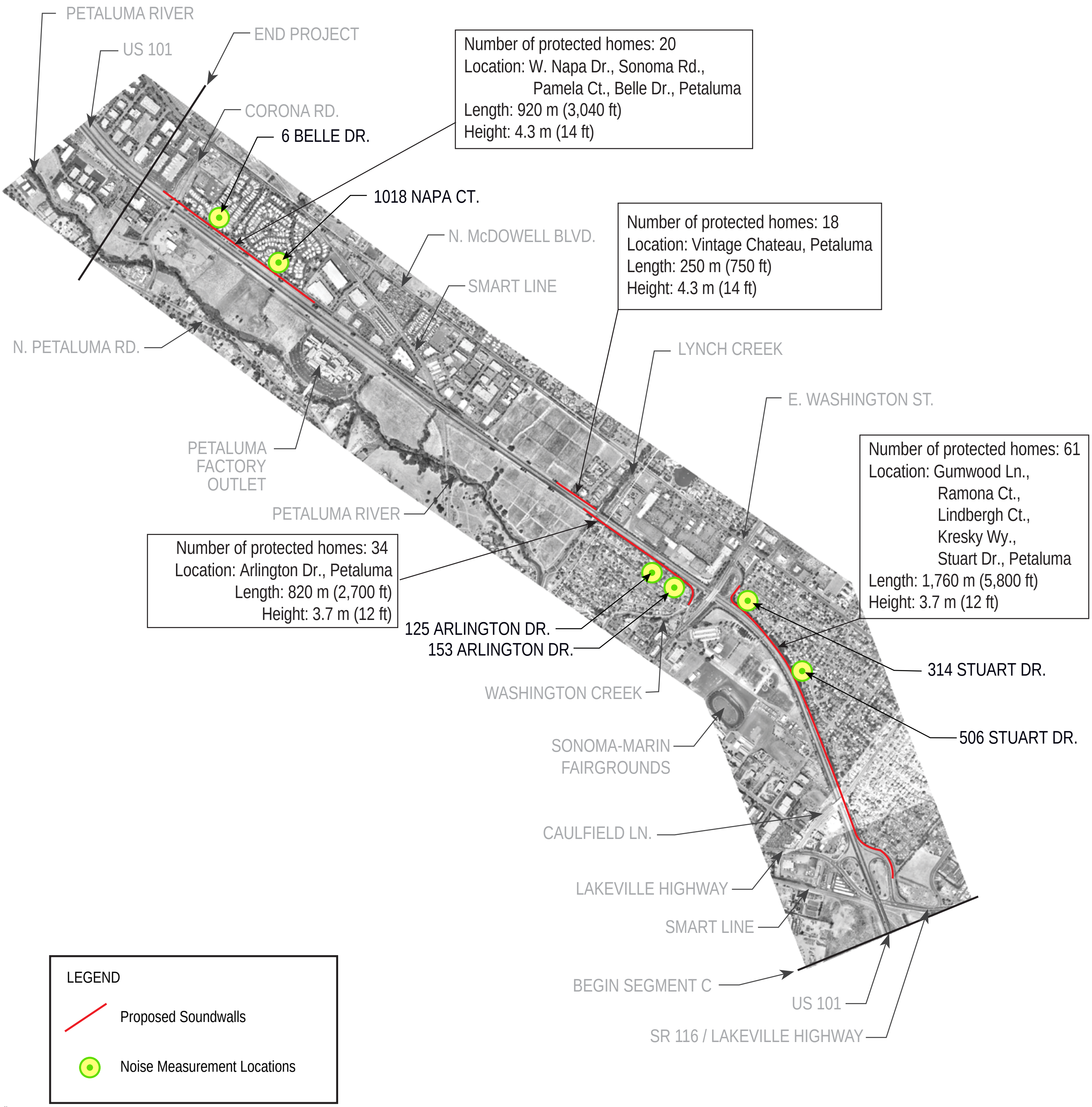
Note: Not to scale.

FIGURE 2-3b
Locations for Proposed Soundwalls
SEGMENT C: The Northern Segment



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Note: Not to scale.

2.3.2 Comparison of Build Alternatives

The two Build Alternatives have similar cross sections and the same width (114 ft). In Segments A and C, the cross sections of both Build Alternatives would have the same number of lanes, lane widths and HOV lanes installed in the median. Similarly within Segment B, the proposed mainline realignment and project footprint would be the same under either Build Alternative, but the cross sections differ slightly in terms of the number of lanes, shoulders, and barriers. For instance, the Reversible HOV Alternative would require a barrier separating the reversible lane from the mixed flow lanes—for purposes of safety—that the Fixed HOV Lane Alternative does not. The Reversible HOV Lane also includes an additional shoulder for emergency pull-out that is not needed under the Fixed HOV Lane Alternative.

While both Build Alternatives would meet the project needs and achieve the project’s purpose, there are operational differences between the two alternatives as explained below.

- The traffic projections indicate that the two build alternatives have similar vehicle performance in Segments A and C. In Segment B, the throughput (the number of vehicles passing through a given stretch of road) is similar for both alternatives in the predominant direction. The Fixed HOV Lane Alternative is projected to have more throughput in the off-peak direction.

- The Fixed HOV lanes would be available to mixed flow traffic during off-peak periods. The reversible HOV lanes would be available during the AM peak period for southbound HOV traffic and during the PM peak period for northbound HOV traffic. The reversible lane could also be available during non-peak periods to accommodate mixed flow traffic.

- The Fixed HOV Lane Alternative would offer flexibility to recognize job growth within Marin and Sonoma counties. Historically, the employment centers have been in the southern part of Marin County and across the Golden Gate Bridge in San Francisco. As a result, the predominant travel direction in the morning commute historically is southbound, and in the evening, northbound. The Marin Countywide Plan and the Sonoma County General Plan each seek to better balance the location of jobs and housing. Therefore the number of jobs occurring in the north could increase enough in the future, creating a reverse commute travel pattern (i.e., more trips going northbound in the A.M. period). If proponents wanted to convert the Reversible HOV Lane to a fixed lane to accommodate a reverse commute, additional outside widening would be required. Also noteworthy are the center columns of proposed overcrossings that would not be compatible under such a conversion.

- The Reversible HOV Lane Alternative would require switching devices, safety devices, and message signs to notify motorists whether the reversible lane is open in their direction. Because of the reversible nature of the HOV lane, more monitoring and staff would be required to ensure that it operates properly compared to the fixed HOV lane.

- Removing a disabled vehicle from the HOV lane or providing emergency vehicle access along US 101would be more difficult under the Reversible HOV Lane Alternative due to barriers separating the HOV lane from the mixed flow lanes, thereby restricting entry from the mixed flow to the HOV lanes.

2.3.3 Access Options in Segment B

For Segment B (the Central Segment), four Access Options were identified by Caltrans from an original set of 26 for consideration in this FEIR/S. While any of the 26 options would be compatible with either Build Alternative, these were rated and scored based on the following evaluation factors: operational flexibility, access to private parcels, compatibility with current land use and zoning, visual resource impacts, parkland impacts, biological resource impacts, cultural resource impacts, and costs. From the original 26, Access Options 4b, 12b, 14b, and 14d were identified for further study along with the Build Alternatives and presented in this document. However, only one Access Option will be identified as part of the Preferred Alternative

Table 2-2 summarizes the improvements for this segment. Some of the improvements presented in the table are common to all the access proposals, while others vary by specific Access Option. Figure 2-4 generally depicts interchange/overcrossing locations and access road configurations associated with Access Options 4b, 12b, 14b, and 14d. Again, either of these Access Options could be implemented with either of the Build Alternatives, but only one will be identified, prior to the final environmental document.

Table 2-2 Proposed Improvements in Segment B

Locations from South to North	KP/(PM)	Retain Structure	Rehabilitate Roadway	Construct New Interchange[1]	Construct Frontage Roads	Replace Structure	Construct Bike/ Pedestrian Path
Atherton Avenue	35.0 (21.7)/ 36.7 (22.8)						✓
Redwood Road	36.7 (22.8)/ 40.0 (24.8)		✓				✓
Olompali State Historic Park (SHP)	40.0 (24.8)/ 41.5 (25.7)						✓
Sanitary Landfill Road	41.5 (25.7)/ 42.1 (26.1)			✓	✓		✓
Silveira Dairy	42.1 (26.1)/ 43.5 (27.0)				✓		✓
San Antonio Road	43.5 (27.0)/ 1.0 (0.6)		✓	✓	✓		✓
Historic San Antonio Creek Bridge	43.5 (27.0)/ 1.0 (0.6)	✓				✓	✓
Marin/Sonoma County Line	/0.0	✓				✓	✓
San Antonio Creek Freeway Bridge	43.5 (27.0)/ 1.0 (0.6)	✓				✓	✓
Skinner Road	0.8 (0.5)				✓		✓
Cloud Lane	1.5 (0.9)				✓		✓
Gambini Road	2.1 (1.3)				✓		✓
Kastania Road	2.7 (1.7)		✓				✓
Petaluma Blvd South	3.8 (2.4)		✓	✓			✓
Petaluma River Bridge	5.2 (3.2)					✓	✓

2.3.4 Comparison of the Access Options

Each of the Access Options would function similarly within the Central Segment by replacing at-grade connections along with existing local access and circulation that would be lost due to the expressway-to-freeway upgrade proposed under the Build Alternatives.

None of the Access Options, as proposed, would provide local access between interchanges. The US 101 mainline would provide the only means of travel through the corridor.

The primary differences among the four Access Options pertain to the alignment of proposed access roads and locations of new interchanges and overcrossings. Before describing these differences in greater detail, the features common to all of the options are identified below. Figure 2-4 generally shows a schematic of the common features of each of the Access Options; refer to Volume 2 for figures showing the proposed roadway configurations, interchanges, and bridges in greater detail.

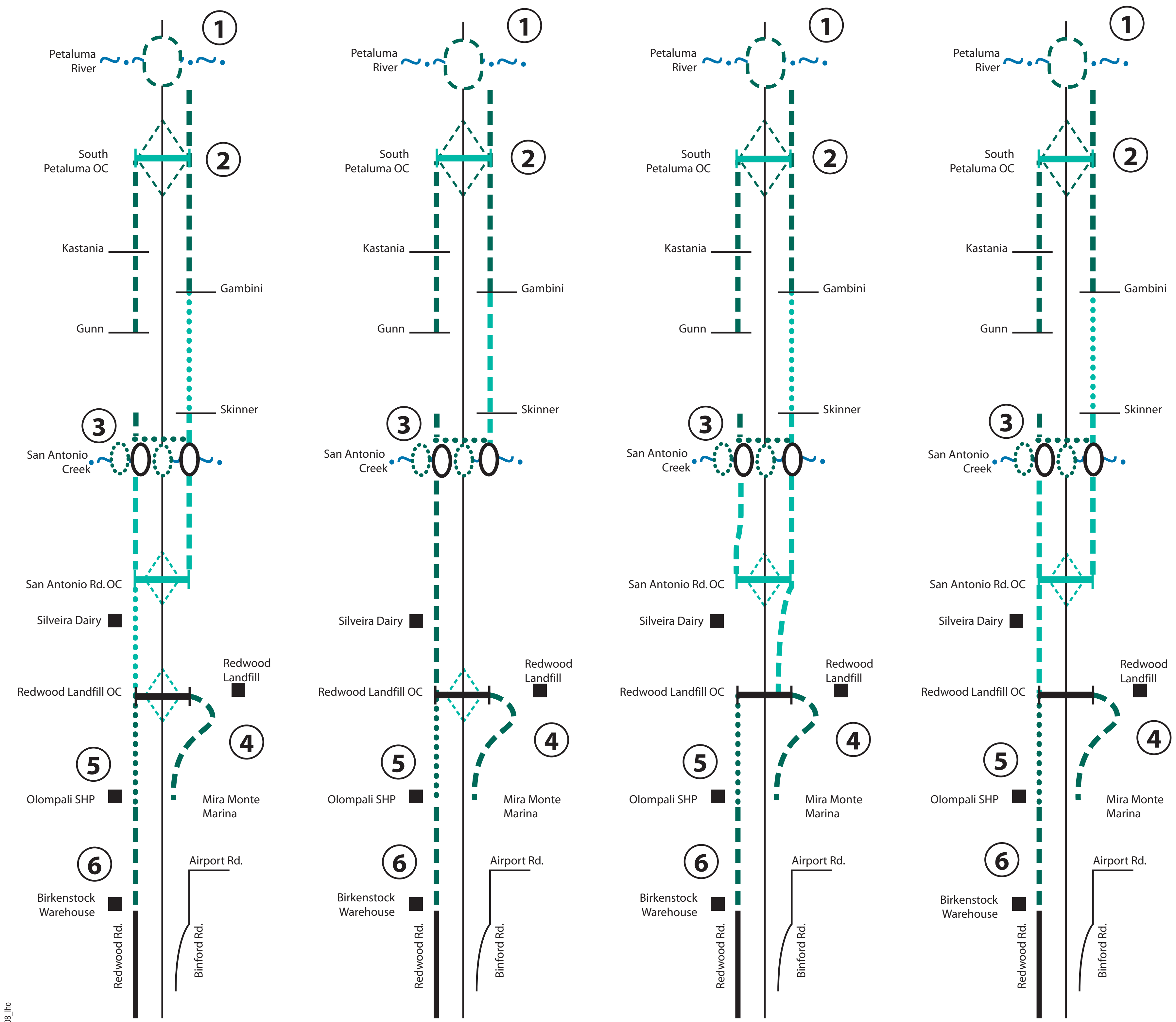
Access Road Design and Bicycle/Pedestrian Paths. In general, the access road configurations are designed to extend ingress and egress for motorized traffic to adjacent property owners, but would not be continuous throughout the entire segment. However, bicyclists and pedestrians would be able to travel continuously throughout Segment B using the overcrossings along with the access roads. The bike/pedestrian networks associated with each Access Option would replace bicycle access that is currently available on the US 101 expressway shoulder. For instance, Class 2 bicycle/pedestrian paths would be provided on access road shoulders in both traffic directions, and Class 1 paths would extend from the termini of the access roads to the next overcrossing or, in some cases, to existing local roads. Figure 2-5 shows typical cross sections of access roads with Class 2 as well as Class 1 bikeways associated with the Access Options, either of which could be implemented with either Build Alternative.

New Eastside Access Road. A 0.9 km (0.6 mi) access road from Redwood Landfill Road on the east side of US 101 south to the Mira Monte Marina intersection would be constructed.

Access to Olompali State Historic Park (SHP). Traffic approaching or exiting Olompali SHP would use Redwood Boulevard from the Atherton Avenue Interchange. Redwood Boulevard would terminate in a cul-de-sac at the entrance to the park.

San Antonio Creek Bridgework. The bridgework under each of the Access Options is also similar, involving the same structures. Consequently, from a design and constructability standpoint, the Access Options would likewise be similar, and differences in costs would be negligible. Following is a brief description of the bridgework over San Antonio Creek:

FIGURE 2-4
Segment B Access Options Schematic

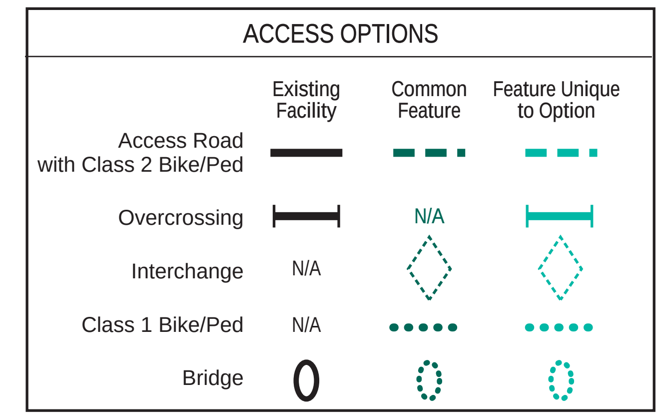


Access Option 4b

Access Option 12b
(Preferred)

Access Option 14b

Access Option 14d



Proposed Elements Common to All Access Options

1 = Petaluma River Bridge Replacement
2 = South Petaluma Boulevard Overcrossing and Access Roads on both sides of US 101
3 = San Antonio Creek Bridge and Bicycle/Pedestrian Path
4 = East Side Access Road from Redwood Landfill Road
5 = Bicycle/Pedestrian Path North of Olompali SHP
6 = Extension of Redwood Road to Olompali SHP

Note: Not to scale.

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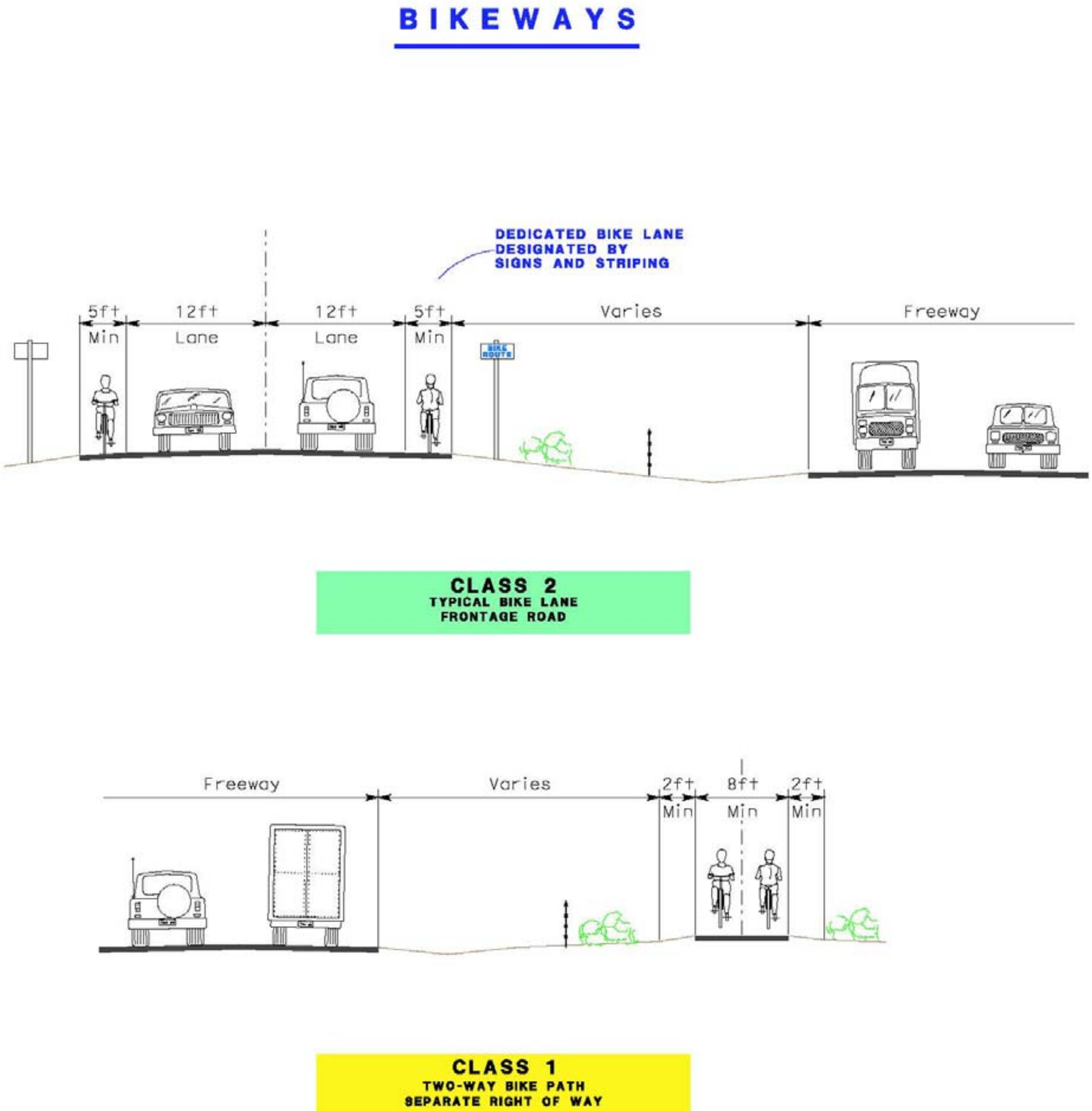
Figure 2-5 Typical Cross Sections of Frontage Roads with Proposed Class 1 and Class 2 Bikeways under Build Alternatives



The existing Historic San Antonio Creek Bridge would remain in place. However, a new bridge would be constructed just west of this bridge for traffic along San Antonio Road.

In addition, a new mainline bridge would be constructed due to a westward shift of the freeway over San Antonio Creek. Consequently, the southbound bridge would be removed. However, the existing northbound bridge would remain in place to serve as part of the access road network proposed under each Access Option.

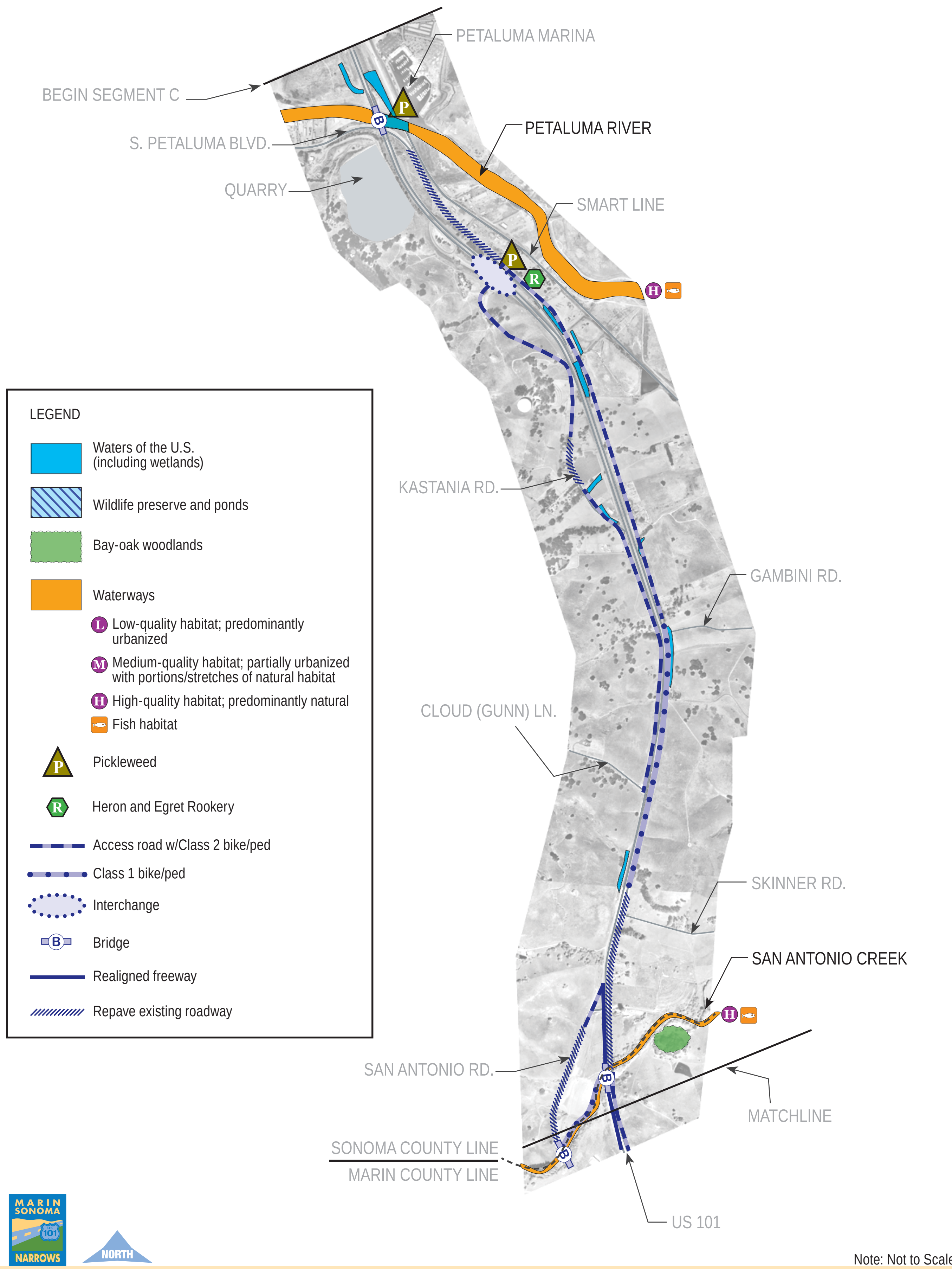
South Petaluma Boulevard Interchange. A new interchange at South Petaluma Boulevard with on and off ramps and an access road would be constructed on both sides of US 101. The access road improvements around the interchange are common to all Access Options. On the west side of US 101, an access road would extend southward a distance of 2.8 km (1.8 mi) and end at Cloud Lane. This road would overlay the existing Kastania Road. On the east side of US 101, South Petaluma Boulevard would be realigned eastward 70 m (230 ft) then conform to the existing roadway to the north. To the south, the road would continue as an access road and extend to just south of Gambini Road.

There are also notable differences between the Access Options. Figures 2-6a and b through 2-9a and b show the common features and variations among the Access Options.

Access Option 4b. Access Option 4b proposes to modify the Redwood Landfill Road Overcrossing into a “diamond” interchange (so called because of the figure created by the on and off ramps). On the west side of US 101, there would be a Class 1 bicycle/pedestrian path extending 1.7 km (1.0 mi) from the Redwood Landfill Road Overcrossing southward to the entrance of Olompali SHP and northward for 1.8 km (1.1 mi) to a new San Antonio Road Interchange just north of the Silveira Dairy.

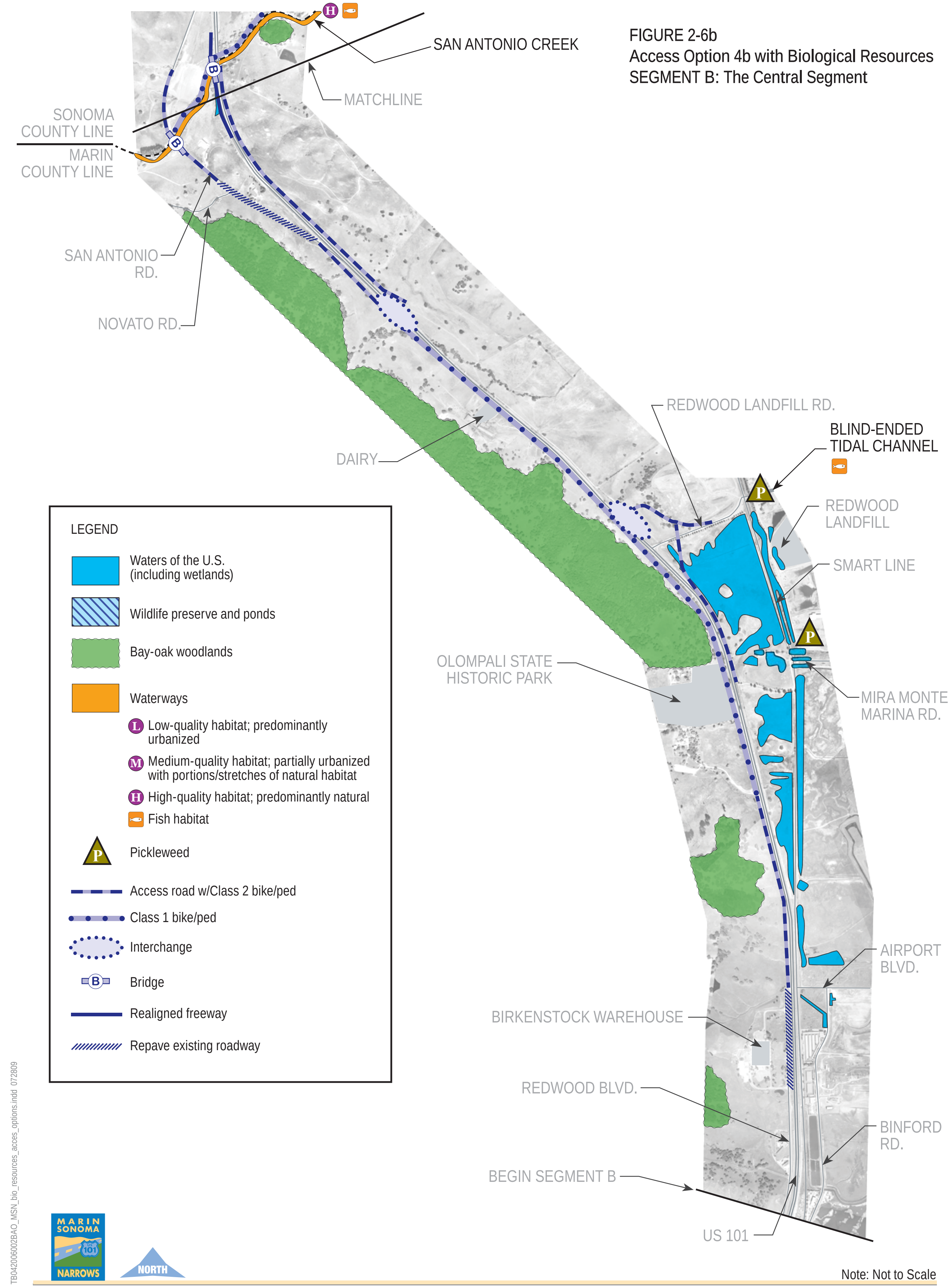
From the new San Antonio Road Interchange, an access road on the west side of US 101 would extend 0.5 km (0.3 mi) northward to San Antonio Road. On the east side, an access road, beginning at the San Antonio Overcrossing would extend northward 1.8 km (1.1 mi) to Skinner Road. A bicycle/pedestrian path would be constructed between this access road and the one extending south from the new South Petaluma Boulevard Interchange to Gambini Road.

FIGURE 2-6a
Access Option 4b with Biological Resources
SEGMENT B: The Central Segment



Note: Not to Scale

FIGURE 2-6b
Access Option 4b with Biological Resources
SEGMENT B: The Central Segment



Note: Not to Scale

FIGURE 2-7a: Preferred Alternative featuring Access Option 12b with Biological Resources
SEGMENT B: The Central Segment

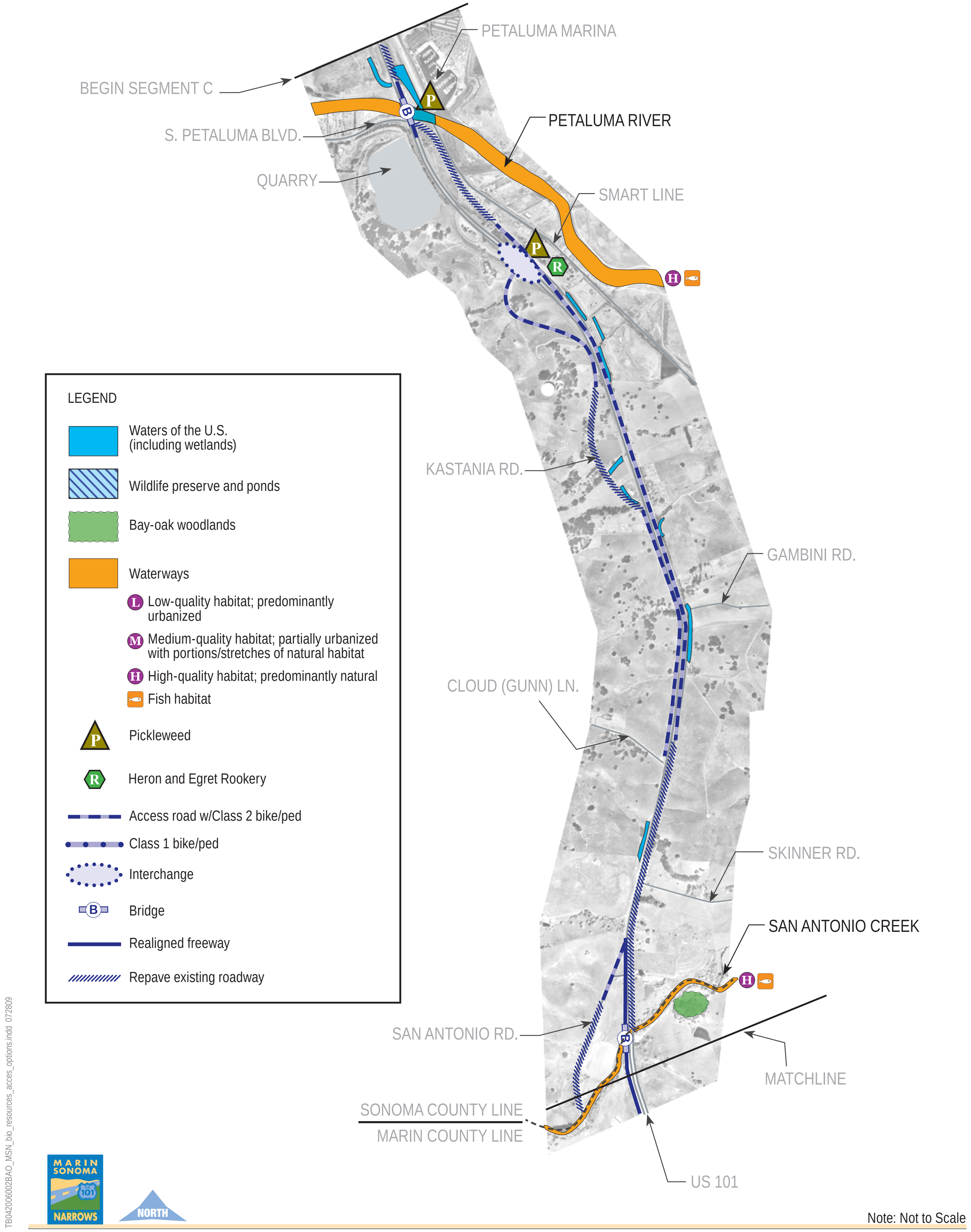
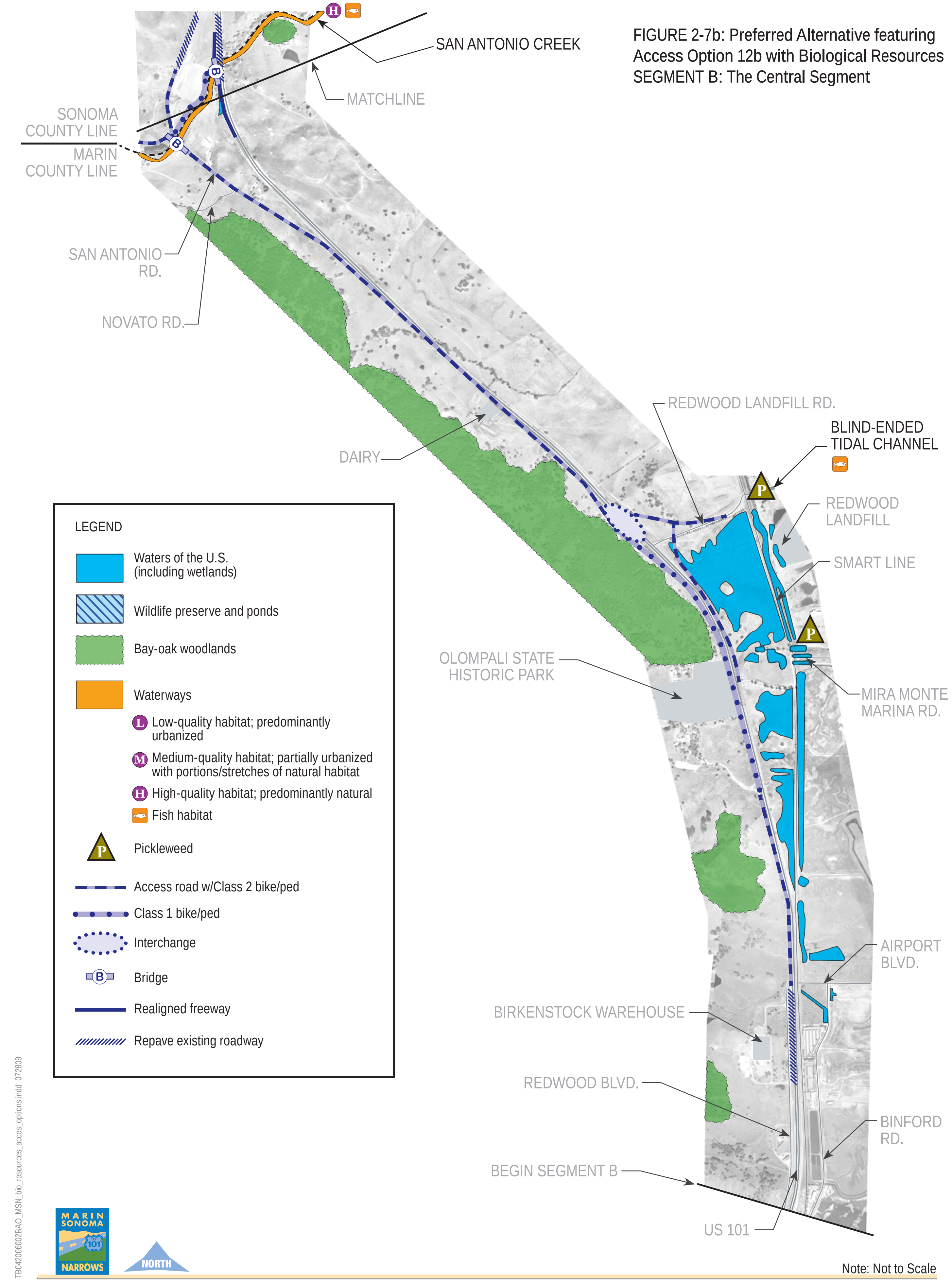


FIGURE 2-7b: Preferred Alternative featuring Access Option 12b with Biological Resources
SEGMENT B: The Central Segment



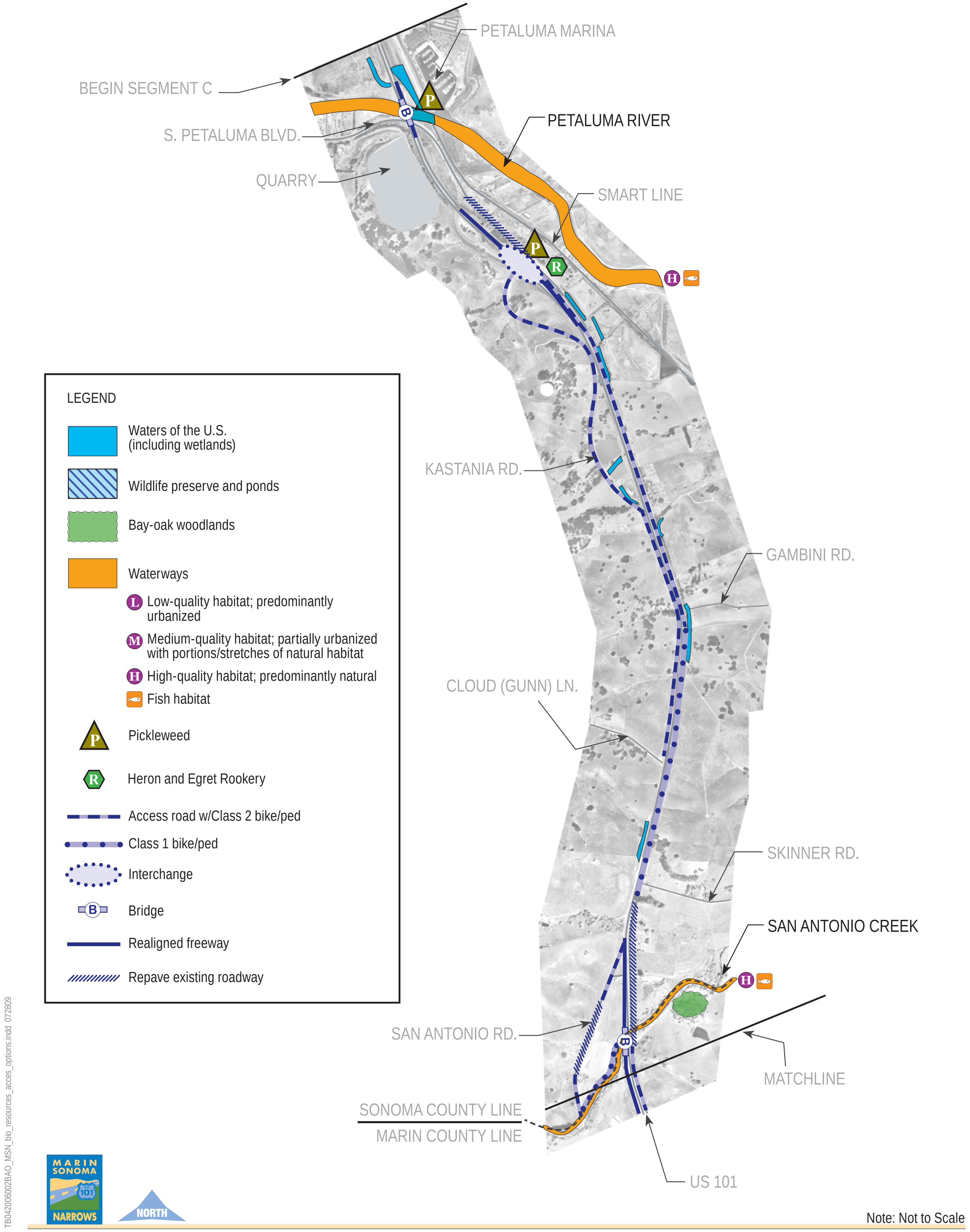
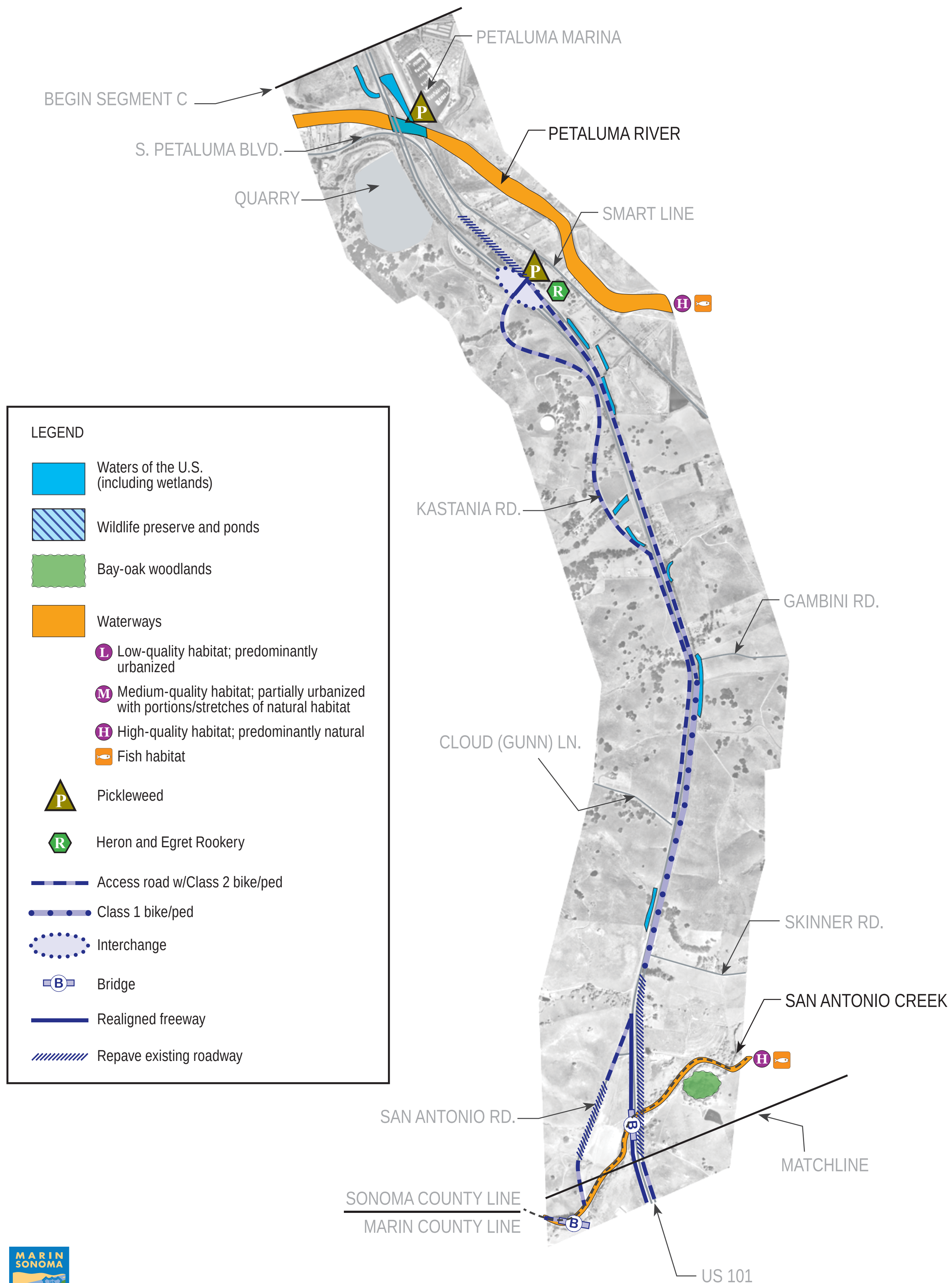


FIGURE 2-8a
Access Option 14b with Biological Resources
SEGMENT B: The Central Segment

FIGURE 2-8b
Access Option 14b with Biological Resources
SEGMENT B: The Central Segment

FIGURE 2-9a
Access Option 14d with Biological Resources
SEGMENT B: The Central Segment



Note: Not to Scale

FIGURE 2-9b
Access Option 14d with Biological Resources
SEGMENT B: The Central Segment

Note: Not to Scale

Access Option 12b. Similar to Access Option 4b, Access Option 12b proposes to convert the Redwood Landfill Overcrossing into a diamond interchange. However, this alternative omits the San Antonio Road Interchange and instead includes a 2.3 km (1.4 mi) access road on the west side of US 101 from the Redwood Landfill Road Interchange northward to the existing San Antonio Road. Also, this Access Option would extend the access road on the east side of US 101 from the new South Petaluma Boulevard Interchange south to San Antonio Creek.

Access Option 14b. Under this Access Option, the overcrossing at Redwood Landfill Road would remain, adapted for public access, but would not be converted into a full interchange as under Access Options 4b and 12b. No access roads for motorized traffic would connect to this overcrossing on the west side. However, on the east side, a northward access road would extend 2.3 km (1.5 mi) to the new San Antonio Road Interchange just north of the Silveira Dairy.

From the San Antonio Road Interchange, an access road would extend 0.5 km (0.3 mi) northward to meet up with existing San Antonio Road. On the east side of US 101, a northward road would extend from the new San Antonio Interchange northward to Skinner Road. From the terminus of this access road, a bicycle/pedestrian path would be constructed northward to connect with the new access road extending south from the new South Petaluma Boulevard Interchange to Gambini Road.

Access Option 14d. At Redwood Landfill Road, the overcrossing would remain as in Access Option 14b. However, a northward access road would extend on the west side of US 101 to a new San Antonio Road Interchange. Unlike Access Option 14b, there would be no southward access road on the east side of US 101.

Unlike Access Option 12b, the other three Access Options include the San Antonio Road Interchange. Access Option 4b is the only option that includes interchanges at both the Redwood Landfill Overcrossing and San Antonio Road. As noted earlier, there would not be any motorized connections between these two interchanges.

While Access Option 14b and 14d also propose the San Antonio Road Interchange, they do not include the interchange at Redwood Landfill Overcrossing; however, only minor modifications would be necessary to make the Redwood Landfill Overcrossing publicly accessible.

During the alternatives development and evaluation process (see Appendix A), the Access Options were evaluated in terms of providing access to Redwood Landfill Road, San Antonio Road, and Cloud (Gunn) Lane/Kastania Road from mainline (main access). Their ability to provide access to local roads was also evaluated (local access). All the Access Options provide main and local access; however, main access was weighted more heavily. Following is a brief summary of the accessibility of Access Options 4b, 12b, 14c, and 14d:

Access Option 4b would provide excellent access to Redwood Landfill and San Antonio Road but no direct access to Cloud (Gunn) Lane/Kastania Road.

Access Option 12b would provide excellent access to Redwood Landfill, improve access to San Antonio Road over existing conditions, but worsen access to Cloud (Gunn) Lane/Kastania Road over existing conditions.

Access Option 14b and 14d would worsen access to the Redwood Landfill area, provide excellent access to San Antonio Road; but provide no direct access to Cloud (Gunn) Lane/Kastania Road.

It should also be noted that cars entering US 101 from either the Redwood Landfill Road Overcrossing or San Antonio Road Interchange (if it is constructed) would not be able to enter the Reversible HOV lane, as entry and exit points to this lane would only occur at the Atherton Interchange and just south of South Petaluma Boulevard Interchange in the peak direction (A.M. southbound/P.M. northbound).

As can be seen in Table S-3, the impacts to natural resources are very similar; however, Access Option 12b would impact the most number of native and non-native trees than the others (1,706 compared to 1,401 under Access Option 4b, 1,378 under 14b, and 1,343 under 14d).

Access Option 12b would also result in the greatest addition to impervious surface area (14.0 ha/34.6 ac); and, along with Access Option 4b, would disturb the greatest amount of wetlands (2.16 ha/5.34 ac).

2.4 Identification of the Preferred Alternatives for MSN HOV Widening Project

The MSN Project DEIR/S, released in October 2007, presented two mainline Build Alternatives: the Fixed HOV Lane Alternative and the Reversible HOV

Lane Alternative. A No Build Alternative was also evaluated; however, it was not identified as the Preferred Alternative because, unlike the Build Alternatives, it does not meet the need and purpose of the project.

After consideration of the advantages and disadvantages of each Build Alternative, along with input from the local partners, the Policy Advisory Group (PAG), regulatory agencies, and the public, Caltrans and FHWA have identified the Fixed HOV Lane Alternative as the Preferred Alternative.

The following is a summary of the reasons for supporting this alternative.

- While both alternatives are projected to provide similar throughput (the number of vehicles passing through a given stretch of road) in the predominant peak direction (A.M. southbound and P.M. northbound), the Fixed HOV Lane Alternative would be available during all periods, while the Reversible HOV Lane would be closed during off-peak periods. The Fixed HOV Lane Alternative would be compatible with Marin County's city-centered corridor and Sonoma County's city-centered growth policies.

- The Fixed HOV Lane Alternative would be more efficient than retrofitting the Reversible HOV Lane to a Fixed HOV Lane in the future. Availability during off-peak periods would be important for potential job and population growth within Marin and Sonoma counties, which would be available with the Fixed HOV Lane Alternative.

- The Reversible HOV Lane would require switching devices, safety devices, and message signs. More monitoring and staff would be needed to operate the Reversible HOV Lane Alternative, making it a more costly system to operate and maintain.

- Removing disabled vehicles from the HOV Lane and providing emergency vehicle access along US 101 would be more difficult with the Reversible HOV Lane Alternative because of the limited access to the center HOV Lane.

- The Fixed HOV Lane Alternative at $429.7 million would be more cost effective than the Reversible HOV Alternative. According to the MSN Project Report, the total estimated construction cost for the Fixed HOV Lane Alternative would be $2.4 million less than the Reversible HOV Lane Alternative, not including support costs (see Table 2-3). The costs reflect the total estimate with Access Option 12b; which is discussed in the following paragraphs.

Table 2-3 Estimated 2008 Project Construction Costs

	Roadway	Structure	R/W	Env	Total
Fixed HOV Alternative					
Segment A	$61.0	$11.5	$1.9	$1.3	$75.7
Segment B-4b	$170.0	$37.5	$43.0	$20.2	$271.3
Segment B-12b	$166.6	$35.9	$41.4	$19.6	$263.5
Segment B-14b	$161.8	$36.9	$42.7	$19.4	$260.8
Segment B-14d	$165.6	$36.5	$$3.1	$19.7	$264.9
Segment C	$66.3	$20.7	$1.7	$1.8	$90.5
Reversible HOV Alternative					
Segment A	$61.0	$11.5	$1.9	$1.3	$75.7
Segment B-4b	$173.0	$37.5	$43.0	$20.2	$273.7
Segment B-12b	$169.0	$35.9	$41.4	$19.6	$265.9
Segment B-14b	$164.2	$36.9	$42.7	$19.4	$263.2
Segment B-14d	$168.0	$36.5	$$3.1	$19.7	$267.3
Segment C	$66.3	$20.7	$1.7	$1.8	$90.5
Source: Marin Sonoma Narrows Project Report. January 2009 Caltrans.					

Although any of the Access Options would be compatible with either mainline alternative, Caltrans and FHWA have identified Access Option 12b. The following is a summary of the reasons for supporting Access Option 12b over the others:

- According to Caltrans' Project Report, January 2009, the estimated construction costs of the Access Options are all within 5 percent of each other. For instance, Access Option 4b is $271.3 million, 14b is $260.8 million, 14d is $264.9 million, and 12b is estimated to cost $263.5 million (not including support costs). Therefore, cost considerations were not an important factor compared to other considerations.

- Although all the Access Options would result in similar adverse visual impacts to motorists, bicyclists, and pedestrians, Access Option 12b will be less visually intrusive because of the utilization of existing interchanges rather than building new larger interchanges. Thus, a high level of visual quality will be maintained with Access Option 12b in which scenic view corridors of hillsides will provide a predominantly natural visual appearance (refer to Section 3.1.11).

- Access Option 12b will also take advantage of existing interchanges reducing the projects footprint and conserving more right-of-way over the other proposals.
- Access Option 12b would provide direct access to US 101 from the Redwood Landfill, which generates more traffic compared to the other surrounding low-density land uses.

At its meeting on February 18, 2008, the Project Advisory Group (PAG) and the Project Leadership Team (PLT), which includes Transportation Authority of Marin (TAM) and Sonoma County Transportation Authority (SCTA), accepted the recommendation of the Fixed HOV Lane Alternative with Access Option 12b as the Preferred Alternative. Caltrans and FHWA have also identified this Preferred Alternative as the Preliminary Least Environmentally Damaging Preferred Alternative (LEDPA). Caltrans and FHWA have also received concurrence from the participating NEPA/404 regulatory agencies on the identification of the Fixed HOV Lane Alternative as the Preliminary LEDPA (see Appendix B).

2.5 Funding and Programming

Revenues for transportation improvement projects are generated from a variety of sources. The primary traditional sources for state transportation projects are state gasoline and diesel fuel taxes, vehicle weight fees, and federal revenues. Additional sources include sales tax measures, local funds other than sales taxes, and private funds. Table 2-4 presents a description of some of these programs.

Table 2-4 State of California Transportation Funding Programs

Funding Program[1]	Description
TCRP (Traffic Congestion Relief Program)	TCRP is a state funding source managed by the California Transportation Commission (CTC) for the Governor. The TCRP requires the CTC to adopt guidelines and implement an Exchange Program that allows the exchange of federal Congestion Mitigation and Air Quality Improvement (CMAQ) and Regional Surface Transportation Program (RSTP) funds for state transportation funds, based upon funding availability.
ITIP (Interregional Transportation Improvement Program)	ITIP is a state funding program for Interregional Transportation Improvement Program funds. Caltrans nominates and the CTC approves a listing of interregional highway and rail projects for 25 percent of the funds to be programmed in the State Transportation Improvement Program (STIP).

Table 2-4 State of California Transportation Funding Programs

Funding Program[1]	Description
SHOPP (State Highway Operation and Protection Program)	SHOPP is a state funding category used by Caltrans to maintain and operate state highways.
RTIP (Regional Transportation Improvement Program)	RTIP is a state funding source that provides for the 75 percent regional allocation of STIP funds for projects on and off the state highway system from the State Highway Account and other funding sources. As the Regional Transportation Planning Agency for the nine-county Bay Area region, the Metropolitan Transportation Commission biennially adopts the Bay Area STIP and submits it to the CTC for approval and inclusion in the STIP.
CMIA (Corridor Mobility Improvement Account)	CMIA is a state funding program that will provide approximately $4.5 billion in funding to reduce congestion, enhance mobility, improve safety and promote stronger connectivity along key corridors throughout the state.

[1]Latest approval year for all programs is 2008.

Because each funding program targets specific project activities (planning, design, and construction), the proposed MSN Project has been divided into four steps. These steps are:

- Step 1: Project Approval and Environmental Documentation (PAED) – this document and accompanying engineering are part of PAED;
- Step 2: Plans, Specifications, and Estimates (PS&E) – final design and development of project cost estimates;
- Step 3: Acquisition of interest and right of way; and
- Step 4: Construction. This phase includes implementation of identified mitigation and monitoring.

Table 2-5 presents these proposed implementation phases in relation to anticipated funding sources and committed and proposed funding amounts. The MSN Project is currently in Step 1.

In order for a project to obtain federal transportation funding, it must be included in the Regional Transportation Plan (RTP). The Metropolitan Transportation Commission (MTC) is responsible for adopting the Bay Area's RTP, the current version of which is known as the Transportation 2035 Plan. Adopted by the MTC on April 22, 2009, the Transportation 2035 Plan describes the strategies and

Table 2-5 Project Funding Sources (Dollars in Thousands and Escalated)

Funding Type and (Source)	Component (phase)							Total
	PAED	**PS&E**	**R/W Sup**	**Con Sup**	**Env**	**R/W**	**Con**	
Phase 1- Committed/Programmed								
CMIA (State)				$10,200			$72,200	$82,400
TCRP (State)	$5,600	$13,800						$19,400
ITIP-IIP (State, incl. Augmentation)	$14,100	$400	$610	$14,460		$5,270	$52,050	$86,890
RIP Marin (State)		$1,900	$2,320		$5,783		$27,197	$37,200
RIP Sonoma (State)					$1,130	$5,570	$12,500	$19,200
SAFETEA-LU HPP Marin (Fed)						$11,322		$11,322
SAFETEA-LU 3763 Marin (Fed)					$87	$338		$425
SAFETEA-LU 3763 Sonoma (Fed)						$425		$425
Demo – Tea 21 (Federal)	$3,100				$5,650			$8,750
Measure M Sonoma (Local)		$7,780	$919			$2,065	$1,433	$12,197
Sub-Total - Phase 1	$22,800	$23,880	$3,849	$24,660	$12,650	$24,990	$165,380	$278,209
Phase 2 (Committed Funds)		$48,340	$5,020	$47,440	$17,150	$34,090	$315,150	$467,190
Total Project (Phase 1 and 2)	**$22,800**	**$72,220**	**$8,869**	**$72,100**	**$29,800**	**$59,080**	**$480,530**	**$745,399**
Metropolitan Transportation Commission – Regional Transportation Plan (RTP) 2035								
Committed Funds	$22,800	$55,168	$6,775	$55,076	$22,764	$45,130	$367,070	**$569,400**
Committed Discretionary Funds		$17,052	$2,094	$17,024	$7,036	$13,950	$113,460	**$176,000**
Total Project	$22,800	$72,220	$8,869	$72,100	$29,800	$59,080	$480,530	**$745,400**

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investments required to maintain, manage, and improve the transportation network within the nine-county San Francisco Bay Area. MTC now updates the RTP every four years and expects to adopt the new RTP, Transportation 2035 Plan: Change in Motion (or 2009 RTP), in 2009.

Also, every two years the MTC prepares and adopts a Regional Transportation Improvement Program (RTIP). Developed in cooperation with County Congestion Management Agencies (CMA) and Caltrans, the 2008 RTIP includes programming for projects on and off the state highway system over a five-year period (e.g., Fiscal Year 2008/09 through Fiscal Year 2012/13). The final 2008 RTIP was adopted by MTC on January 23, 2008, and subsequently was approved by the California Transportation Commission on May 29, 2008 as part of the 2008 State Transportation Improvement Program (STIP).

The MSN Project is included in the current RTP in the Financially Constrained Element with a combination of programmed and planned local, state, and federal funds available over the long term of the Transportation 2035 Plan. The MSN Project is also included in the 2008 RTIP and STIP.

In February 2008 MTC began the process of updating the RTP with the issuance of the Notice of Preparation (NOP) for the preparation of the Draft EIR for the Transportation 2035 Plan. Two scoping meetings were held in March 2008 to solicit input on the scope and content of the Draft EIR. The program-level EIR for the Transportation 2035 Plan analyzed the broad, regional environmental impacts of implementing the investments identified in the plan. Throughout the process of preparing the Draft EIR and RTP, MTC has made an extensive effort to seek public input including focus group meetings, community-based focus groups, evening workshops in each of the nine Bay Area counties, telephone polls and web surveys. The public outreach encouraged members of the public, cities, counties and partner agencies to submit possible projects for consideration for inclusion in the final plan.

In December 2008, MTC circulated the Draft EIR and Draft Transportation 2035 Plan for a 45-day public review period including a public hearing. Both documents were approved and finalized on April 22, 2009.

There is a significant gap between the amount of committed funds and total project costs. The challenge lies not just in filling the gap, but also in matching project needs and schedule with timing of available funds. Currently $467.19

million are needed from future unidentified sources to complete the project. It is anticipated that these funds will be secured from a variety of sources including Federal, State and local sources. Local sources are likely to include local gasoline tax and ballot initiatives. The funding sources identified are consistent with the fiscally constrained STIP/TIP long range plans for the state. The MSN Project is listed in the following State planning and regional planning documents (long range plans).

State Planning (STIP)

- Route Concept Report: The MSN Project is consistent with the current Route Concept Report dated March 13, 1986. A draft Transportation Corridor Concept Report was prepared in May 2002 but was never approved. The District is currently working on a Corridor System Management Plan for the north US 101 corridor. The CSMP will function as the Transportation Corridor Concept Report and is expected to be complete by September 2010.

- Transportation System Development Plan: The Department developed a Statewide System Management Plan (1998) that includes a strategy for Bay Area transportation corridors. This study found that congestion relief in the US 101 corridor would require a multi-modal (carpool, bus, rail, ferry, bicycle, and pedestrian) approach.

Regional Planning (TIP)

- The most recent transportation plan in the project area is the Transportation 2035 Plan, adopted by MTC on April 22, 2009. The most recent Transportation Improvement Program (TIP) is the 2009 TIP. The FHWA made its conformity determination for the Transportation 2035 Plan and the TIP on May 29, 2009. The project is listed in the 2009 TIP (TIP ID nos. MRN050034 and SON070004) and the Transportation 2035 Plan (RTP reference no. 230702). The T2035 includes $745.4 million for the MSN project, $569.4 million in committed funds and $176.0 million in discretionary funds. The proposed project is consistent with the Congestion Management Plan.

- MTC forecasts that $218 billion in federal, state, regional and local revenue will become available to the Bay Area over the 25-year horizon of the Transportation 2035 Plan. This $218 billion constitutes the “budget” for the financially constrained long-range plan. MTC divides this 25-year plan revenue into two separate categories, as follows: (1) Committed Funds have been reserved by law for specific uses, or allocated by MTC action prior to the development of the Transportation 2035 Plan, and (2) Discretionary Funds are flexible funds available to MTC (and not already programmed in Committed Funds) for assignment to projects via the Transportation 2035 Plan planning process). See Part 2: Plan Finances of the Transportation 2035 Project Notebook for more details -- http://www.mtc.ca.gov/planning/2035_plan/T2035-Project_Notebook_web.pdf.

- It is important to note that all projects/programs identified in Appendix 1 of the Transportation 2035 Plan (including Project #230701) are fully funded via a combination of committed and discretionary funds and therefore included in the financially constrained long-range plan -- see http://www.mtc.ca.gov/planning/2035_plan/RES-3893_Attach_C-1_T2035_Appendix_1.pdf.

Local Planning

- This project is being proposed in partnership with TAM, SCTA and FHWA. The completion of the HOV system through Marin and Sonoma counties has been a consistent goal expressed in regional planning documents such as the US 101 Corridor Strategic Plan, the Marin County Congestion Management Plan, the Sonoma/Marin 1997 Multi-Modal Transportation & Land Use Study, the MTC 2005 HOV Master Plan and the MTC Transportation 2035 Plan.

As shown in Table 2-4, currently the project has committed funding of $278.2 million, which is short of the Caltrans cost estimate of $745.4 million total project capital cost that is needed to construct the Preferred Alternative. Funding Sources include CMIA, TCRP, IIP, RIP, Local Measure M, SAFETEA-LU and TEA 21 Demonstration.

Conformity with the Transportation Improvement Plan

The Metropolitan Transportation Commission (MTC) prepares and adopts the Transportation Improvement Plan (TIP) every two years. The MSN Project was included in the most recent TIP 2007 and subsequent amendments, as approved by the FHWA on October 2, 2006. The MSN Project is included in the Draft 2009 TIP.

On April 22, 2009, the MTC issued a final transportation air quality conformity finding for the Transportation 2035 Plan and the 2005 TIP/ Amendment #05-05. The FHWA approved this air quality conformity finding on May 29, 2009. Since the design concept and scope of the project has not changed, the Project conforms to the State Implementation Plan (SIP).

Project Schedule

- Estimated Phase 1 construction to start Fiscal Year (FY) 2010/11 and end FY 2013/14
- Estimated Phase 2 construction to start FY 2015/16 and end FY 2018/19

2.6 Alternatives Considered and Withdrawn

During the alternative development phase, Caltrans and its partners considered a wide range of improvements to relieve congestion along US 101 within the project boundaries. This section identifies the alternatives that were considered but then withdrawn from further evaluation. Comments received during the public comment period did not provide substantial information to revise Caltrans' and FHWA's assessment that the following alternatives would not meet the need and purpose of the project.

2.6.1 Transportation Systems Management (TSM)

The objective of TSM is to reduce congestion using the existing infrastructure. This alternative would implement measures such as express buses in HOV lanes, new and expanded park and ride facilities, and enhanced rideshare-matching services. It could also include travel demand management measures such as flex time, alternative work schedules, satellite telecommuting centers, and other strategies to reduce peak hour travel demand.

The TSM Alternative would, however, have limited effectiveness. For instance, the lack of HOV lanes within the project boundaries would reduce travel time reliability that commuters depend upon to make TSM measures such as carpooling and express bus use work.

Caltrans also considered measures such as ramp metering. Ramp metering is not effective on highly congested roadways because loop detectors regulate cycle lengths at ramps. As congestion increases, cycle lengths shorten to delay ramp traffic from entering the freeway. Consequently, cars back up onto local streets.

In addition, other TSM measures like Extinguishable Message Signs[3] have been used at intersections such as the Redwood Landfill Road to alert drivers to cross traffic; however, this measure alone would not adequately address the access issues within Segment B (the Central Segment).

Consequently, for the aforementioned reasons, the TSM alternative would not be effective as a "stand alone" proposal to adequately meet the project need to alleviate congestion, or improve goods movement, or correct existing operational deficiencies along US 101 within the project boundaries, or address existing flood hazards associated with undersized culverts under US 101. However, TSM features are beneficial, and measures such as ramp metering and HOV bypass ramps have been incorporated into the Build Alternatives.

2.6.2 Role of the RTP in Identifying the Range of Alternatives

The role of the Regional Transportation Plan (RTP) in identifying the range of alternatives is to identify regional needs from which more focused documentation can be developed. The Transportation Plan for 2035, prepared in February 2005, identifies these needs in the project area. The alternatives developed for the MSN project reflects needs stipulated in RTP and were based from these needs. Some of the transportation needs from the RTP are, reduce travel times through the Golden Gate corridor HOV lanes, protect operational capability of reliever routes to US 101 for short trips during the peak period; maintain interchange spacing and ensure improvements to connecting east-west routes do not adversely affect operations on US 101; develop ramp-metering plan for US 101 at key access points to balance access for local and through trips; maintain reliable US 101 operations in off-peak period for freight mobility; expand commute-period transit options in the Golden Gate corridor; improve transit services between cities; develop bicycle and pedestrian travel options for commuting, recreation and tourism; and develop bicycle and pedestrian access to existing and future rail and ferry facilities.

2.6.3 High Occupancy Vehicle Toll (HOT) Lanes

One of the more recent traffic management concepts, High Occupancy Toll (HOT) lanes, combines HOV and pricing strategies by allowing single occupancy

[3] Message signs that communicate traffic information, warnings, and/or advisories. The message can be turned on and off, or "extinguished" depending on traffic conditions.

vehicles to access HOV lanes by paying a toll. The lanes are “managed” through pricing to maintain free-flow conditions even during the height of rush hours. The HOT lanes are physically separated from the parallel general purpose lanes (e.g., mixed-flow lanes) by continuous concrete barriers or a fence of collapsible pylons.

Two HOT lane studies have been conducted on the US 101 corridor through Marin and Sonoma counties. The first, completed in January 1999, studied toll lanes between Petaluma and Windsor in Sonoma County (MTC and SCTA, 1999; Sonoma County US 101 Variable Pricing Study). The second, completed in January 2000, evaluated toll lane options between SR 37 and the Petaluma River Bridge (MTC, January 2000. US 101 Variable Pricing Study: State Route 37 to the Petaluma River Bridge).

The studies concluded that HOV lanes would be as effective as HOT lanes, simply due to the increased capacity. The time savings for users of the HOV or HOT lanes would range from four to eight minutes in Segment B. Although the alternative would reduce congestion, it would require more right-of-way outside the environmental study area. Moreover, the HOT Lane Alternative would not correct existing operational deficiencies along US 101 within the project boundaries, or address existing flood hazards associated with undersized culverts under US 101, or improve goods movement.

Although the Build Alternatives would not preclude HOV lanes from being converted to HOT lanes in the future, the following considerations need to be incorporated into the scope of this alternative:

- The cross section for a HOT lane in the US 101 corridor would be a minimum of 138 feet. Reasons for this wider footprint stem from merge areas near the HOT lane entry and exit points, and CHP enforcement areas for single occupancy vehicles (SOV) violations. The wider footprint would have larger impacts on the environment, require additional right of way, and substantially increase project costs.

- Toll revenues would not likely be sufficient to fully finance toll lane construction and operations, although revenues may be sufficient to cover ongoing operating and maintenance costs, estimated to be about $1.5 million per year.

- The 2000 SR 37-to-Petaluma study assumed that the HOV definition for the US 101 corridor would be changed from two persons per vehicle to three to maximize revenue for the HOT lane option. Traffic forecasts indicate the number of vehicles with at least three passengers would be very low.

- Installation of HOT lanes requires state legislative approval. State legislation (AB 2032 by Assemblyperson John Dutra) has been introduced to authorize HOT lanes at designated locations on a five-year trial basis.

Caltrans and MTC have funded The Bay Area High Occupancy/Toll (HOT) Network Study, an independent study considering the expansion of HOT lanes for the Bay Area region. The Study results indicate that the HOV system, in general, can incorporate HOT land functions and continue to offer priority for carpoolers and express buses. Consequently, implementation of the MSN Project with HOV lanes would not prelude consideration of future HOT lanes on US 101.

2.6.4 Express Bus Service

Caltrans met with Golden Gate Bridge, Highway and Transportation District (GGBHTD), operator of express bus service Marin and Sonoma counties. Within the project boundaries, Golden Gate has express bus stops at several locations that are near park and ride facilities. They include Hanna Ranch Road near SR 37, Rowland Avenue, Rush Landing (which provides direct access to Atherton Avenue Interchange), South Petaluma Boulevard, and Caulfield Avenue.

GGBHTD's vision includes new and expanded park and rides lots at interchanges to support express bus ridership, bus stops positioned to take advantage of HOV on-ramps, and HOV lanes along the entire corridor to improve their reliability and operations. Because a fixed HOV system is an important component of GGBHTD's service goals, express bus service would be an enhancement to the MSN Project. Both express bus service and the MSN Project are necessary to reduce congestion on US 101; they are complementary, rather than alternatives. Furthermore, investment in express bus service only, rather than the MSN Project, would not correct the operational deficiencies of US 101 through Segment B to improve access to land uses in Segment B, and to address existing flood hazards associated with undersized culverts under US 101.

In addition, increased express bus service alone would not alleviate congestion and would subject express bus service to the delays within mixed flow lanes.

2.6.5 Commuter Rail Service and Goods Movement

At the present time, the NCRA and SMART are pursuing two separate projects along the NWP corridor and intend to coordinate commuter rail and goods movement services.

The SMART commuter rail service proposes a 70-mile system operating throughout Marin and Sonoma counties on the Northwestern Pacific Rail right-of-way. Caltrans believes commuter rail service would be a valuable adjunct to the corridor, joining the list of other available modes (e.g., ferry service, transit, and highway). As noted in Table S-1, Phase II of the SMART line would extend commuter service south of San Rafael to Larkspur. Because of the lack of station locations within the Segment B, this service would not improve access for adjacent property owners within this segment, nor help correct existing operational deficiencies along US 101 within the project boundaries, or address existing flood hazards associated with undersized culverts under US 101. However, the bike/pedestrian trail that SMART is proposing within its corridor would be most accessible from the US 101 corridor, South Petaluma Boulevard.

SMART has released a Supplemental FEIR proposing to expand goods movement further north. Materials would include quarry materials, solid waste, and merchandise. Goods movement along US 101 is well-established and more diverse. It is estimated that 4.1 percent to 5.7 percent of 90,000 annual average daily trips in 2005 in the MSN Project area were trucks involved in goods movement (Caltrans, November 2006). Goods movement along US 101 includes local distribution, pickup, delivery, and service markets, long-haul domestic trade markets, and international trade.

SMART’s ridership study finds that commuter rail would support 6,000 riders per day. The AADT in 2005 was 155,000 trips in the MSN project area and this is expected to increase over the next 20 years.

For the reasons stated above, the MSN Project Build Alternatives would better meet the need and purpose of the project over rail commuter service and goods movement as proposed by SMART and NCRA within the project area.

2.6.6 Freeway Widening for Mixed Flow Lanes

A mixed flow lane alternative would be unable to meet the purpose and need of the project in reducing congestion to the same extent as HOV-based alternatives in the project's 16.1-mile segment of U.S.101. Likewise, a mixed flow alternative would not capitalize on the mobility trends supported by Marin and Sonoma Counties' HOV lane segment productivities.

Of the 11 Bay Area freeway HOV lane segments studied, MTC estimates that all of the existing and planned HOV lanes will move more people than their adjacent mixed flow lanes. MTC measured the productivity of the HOV lanes based upon the number of people per lane. Currently, seven of the freeway HOV lane segments studied are twice as productive compared to their adjacent mixed flow lanes. One of the freeway HOV segments already has 3.9 times the productivity of its adjacent mixed flow lane (2002 HOV Lane Master Plan Update).

In terms of the project area, Marin County currently has the fifth highest number of vehicles of in its HOV lanes than all other freeway HOV segments studied. Furthermore, the HOV lane segments studied in Marin County has three times the productivity of the adjacent mixed flow lane. Overall, this productivity in 2001 was the third highest of the 11 corridors studied (2002 HOV Lane Master Plan Update).

Sonoma County is projected to achieve 3.5 times the productivity of its adjacent mixed flow lanes in the peak direction by 2025 (2002 HOV Lane Master Plan Update).

The MTC HOV Master Plan reports that a national target or goal for HOV lane use is to achieve a one-minute time savings per mile of HOV lane. In 2001, Marin County ranked third in the Bay Area at 1.4 in time savings per mile of HOV lane (2002 HOV Lane Master Plan).

If all HOV lanes in the Transportation Implementation Plan (TIP) were converted to mixed flow lanes, the resulting congestion and increased VMT in 2010 would result in 1.3 more tons per day of Reactive Organic Gases and 0.9 more tons of oxides of nitrogen – the precursors to ozone (2002 High Occupancy Vehicle Lane Master Plan Update).

Consequently, the MTC study results and transportation trends in Marin and Sonoma counties led to the withdrawal of a mixed flow lane alternative from further study.

Chapter 3 Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures

3.1 Human Environment

3.1.1 Introduction

This section addresses all aspects of the human environment. These aspects include land use, growth, community character and cohesion, transit and parking, traffic and circulation, aesthetics, and cultural resources. The section describes the development pattern along the US 101 corridor, provides a socioeconomic profile of the communities adjoining or traversed by US 101, characterizes the transportation network that provides people and goods movements and how well it functions, and describes the visual and cultural landscape that imparts character and history to the corridor.

3.1.2 Land Use

3.1.2.1 Regulatory Setting

The regulatory framework for land use is governed by local general plans prepared by cities and counties in accordance with the state government code. State law requires that each general plan address seven topics, ranging from land use to housing to open space. Applicable plans related to land development are described here. In addition, because of the strong nexus among land use, transportation, and air quality, some of the important state and regional plans addressing these topics are also summarized below.

Local Land Use Plans

Marin Countywide Plan. The Marin Countywide Plan advocates concentrating urban development in the “City-Centered Corridor,” one of the County’s four development corridors, located along US 101 in the eastern part of the county near San Francisco and San Pablo Bay. As envisioned in the Plan, city- and community-centered growth helps to promote economic efficiency, protect natural resources, and preserve existing communities in rural and coastal areas to ensure that a range of living options remain available in the County as a whole.

On January 30, 2007, the Marin County Board of Supervisors and the Planning Commission approved a public hearing schedule to review and discuss the update to the 1994 Countywide Plan. This process culminated in the adoption of a revised Marin Countywide Plan on November 6, 2007; however, the fundamental land use objectives and development principles remain as stated in the 1994 Countywide Plan.

Because much of the land use character of the MSN corridor between Novato and Petaluma is rural, protection of the visual quality and rural landscape was an important consideration in developing the mainline alternatives and Access Options. The value of the area's scenic beauty is underscored by the Plan that contains the following policies:

- **Viewshed Protection.** The County shall protect visual access to the bayfront and scenic vistas of water and distinct shorelines through its land use and development review procedures. This view protection is essential for the preservation of Marin County and San Francisco Bay identity, for the enhancement of aesthetic qualities, and for visual and psychological relief from adjacent urban environments.

- **Minimize Visual Impacts of Public Facilities.** The County should require appropriate placement, setbacks, and landscaping of public facilities, such as soundwalls, to reduce visual impacts and impacts on views of hillsides, ridgelines, open space, and the Bay. The County encourages similar measures to reduce visual impacts for public projects over which it does hot have jurisdiction.

City of Novato General Plan. Land use goals of the City of Novato General Plan are to:

- Preserve the small town character and environmental needs of the Novato community; and

- Develop effective transit services and infrastructure.

The major objectives of the Plan include:

- Increase the capacity of the existing transportation system to support current and future development;

- Coordinate effectively with neighboring jurisdictions and special authorities, such as the Transportation Authority of Marin; and
- Address countywide transportation problems and maintain transportation standards.

Sonoma County General Plan. The Sonoma County General Plan 2020 was adopted in September 2008. Primary goals of the Land Use element of the Sonoma County General Plan are to coordinate land use with growth policies, phase rural and urban growth with availability of adequate services, provide open space separation between cities/communities, create opportunities for diverse rural and urban residential environments, protect agricultural lands, and preserve scenic features and biotic resource areas.

The following policies that appear in the general plan are examples of the value that Sonoma County places on scenic resources:

- Encourage protection of visual access to the San Pablo Bay Shoreline and the Petaluma River; and
- Protect visual values on hillsides, ridgelines, and other scenic resources.

Sonoma County Comprehensive Transportation Plan. The primary goal of the Sonoma County Comprehensive Transportation Plan for 2004 is to provide a well-integrated circulation system that supports “smart” growth principles and the city-centered growth philosophy, through a collaborative effort of all the cities and the County. Primary objectives to obtain this goal include:

- Focusing commute and through traffic onto US 101 and designating major arterial routes to serve primarily as connectors between urban areas; and
- Providing east/west connectivity within each community including interchange improvements to improve access to US 101.

City of Petaluma General Plan. The Petaluma Draft General Plan 2025 was released for review in July 2006, and was adopted May 2008. Land use objectives in the General Plan include promoting architectural and socioeconomic diversity within residential areas and establishing a realistic ratio between East Side and West Side growth. Policies set forth by the general plan to obtain these objectives include:

- The City's growth management system shall be updated and revised from time to time;
- The City would not guarantee that any individual project will be able to achieve the maximum densities shown on the Land Use Map;
- Those parcels that are undevelopable shall continue to be identified and so designated on the City's plans;
- Minimize the impacts of future airport development on nearby residential areas;
- Improve traffic flow; and
- Plan long-range for needed roads and infrastructure.

Key Transportation Plans

The MSN Project is being proposed in partnership with TAM, SCTA, and FHWA. The completion of the HOV system through Marin and Sonoma Counties has been studied in regional planning documents such as the Sonoma/Marin 1997 Multi-Modal Transportation & Land Use Study (Calthorpe Study) and the Marin County Congestion Management Plan.

The Calthorpe Study. The Calthorpe Study advocated the creation of a balanced transportation network throughout Marin and Sonoma Counties. The Final Preferred Scenario included transit improvements as well as improvements to US 101 and local roads. Although the improvement of US 101 from expressway to freeway status between Novato and Petaluma was part of the Study, it was not part of the recommended Final Preferred Scenario, as it failed to demonstrate that such an improvement would significantly improve levels of service for commuters within the segment. The relatively high cost of the upgrading ($125 million) was another reason for its exclusion from the Final Preferred Scenario. However, the addition of HOV lanes in Marin and Sonoma Counties were part of the Preferred Scenario.

The Marin County Congestion Management Plan. US 101 has been operating at unacceptable levels since the very first Congestion Management Plan in 1991. The MSN Project is identified in the 2005 Congestion Management Program as a "candidate for future funding." The Congestion Management Program notes that projects that support or help implement Transportation Control Measures in the Bay Area's Clean Air Plan should receive higher funding priority. Examples of such projects include high-occupancy vehicle lanes and ramp meter bypass lanes for high-occupancy vehicles. The MSN Project includes both of these measures.

Route Concept Report. The MSN Project is consistent with the current Route Concept Report and the current draft of the Transportation Corridor Concept Report.

Transportation System Development Plan. Caltrans developed a Statewide System Management Plan (1998) that includes a strategy for Bay Area transportation corridors. This study found that congestion relief in the US 101 corridor would require a multi-modal (carpool, bus, rail, ferry, bicycle, and pedestrian) approach.

MTC Transportation 2030 Plan. The MSN Project is listed as a Track 1 project in the Golden Gate Corridor section of the current MTC Transportation 2030 Plan for the San Francisco Bay Area (see Appendix L). The Congestion Management Plan identifies the following objectives:

- Maximize travel time benefits for high-occupancy vehicle lanes and transit in entire (Golden Gate) corridor;
- Protect operational capability of reliever routes to US 101 for short trips during the peak period;
- Maintain interchange spacing and ensure improvements to connecting east-west routes do not adversely affect operations on US 101;
- Develop ramp-metering plan for US 101 at key access points to balance access for local and through trips;
- Maintain reliable US 101 operations in off-peak period for freight mobility;
- Expand commute-period transit options in (the Golden Gate) corridor;
- Improve transit service between cities;
- Develop bicycle and pedestrian travel options for commuting, recreation and tourism; and
- Develop bicycle and pedestrian access to existing and future rail and ferry facilities.

Air Quality Plan

The Bay Area Air Quality Management District's 2000 Clean Air Plan contains strategies to achieve air quality standards. A list of Transportation Control Measures (TCM) is recommended to be implemented to reduce vehicle emissions. Transportation Control Measure 8 in the Plan is to construct carpool/express bus lanes on freeways.

3.1.2.2 Affected Environment

Land uses within the cities of Novato and Petaluma are primarily residential, commercial, industrial, and open space. In Segment B of the project corridor along both sides of US 101 between the Novato and Petaluma city boundaries, land use is predominantly agricultural. Figure 3.1-1 shows existing land uses throughout the US 101 corridor within the MSN Project boundaries. Following is a description of existing and future land uses and trends.

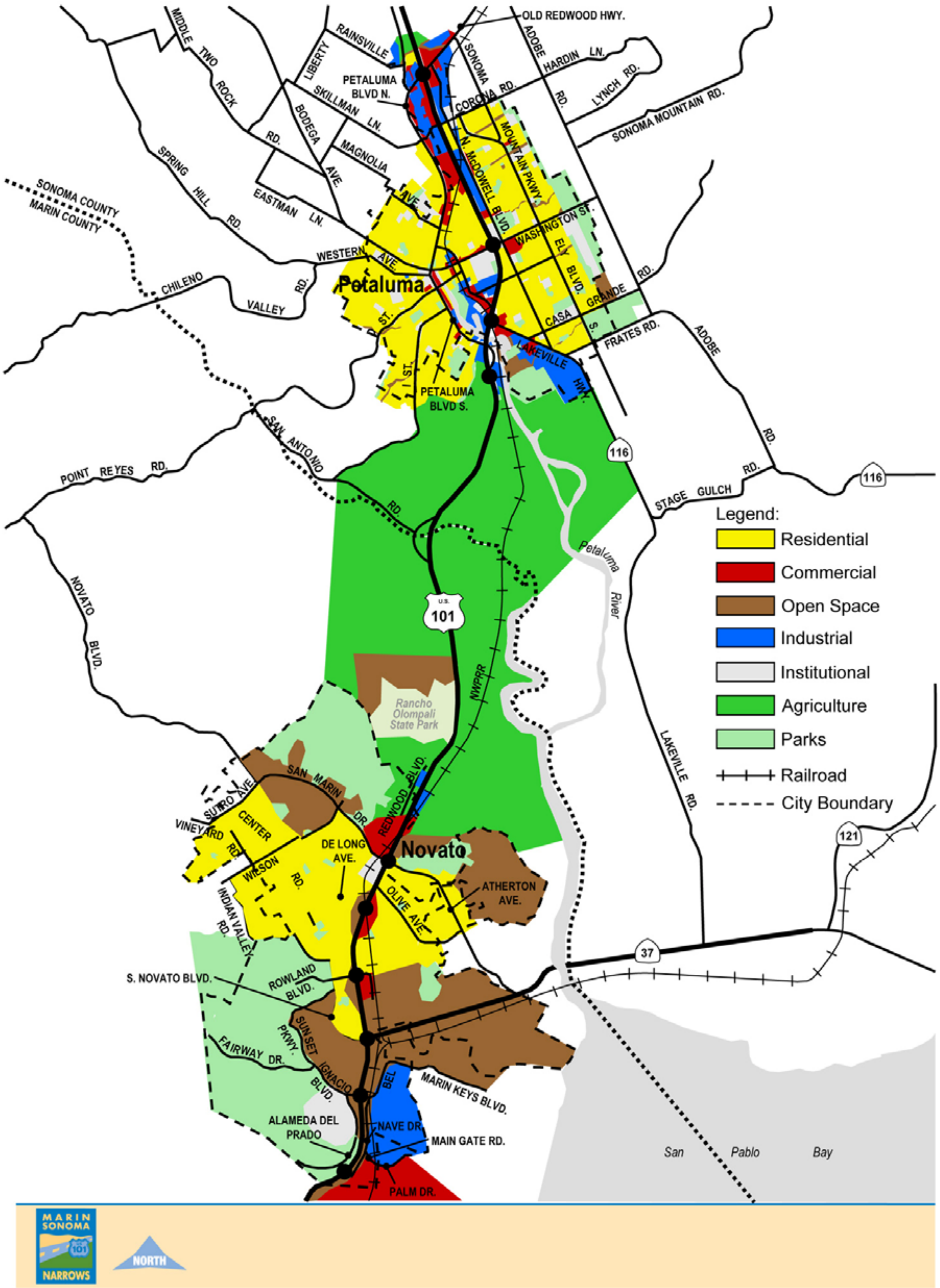
Existing Land Use and Trends

From the southern project boundary to the US 101/South Novato Boulevard Interchange, existing land use is predominately residential in the valley areas west of US 101 and in pockets along San Pablo Bay east of the freeway. The College of Marin-Indian Valley is located west of the freeway, near Ignacio Boulevard; Stonetree Golf Club is located east of the freeway, south of SR 37.

Commercial uses in downtown Novato are concentrated along Grant Avenue, along Redwood Boulevard, in pockets along US 101, and in various small clusters and convenience centers. The Vintage Oaks Shopping Center is located east of the highway and south of the Rowland Boulevard Interchange, in the Novato Redevelopment Project Area.

Offices are located along the freeway, in and around downtown Novato, near the Novato Community Hospital, along Novato and South Novato Boulevards, and within the industrial parks. Novato Industrial Park contains the bulk of the City's warehousing, distribution, and manufacturing uses. Several industrial operations remain near the downtown, between the railroad and Redwood Boulevard.

Figure 3.1-1 Existing Land Use



Between the US 101/San Marin Drive—Atherton Avenue Interchange and the US 101/San Antonio Road intersection, land uses are primarily agricultural and open space. Valley Memorial Park and the Marin County Airport/Gnoss Field are located east of the highway; Rancho Olompali SHP and the Institute of Noetic Sciences are located to the west of the highway.

Land in the vicinity of San Antonio Road, at the border of Marin and Sonoma Counties, is currently scarcely populated. There are a few houses on relatively large parcels of land and a few small business establishments.

West of the US 101/Petaluma Boulevard Interchange, land uses include residential and commercial. The Petaluma Golf and Country Club is located west of the highway and south of Petaluma Boulevard.

Between SR 116 and the northern project boundaries at Old Redwood Highway, land uses are residential, commercial, and open space west of US 101. Cypress Hill Cemetery is located west of the highway near Petaluma Boulevard. East of US 101, land uses are residential, commercial, industrial, and open space. Petaluma Adobe State Historic Park, Adobe Creek Golf Course, Petaluma Municipal Airport, Rooster Run Golf Club, Petaluma Valley Hospital, and the Santa Rosa Junior College Petaluma Campus are located in this area.

Future Land Use

Based on the Association of Bay Area Government’s (ABAG) Projections 2005, Marin County is expected to gain 15,500 households and 36,400 residents between 2000 and 2030. This is one of the slowest population growth rates in the Bay Area region. One factor limiting Marin’s population growth is the County’s aging population; another is its low average household size.

Sonoma County’s population increased considerably between 1990 and 2000. By 2000, the County had reached a population of over 458,000. However, Projections 2005 forecasts that the rate of population growth will slow considerably over the next 30 years. Between 2000 and 2030, Sonoma County is expected to add over 41,400 households and almost 100,000 residents. However, in 2030, Sonoma County will be home to a smaller share of the region’s population than it was in 2000. Nearly half of the households that will be added from 2000 to 2030 will be in Santa Rosa, north of the MSN Project area.

Between 2000 and 2030, the City of Novato is projected to have the highest residential growth in Marin County, adding over 5,500 households and 13,800 residents. The City of Novato General Plan, revised March 2003, projected 27,000 housing units at buildout, which was expected to occur by 2015. Population at buildout was estimated to be 66,400.

The City of Petaluma is projected to have the second highest growth rate in Sonoma County, adding 4,178 households during this period. The City of Petaluma General Plan: 1987-2005, revised 1990, projected 16,831 dwelling units in 1990. Nearly 80 percent of dwelling units were single-family units (including mobile homes), with approximately 20 percent in multi-family developments. According to the general plan, buildout of commercial and office, industrial, and public space (schools, parks and agricultural land) sites within the City of Petaluma would result in approximately 600,000 square meters (m^2) [6.5 million square feet (ft^2)] of commercial and office uses, 2.2 million m^2 (23.7 million ft^2) of industrial uses and 1.9 million m^2 (20.6 million m^2) of public uses.

Table 3.1-1 lists major approved and proposed projects in the MSN study area. The locations of these projects are shown in Figure 3.1-2.

3.1.2.3 Impacts

Land Use Compatibility

Fixed HOV Lane Alternative. Impacts under this Preferred Alternative will require some commercial and agricultural land to be converted to transportation use (Table 3.1.2), the Fixed HOV Lane Alternative would not alter land use patterns. Farmland impacts are more fully discussed in Section 3.1.5.

The land use pattern in Segments A and C is predominantly urban and reflects a mix of residential and commercial uses primarily. In these segments, the MSN Project proposes the addition of an HOV lane in each direction within the existing US 101 median. There would be some widening outside the existing right-of-way in Petaluma (Segment C); however, these changes to US 101 would not interfere with existing land uses nor impede local planning policies concerning future land development since there is relatively little land acquisition or displacement associated with the Fixed HOV Lane Alternative (see further details in Section 3.1.6, Community Character and Cohesion).

Table 3.1-1 Major Approved and Active Projects in the Study Area

No.	Project Name	Address	Approved ha/ac	Approved Use	Project Status
City of Novato (November 2008)					
1	Binford Road Storage Facility	8190 Binford Road	2.29 / 5.67	Commercial	Under Review
2	Costco Expansion	300 Vintage Way	0.33 / 0.80	Commercial	Under Construction
3	Creekside Office	1744-1748 Novato Boulevard	0.12 / 0.28	Commercial	Completed Construction
4	Marion Heights	1750 Marion Avenue	3.02 / 7.47	Residential	Completed Construction
5	New Beginnings Next Key	1399 North Hamilton Parkway	0.02 / 0.05	Mixed Use	Under Construction
6	Oleander Lane Design Review	1 Oleander Lane	5.52 / 13.65	Residential	Approved
7	Olive Court	469 Olive Avenue	1.77 / 4.38	Residential	Under Construction
8	San Pablo Subdivision	San Pablo Avenue/ Hangar Avenue	1.27 / 3.13	Residential	Completed Construction
9	Somerston Park (Marion Heights)	Northside of Marion Avenue between Anna Court and Bryan Drive	4.29 / 10.60	Residential	Under Construction
10	Oak Ridge Estates	End of Shevelin Road	13.84 / 34.19	Residential	Updating EIR; Waiting on Approval
11	Whole Foods/Mixed Use	790 Delong Avenue	0.50 / 1.23	Mixed Use	Under Construction
12	Woodview Subdivision	San Marin Drive/Dorothy Way	7.57 / 18.70	Residential	Under Construction
County of Sonoma (April 2009)					
13	Dutra Asphalt & Recycling Facility	3355 Petaluma Blvd. South	15.38 / 38	Industrial	Out for Public Comment
14	Royal Petroleum	2645 & 2525 Petaluma Blvd. South	0.93 / 2.3	Commercial	Approved; In design
15	Shamrock	210 & 222 Landing Way	2.43 / 6	Industrial	Completed Construction
16	Novato Disposal	2543 Petaluma Blvd. South	2.18 / 5.39	Industrial	Approved
City of Petaluma (December 2005 & November 2008)					
17	Intersection widening and signalization	Adobe Road and Corona Road Intersection	N/A	Traffic Improvement	Approved
18	Boulevard Apartments	945 Petaluma Boulevard North	N/A	Residential	Completed Construction
19	Deer Creek Plaza	NW side of N. McDowell/ Ranier Ave. Intersection	14.57 / 36	Mixed Use	Process of being revised to new General Plan of Mixed Use
20	Lafferty Ranch Park	3.5 miles from Petaluma	109.27 / 270	Recreation	On Hold
21	Magnolia Place	Magnolia Avenue, Near Cemetery	9.87 / 24.4	Residential	Completed Construction
22	Marina Office Building	785 Baywood Drive	0.30 / 0.73	Office	Approved
23	McDowell/E. Washington	McDowell and E. Washington Intersection	N/A	Traffic Improvement	Completed
24	Park Square	Casa Grande Road at Lakeville Street	0.21 / 0.52	Residential/ Office	Retail portion under construction. Residential portion completed.
25	Petaluma Theater District	First and Second Streets at C and D Streets	0.48 / 1.19	Commercial/ Residential	Approved
26	Recycled Water Pipeline Phase I	Browns Lane/Ely Road/Casa Grande Road	N/A	Utility	EIR in process
27	Redwood Technology Center	Old Redwood Highway and W. McDowell Blvd	5.83 / 14.4	Office	Under Construction

Table 3.1-1 Major Approved and Active Projects in the Study Area

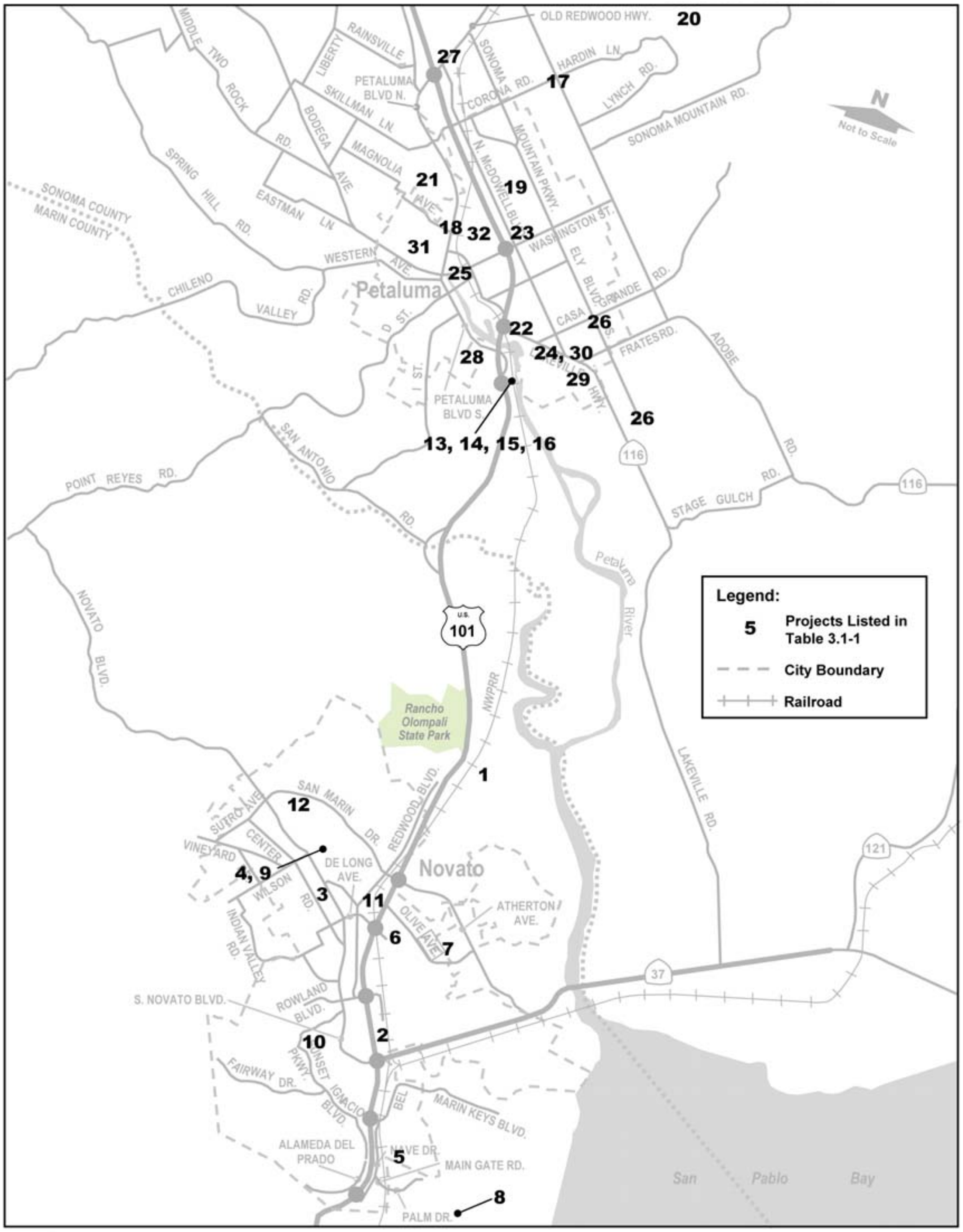
No.	Project Name	Address	Approved ha/ac	Approved Use	Project Status
28	Riverview Subdivision	Mission Drive near McNear Avenue	7.28 / 18.00	Residential	Under Construction
29	Sola Business Park	1490 Cader Lane	3.29 / 8.14	Office	Completed Construction
30	Technology Lane Commercial Center	Technology Lane	0.37 / 0.92	Office	Completed Construction
31	Sweed School	331 Keller Street		Residential	Completed Construction
32	East Washington Place	East Washington and Ellis Streets	13.35 / 33	Office/Mixed Use	EIR in preparation

Sources:

Marin County Community Development Agency, *Propdev 40 Semi-Annual Proposed Development Survey*, October 2005. City of Novato Planning Department, November 2005 & November 2008.

City of Petaluma Community Development Department, Planning Division, December 2005 & November 2008. County of Sonoma, April 2009

Figure 3.1-2 Major Approved and Proposed Projects in the MSN Study Area



NORTH

Note: Not to scale.

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In Segment B, the Fixed HOV Lane Alternative would convert the existing expressway to a freeway. The requisite roadway widening to accommodate this conversion would affect farmlands, open space, undeveloped lands, and thus, would alter the land use pattern in this reach. The predominantly rural land uses, however, would continue to define Segment B in accordance with the land use policies for Marin and Sonoma Counties in the unincorporated areas. The most notable change in Segment B would be the increased views of roadway infrastructure, which is discussed in Section 3.1.11, Visual/Aesthetics.

The future land use trends, as forecast by ABAG and defined by Marin and Sonoma Counties, suggest additional growth in Sonoma County, particularly in Petaluma. The Fixed HOV Lane Alternative would not impede that land use trend nor cause a shift from the land use pattern planned for by the local jurisdictions.

Reversible HOV Lane Alternative. Like the Fixed HOV Lane Alternative, the Reversible HOV Lane Alternative would convert some commercial and agricultural land to transportation use. The Reversible HOV Lane Alternative would result in land use impacts identical to those described for the Fixed HOV Lane Alternative. Specifically, the Reversible HOV Lane Alternative would not alter existing or future land use patterns.

Access Options. Land use impacts by Access Option would be similar, although each Access Option would vary in the amount of farmland, open space, or undeveloped land affected. Predominantly rural land uses, however, would continue to define Segment B regardless of which Access Option is implemented, and therefore the Access Options would not alter land use patterns in that they would not impede or interfere with the routine operations and activities conducted by the existing uses. Rather than interrupt these activities, the Access Options would ensure that local and major traffic movements continue to be served, that access to existing uses is maintained, that occasional overcrossings are provided to foster mobility, and that a continuous bicycle/pedestrian pathway is provided.

No Build Alternative. The No Build Alternative would have no effect on existing land uses as it would not require any land acquisition or conversion of uses to transportation.

Consistency with Adopted Plans

Fixed HOV Lane Alternative. With respect to applicable plans and policies, the Fixed HOV Lane Alternative would be consistent with:

- The transportation objectives of the general plans of Sonoma County, Petaluma, Marin County, and Novato because it enhances the main intercity, regional travel corridor, and thus, better allows local arterials to serve intracity travel;
- The aesthetic objectives of the general plans of Sonoma County and Marin County, because the realignment and widening of the mainline freeway sought to minimize footprint impacts to open spaces resources, although the visual landscape in Segment B would be substantially altered by the conversion of the expressway to a freeway, as discussed in detail in Section 3.1.11;
- The Calthorpe Study and the Marin County Congestion Management Plan because it is a major improvement, involving interchanges, ramps, and HOV lanes, that is anticipated to ease congestion on US 101. Although the Calthorpe Study did not include upgrading Segment B to freeway status as part of the Preferred Scenario, it did not discount this alternative from being viable. The Study did note that, should state or federal funding become available to upgrade the segment to a freeway, the two counties "may wish to consider its implementation." Related improvements – new interchanges, new or revised on- and off-ramps, and modified shoulders – were considered essential to a future upgrade scenario;
- State transportation plans (i.e., the Route Concept Report and Transportation System Development Plan) because it offers congestion relief for US 101 and would help implement these plans;
- The Regional Transportation Plan (RTP) and the Clean Air Plan because it promotes efficient use of the existing freeway infrastructure, it enhances safety, it promotes HOV lanes that reduce regional air emissions, and it improves transit service.

Reversible HOV Lane Alternative. Even though the Reversible HOV Lane Alternative would provide an HOV lane in one direction, depending on the time of day, it would still offer congestion relief along the US 101 and help implement plans and programs that have called for improvements to this stretch of the corridor. As a result, this alternative would also be consistent with the applicable plans and policies, as described above for the Fixed HOV Lane Alternative.

Access Options. Whereas the Build Alternatives address interregional and intraregional travel and thus are important to countywide, regional, and state plans, the Access Options concern much more localized travel. Accordingly, the most applicable plans are the Marin Countywide Plan and the Sonoma County General Plan. Applicable policies from these plans call for the protection of the rural character, scenic beauty, open spaces, and other natural resources. Each Access Option would vary in its impacts to these resources and, thus, their consistency with applicable policies. During the formulation of the Access Options, care was taken to minimize footprint impacts to natural resources to the extent feasible. The retention of the overall rural character of the area, as discussed above, suggests that each of the Access Options would generally be consistent with relevant county policies. For further details on the Access Options' effects on farmlands, visual resources, trees, and wetlands, please refer to the assessments in Sections 3.1.5, 3.1.11, 3.3.2, and 3.3.3, respectively.

No Build Alternative. In the future, the increasing congestion on US 101 that would occur without improvements could discourage future development/ expansion proposals, restrict local and regional mobility, and limit the counties' ability to foster city-centered development because of inadequate US 101 capacity and accessibility. Thus, the No Build Alternative would not support the adopted plans that call for congestion relief on US 101. In addition, the No Build Alternative would not satisfy Transportation Control Measure 8 of the Clean Air Plan, to construct carpool/express bus lanes on freeways.

Land Use Conversions

Fixed HOV Lane Alternative. The greatest amount of conversions would occur in Segment B. Land use changes in relation to property acquisitions would vary depending on the Access Option, as described below. Depending on the Access Option identified, the Fixed HOV Lane Alternative would convert between 145.77 ha (360.25 ac) and 170.59 ha (421.58 ac) of land to transportation use.

In Section A, 0.25 ha (0.63 ac) would be converted from commercial/office use. In Segment C, 1.94 ha (4.80 ac) would be converted from residential, commercial/office, agricultural, and vacant/other uses.

Commercial land conversions would take place along driveway areas, not commercial floor space or storage space. In these cases, access to commercial establishments would be restored. Agricultural land conversions are discussed in Section 3.1.5.

Reversible HOV Lane Alternative. Because the Reversible HOV Lane Alternative would have the same footprint and roadway improvements as the Fixed HOV Lane Alternative, the land conversion impacts described for the Fixed HOV Lane Alternative also apply to the Reversible HOV Lane Alternative. Thus, this Build Alternative would also convert between 145.77 ha (360.25 ac) and 170.59 ha (421.58 ac) of land to transportation use, depending on the Access Option identified.

Access Options. Depending on the Access Option identified, the amount of land converted to transportation use would vary, as shown in Table 3.1-2. Access Option 14d would require the most land conversion (168.40 ha [416.15 ac]) of the four options; while Access Option 12b would convert the least (143.58 ha [354.82 ac]). For all Access Options, the largest land use type impacted would be residential use; the smallest impact would be commercial/office uses.

Table 3.1-2 Land Use Converted to Transportation Under the Build Alternative by Segment and Access Option

Land Use Converted	Segment A	Access Option 4b	Access Option 12b	Access Option 14b	Access Option 14d	Segment C
Residential to Transportation	0.00 ha/ 0.00 ac	79.45 ha/ 196.31 ac	70.76 ha/ 174.86 ac	80.81 ha/ 199.69 ac	83.70 ha/ 206.84 ac	0.12 ha/ 0.28 ac
Commercial/ Office to Transportation	0.25 ha/ 0.63 ac	3.41 ha/ 8.43 ac	3.41 ha/ 8.43 ac	3.41 ha/ 8.43 ac	3.41 ha/ 8.43 ac	1.46 ha/ 3.64 ac
Agricultural to Transportation	0.00 ha/ 0.00 ac	65.67 ha/ 162.27 ac	63.22 ha/ 156.23 ac	63.61 ha/ 157.17 ac	73.52 ha/ 181.67 ac	0.17 ha/ 0.41 ac
Vacant/ Other to Transportation	0.00 ha/ 0.00 ac	6.19 ha/ 15.30 ac	6.19 ha/ 15.30 ac	6.19 ha/ 15.30 ac	7.77 ha/ 19.21 ac	0.19 ha/ 0.47 ac
Total Land Converted to Transportation	0.25 ha/ 0.63 ac	154.72 ha/ 382.31ac	143.58 ha/ 354.82 ac	154.02 ha/ 380.59 ac	168.40 ha/ 416.15 ac	1.94 ha/ 4.80 ac

ha = hectares
ac = acres

As reported in the discussion of Farmlands (Section 3.1.5), proposed right-of-way acquisitions would not cut off property owners from access to their lands. However, upgrading Segment B to an access-controlled freeway would sever the direct access that many property owners currently have to US 101 via private driveways. In these cases, property owners would access US 101 by way of access roads or interchanges proposed under the Access Options. Compensation for property owners who currently have direct access will be reached with individual property owners based upon impacts to their property under Access Option 12b, as this is part of the Preferred Alternative.

No Build Alternative. The No Build Alternative proposes routine maintenance and upkeep of the existing US 101 facility. Since no new improvements or expansion of the right-of-way is included as part of this alternative, the No Build Alternative would not result in land conversion or relocation impacts.

3.1.2.4 Avoidance, Minimization, and Mitigation Measures

The MSN Project is compatible with the existing land use pattern and supports future land use plans and policies. Therefore, no measures to avoid, minimize, or mitigate impacts are warranted. However, during project development, Caltrans will continue to look at ways of reducing the project footprint in order to minimize the conversion of additional farmland.

3.1.3 Parks and Recreation

3.1.3.1 Regulatory Setting

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at U.S.C. 303, declares that it 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 recreational lands, wildlife and waterfowl refuges, and historic sites, all of which are integral components of community character.

The Secretary may approve a transportation program or project (other than any project for a park road or parkway under section 204 of title 23) requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site 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:

1. There is no prudent and feasible alternative to using that land; and

2. 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.

Special consideration is given to the temporary occupancy of 4(f) land. If the following five conditions can be satisfied, Section 4(f) will not apply:

1. Duration of occupancy must be temporary, i.e., less than the time needed of construction of the project, and there should be no change in ownership of the land;

2. Scope of work must be minor, i.e., both the nature and magnitude of the changes to the 4(f) resource must be minimal;

3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the activities or purposes of the resource, on either a temporary or permanent basis;

4. The land being used must be fully restored, i.e., the resource must be returned to a condition which is at least as good as that which existed prior to the project; and

5. There must be documented agreement of the appropriate federal, state or local officials having jurisdiction of the resource regarding the above conditions.

3.1.3.2 Affected Environment

Olompali SHP and 55 other park and recreational facilities that are located in the project study area are listed in Table 3.1-3 and shown in Figure 3.1-3. These facilities are operated by the park and recreational departments of the cities of Novato and Petaluma, the Marin County Open Space District, and the State of California. The golf courses in the study area are operated privately. Numbers on the table are keyed to locations shown in the figure.

Managed by the California Department of Parks and Recreation (DPR), the 700-acre Olompali SHP has multiple uses including recreation, education, and preservation uses. Olompali SHP is considered a 4(f) resource under the Department of Transportation Act of 1966 (49 U.S.C. 303). The park is located in Segment B of the project corridor and is only directly accessible from the southbound side of the expressway. Caltrans' existing right-of-way extends up to the park entrance.

Currently there is only motorized access from southbound US 101. From the northbound direction, motorists can access southbound lanes at the open median at San Antonio Road approximately 2.5 miles north of Olompali SHP, or at the South Petaluma Boulevard Undercrossing, approximately 7 miles north of the Park. As stated in Section 1.2, nonstandard sight distances and congestion hamper crossing the open median at San Antonio Road. Traveling to South Petaluma Boulevard Undercrossing poses a similar inconvenience to park visitors as it does to residents who live within the expressway segment in that they have to travel long distances to double back to access points on the opposite side of US 101. Safe bicycle crossings are also not available due to this limited access between the east and west sides of US 101.

The southbound on/off ramps to the Park are also shorter than standard, which require quicker deceleration and acceleration than standard ramps would allow. Bicycle access to the Park is available from San Antonio Road.

On the east side of US 101 across from Olompali SHP is a direct access road leading to the Mira Monte Marina, a local docking point to the Petaluma River. The Marina does not own the access road. Therefore, unlike Olompali, the project boundaries are not adjacent to the Marina. Consequently, Mira Monte Marina would not be used for the purposes of Section 4(f). Likewise, the other 54 public parks and recreational facilities listed in Table 3.1-3 and shown in Figure 3.1-3 are outside the MSN Project boundaries and, therefore, would not be considered for purposes of 4(f).

3.1.3.3 Impacts

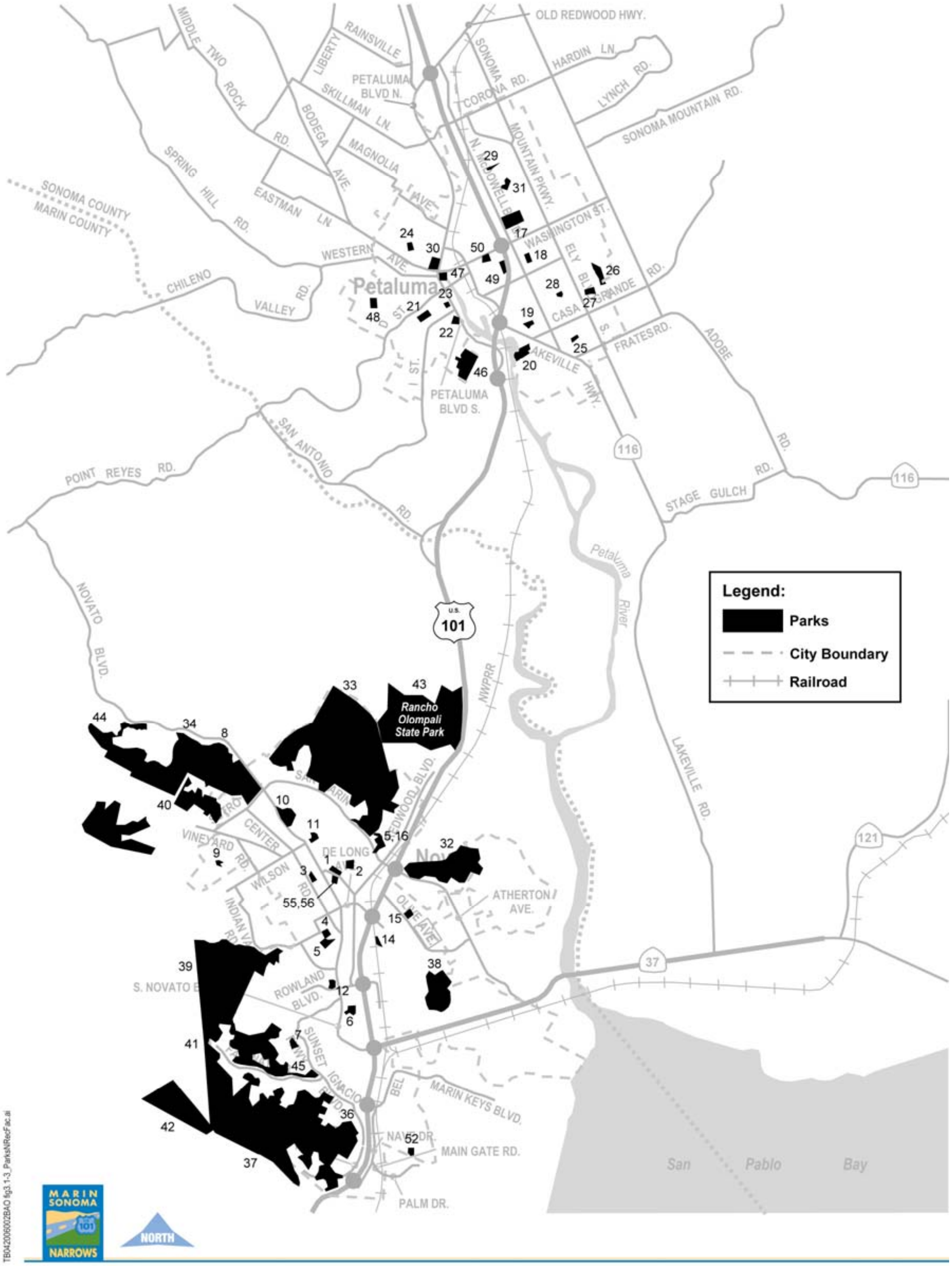
Fixed HOV Lane Alternative. Because Olompali SHP is a Section 4(f) resource under the Department of Transportation Act of 1966 (49 U.S.C. 33), Caltrans and FHWA have taken measures to avoid permanent impacts to the park. With this in mind, Caltrans would shift the US 101 mainline eastward up to 90 ft away from the park. This shift away from the park would allow the existing southbound lanes to be repaved and used as a Class 1 bicycle path from the Redwood Landfill Road Overcrossing to the park. In cooperation with the DPR, a new park entrance would be constructed to conform with the MSN Project. As further explained under Access Options, this alternative would meet the temporary occupancy conditions for 4(f) lands presented in Section 3.1.3.1.

The Fixed HOV Lane Alternative would not impact any other park facilities within the project area.

Table 3.1-3 Existing Park and Recreational Facilities in the MSN Study Area

No.	Name	No.	Name
Parks – City of Novato			
1	Marion Recreation Area	9	Marin Highlands Park
2	Lee Gerner Park	10	Miwok Park
3	Lu Sutton School Park	11	Pioneer Park
4	Hill Recreation Area	12	Scottsdale Pond
5	Arroyo Avichi Park	13	South Novato Boulevard Park
6	Lynwood School Park	14	Slade Park
7	Joseph Hoog Park	15	Olive School Park
8	Lions Park	16	Stafford Grove Park
Parks – City of Petaluma			
17	Lucchesi Park	25	Del Oro Park
18	McDowell Park	26	Wiseman Airport Park
19	Miwok Park	27	Arroyo Park
20	Shollenberger River Park	28	La Tercera Park
21	McNear Park	29	Sunrise Park
22	Wickersham Park	30	Putnam Plaza
23	Walnut Park	31	Bond Park
24	Oak Hill Park		
Preserves			
32	Rush Creek Open Space	38	Deer Island Open Space
33	Mount Burdell Open Space	39	Indian Valley Open Space
34	Little Mountain Open Space	40	Verissimo Hills Open Space
35	Indian Tree Open Space	41	Ignacio Valley Open Space
36	Loma Verde Open Space	42	Lucas Valley
37	Pacheco Valle		
State Parks			
43	Rancho Olompali SHP		
Golf Courses			
44	Indian Valley Golf Club	45	Marin Country Club
46	Petaluma Golf and Country Club		
Recreation Centers – City of Petaluma			
47	Cavanagh Landing	50	Swim Center and Skate Park
48	Cavanagh Recreation Center	51	Petaluma Community Center
49	Kenilworth Athletic Fields		
Recreation Centers – City of Novato			
52	Hamilton Community Center	55	Novato Gymnastics Center
53	Hamilton Pool/Camban	56	Novato Teen Center
54	Hill Community Room and Gym		
Source: Parsons 2005			

468 Figure 3.1-3 Parks and Recreational Facilities in the MSN Study Area



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Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would propose the same footprint and freeway improvements and modifications as the Fixed HOV Lane Alternative. The one difference between the two Build Alternatives is the operation of the HOV lane in the median, and this feature would not alter the description of impacts to parks and recreational facilities under the Fixed HOV Lane Alternative. As further explained under Access Options, the Reversible HOV Lane Alternative would meet the temporary occupancy conditions for 4(f) lands presented in Section 3.1.3.1

Access Options. Any of the Access Options would work with either of the Build Alternatives. Furthermore, the improvements to the Park entrance and right-of-way transfers that include the Class 1 bicycle/pedestrian facility would be the same under each Access Option due to the eastward alignment of the US 101 mainline, the closure of the existing southbound exit, and new motorized access along Redwood Boulevard. A new entryway will require approximately 0.32 ha (0.78 ac) of temporary Park right-of-way during construction. The scope of work would also involve relocating the park sign to coincide with the new park entrance. The existing US 101 southbound lanes would be repaved and converted to a Class 1 bike/pedestrian facility. In addition, the State DPR has requested that Caltrans relinquish a portion of Redwood Blvd. leading up to Olompali's entrance. Consequently, Caltrans and FHWA would agree to transfer approximately 6.11 ha (15.1 ac) to the DPR including the Class 1 bicycle/ pedestrian path along the southerly approach from the Redwood landfill overcrossing and the northerly approach from Redwood Boulevard (see letter to DPR and meeting notes dated 6/30/08, Appendix C).

The MSN Project is eligible for special consideration for temporary occupancy of 4(f) land. Under the Build Alternatives, Caltrans and the FHWA have satisfied the five conditions for temporary occupancy of 4(f) land stated in Section 3.1.3.1. This is demonstrated in the following discussion:

The duration of project construction involving Olompali SHP would be approximately three months, compared to the construction of the MSN Project, which would be phased over several years. Therefore, the duration of occupancy would be temporary, and certainly shorter than the construction of the entire project. While Caltrans would transfer right-of-way to the Department of Parks and Recreation, there would be no change in ownership of parkland to Caltrans or the FHWA.

The scope of work involving the parkland would be minor and beneficial based upon construction of a new entrance connecting to a new Class 1 bicycle/pedestrian lane from the Redwood Landfill Overcrossing north of the Park. A Class 2 bicycle path would also be accessible along Redwood Boulevard. Motorized access from Redwood Boulevard via Atherton Interchange, approximately 2 miles south of the Park, would be an improvement over the existing nonstandard southbound ramps. The Atherton Interchange would serve both northbound and southbound motorists.

Public access to the Park would be maintained during construction, and signage and routing would be developed in conjunction with Park officials.

There would be no permanent adverse impacts to Olompali SHP resources or its amenities, such as its historic resources, recreational or bicycle trails, historic gardens, or parking facilities.

The Parkland involved in the construction of the MSN Project would be restored to comparable or better condition than prior to construction due to the new entrance and connections, improving access for Park visitors, as described above. The transfer of right of way from Caltrans to DPR would allow for improved security and park operations (see letter and meeting notes 6/30/08, Appendix C).

Documented agreement that the above conditions were met was made between the DPR and Caltrans on September 15, 2008 (see letter dated 9/11/08, and signed by DPR 9/15/08, Appendix C).

In terms of other recreational facilities adjacent to the MSN Project, on the east side of US 101, across from Olompali SHP, there is a local road providing access to the Mira Monte Marina on San Pablo Bay. The eastward realignment of US 101 in this area would eliminate the current at-grade connection to Mira Monte Marina. Under the Preferred Alternative, Access Option 12b will provide convenient replacement access, with both northbound and southbound traffic able to use the Redwood Landfill Road Interchange, north of the marina, to reach a new frontage road serving the marina along the eastside of US 101. Replacement access would also be provided for Access Options 14b and 14d, but travelers would need to use the San Antonio Overcrossing further north to reach the new frontage road. This connection would not be as convenient as Access Option 12b. Access to the marina under Access Option 4b would be the same as 12b.

No Build Alternative. Since the No Build Alternative would involve only routine maintenance and upkeep of US 101, there would be only limited impacts to any park or recreational facilities during the short-term, temporary construction period.

3.1.3.4 Avoidance, Minimization, Mitigation Measures

During the early stages of the project, Caltrans and FHWA developed plans for a new entryway to be built within the existing park right-of-way, which would have resulted in a minor incorporation of parkland. However, to avoid permanent impacts to the park, the entryway was shifted southward along Redwood Blvd. Thus, use of 4(f) land has been avoided.

Public access to the Park would be maintained during construction, and Caltrans shall plan construction activities and staging with state park officials to ensure public access and park operations are not disrupted. Signage and routing would also be developed in conjunction with Park officials. These measures along with Highway Advisories, Public Information, ITS, and other traffic management measure will reduce impacts to park attendance during construction.

3.1.4 Growth

Introduction

This growth assessment examines the relationship of the MSN Project to economic and population growth and the construction of additional housing in northern Marin County and southern Sonoma County. It focuses on the potential for the project to facilitate or accelerate growth beyond planned developments, or induce growth to shift from elsewhere in the region. In this analysis, the project's influence on area growth due to travel time savings is considered within the context of other relevant factors such as relative cost and availability of housing, availability of amenities, local and regional growth policies, and development constraints. The information presented in this section is taken from the technical report, Growth Inducement Analysis for Marin-Sonoma Narrows from Ignacio Boulevard, Novato to Old Redwood Highway, Petaluma (Parsons 2005) and Caltrans Environmental Handbook, Volume 4, Community Impact Assessment (June 1997).

Caltrans conducted a growth study for the MSN Project to address two main issues. The first issue is whether the improved or enhanced accessibility provided by either Build Alternative would increase residential growth beyond what is planned in northern Marin County or southern Sonoma County, or would merely support planned growth. The second issue is the sensitivity of environmental resources to unplanned growth, particularly agricultural lands. The study addressed these issues by analyzing population, employment, housing, work trips, and local growth plans in northern Marin and southern Sonoma cities and counties. Then, travel time savings information from the Traffic Operations Study (Caltrans, February 2005) was used to analyze how travel times would affect the aforementioned trends. In addition, the Caltrans analysis addressed whether the project would reduce or remove barriers to growth by looking at current zoning designations in affected cities and counties.

3.1.4.1 Regulatory Setting

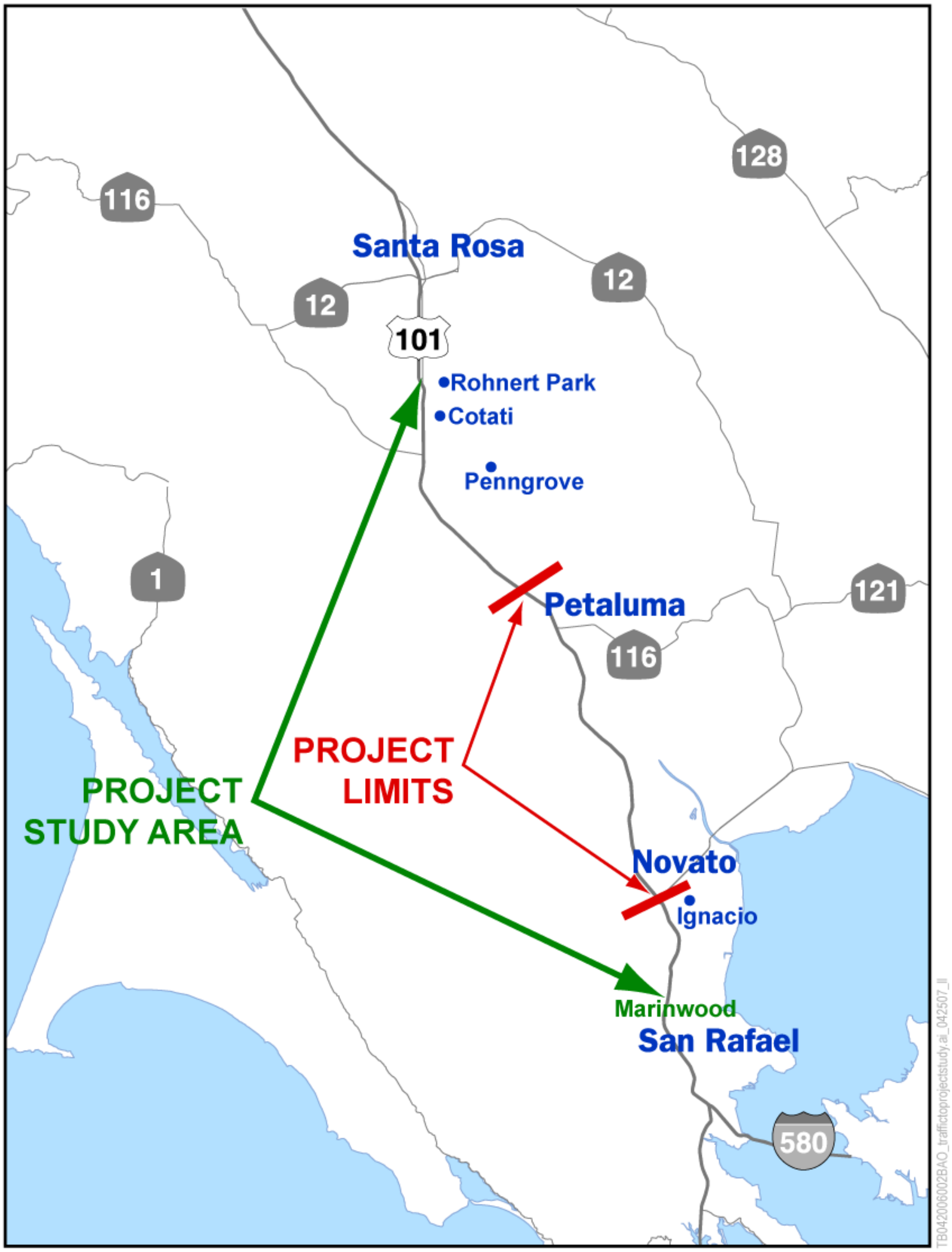
The Council on Environmental Quality (CEQ) regulations, which implements the National Environmental Policy Act (NEPA) of 1969, requires evaluation of the potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine indirect consequences, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations, 40 CFR 1508.8, refer to these consequences as indirect impacts. Indirect impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act (CEQA) also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…"

3.1.4.2 Affected Environment

Three northern Marin County and three Sonoma County areas were selected for a regional analysis of current population trends: Miller Creek, Hamilton Field, San Antonio (where Marin borders Sonoma County), Petaluma, Penngrove, and Rohnert Park. Land uses are discussed in Section 3.1.1 and shown in Figure 3.1-1. The Growth Study Area is shown in Figure 3.1-4. While the population of Sonoma County is expected to increase 28 percent between 2000 and 2030, Rohnert Park, Petaluma, and Penngrove would represent 18 percent of Sonoma

Figure 3.1-4 Relationship of Growth Study Area to Project Area



County's expected growth. The selected Marin County communities will comprise 6 percent of the County's population but 38 percent of the County's growth (144 percent) between 2000 and 2030.

According to Census 2000 Journey to Work tables, the majority of commute trips for both Marin County and Sonoma County are within their respective counties. Commuters from Marin County who work outside the County work primarily in San Francisco/Peninsula (28 percent) and the East Bay (6 percent). In addition to the 8 percent of Sonoma County commuters who work in Marin County, about 8 percent of the Sonoma County commuters pass through Marin County on their way to other counties, resulting in about 16 percent of Sonoma County commuters passing through at least part of the Project area. Thus, the Sonoma County residents commuting to Marin County or farther south constitute the predominant current use of US 101 through the MSN Project area for commuting.

Commuter traffic contributes to vehicle volumes exceeding capacity, resulting in severe congestion and increased travel times along US 101 through the project area, mostly during peak hours. The heavy traffic and delays on US 101 also lead to traffic spill-over onto local streets, which affects the quality of life in communities along the highway. These traffic issues would tend to constrain development and growth, particularly for the more remote areas in the northern portion of Marin County.

The existing at-grade intersections and rural, agricultural land uses in Segment B help to maintain barriers to growth. Additionally, there are no traffic-dependent establishments in Segment B, except the Gas `N' Shop on Kastania Road.

3.1.4.3 Impacts

Growth Inducement

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would improve traffic conditions and travel times through the project area and vicinity. The growth-inducing effect of the MSN Project on development in residential growth areas throughout the US 101 corridor was evaluated in the Growth Inducement Analysis technical report. Growth could be affected by reduced travel time (enhanced accessibility) and local and regional growth policies, growth constraints, the relative costs and availability of housing, and amenities available in the selected residential areas.

Based on the traffic and transportation analysis (Section 3.1.10), average travel time savings[1] would vary from less than one minute to about nine minutes for trips between the six residential zones and eight employment zones, with the residential areas towards the north end of the study area having the most travel time savings under the Fixed HOV Lane Alternative. This travel time savings would slightly increase growth pressure in Petaluma.

The Fixed HOV Lane Alternative would eliminate delay in HOV lanes, allowing the HOV lane users to travel at or very near free-flow speeds through the project area. However, the mixed-flow lanes within the project boundaries would not be operating at free-flow speed during peak hours. The mixed-flow lane users would still experience congestion and delay. Therefore, growth would not be induced entirely by the HOV free-flow speeds. Hence, while the Fixed HOV Lane Alternative would support some of the planned growth in the area, it would not fully accommodate planned growth or induce unplanned growth.

While travel time savings from the Fixed HOV Lane Alternative could theoretically stimulate growth modestly, other factors in addition to traffic conditions influence growth. For example, local plans and policies that control local land use and undevelopable lands within their jurisdictions create the context within which the Fixed HOV Lane Alternative is being proposed and, as such, are a greater influence on growth control than travel time saving alone would provide. Each of the six study communities has adopted plans and mechanisms to control the amount and type of growth within their jurisdiction. For example, the City of Petaluma has defined an “urban limit line” to mark the outer edge of where urban development can occur during its planning period. Petaluma also uses a “residential development control system,” to limit growth to a specified number of units per year. In Marin County, more than three-fourths of the County’s land is protected from development. One of the goals of the Marin County General Plan is to concentrate urban growth in its selected city-centered corridors.

Other primary factors, in addition to commute time and growth plans, that affect population growth in outlying residential communities include the cost and availability of housing. Housing prices in Marin and Sonoma Counties are high, compared to many other residential areas in the San Francisco Bay Area. Prices have increased dramatically in both counties and prices can be expected to

[1] Average travel time for both HOV lane and mixed-flow lane users.

continue increasing as more people move to the North Bay. In addition, the housing vacancy rate for the four areas that could be affected by the MSN Project varies between 1.0 and 1.5 percent, which indicates that the demand for housing in these residential areas is much higher than the available housing supply. Low housing vacancy rates and high housing costs tend to act as growth deterrents that would outweigh minor travel time savings.

In conclusion, growth management policies, as well as moderately high housing prices and low vacancy rates, would tend to discourage accelerated residential growth, even in areas where commuters would realize the greatest potential travel time savings. Therefore, the Fixed HOV Lane Alternative would support planned growth, but would not induce unplanned growth in the area. Because the Fixed HOV Lane Alternative would not induce unplanned growth, it would not cause secondary impacts to environmental resources.

Reversible HOV Lane Alternative. Travel time savings under the Reversible HOV Lane Alternative would be the same as that under the Fixed HOV Lanes Alternative for all residential zones except Hamilton Field and Miller Creek. Since the Reversible HOV Lane Alternative would not improve effective capacity in the “reverse” commute direction (northbound in the morning and southbound in the evening), there would be no travel time savings for traffic from these two residential areas. In addition, there would be no travel savings from any of the residential zones to the jobs in central Sonoma County, since these trips would be in the reverse commute direction as well. Based on these travel time savings, the growth inducement analysis showed a slight increase in growth pressure in Petaluma.

However, as described above for the Fixed HOV Lane Alternative, the other factors influencing growth in the project area would prevent the Reversible HOV Lane Alternative from inducing growth. These factors include the growth management policies of the affected communities and the availability and cost of housing. Therefore, the Reversible HOV Lane Alternative would not induce growth and would not cause secondary effects to environmental resources.

Access Options. Addressing at-grade access issues within Segment B the Central Segment, is an important part of the project’s Need and Purpose. All of the Access Options propose the construction of new interchange(s) and access roads. These features are usually considered to be growth inducing. However, the purpose of new interchanges in the MSN Project would be to replace the direct access to US 101 that presently exists within Segment B. This segment is approximately 13.1 km (8.1 mi) long.

In addition, Marin County and Sonoma County land use policies support the preservation of the existing agricultural communities. To coincide with these policies, each of the four Access Options under evaluation would use major portions of the existing local roads. The roads would also be non-continuous, rather than bypasses to the mainline, or attractions to traffic dependent establishments or new residential development. The access roads themselves would then be transferred to county ownership, which are, again, governed by local land use plans and policies.

Based upon these limits to the access roads along with the agricultural and open space land uses supported by the counties' general plans, the proposed Access Options would not be growth inducing.

No Build Alternative. The No Build Alternative would not improve access to or along the US 101 corridor, and therefore the No Build Alternative does not have the potential to attract additional land development or intensification. Accordingly, the No Build Alternative would have no effect on growth.

3.1.4.4 Avoidance, Minimization, and/or Mitigation Measures

Caltrans' Alternatives analysis included criteria for evaluating compatibility with current land use and zoning. From this standpoint, various alternatives were eliminated that had less compatibility than the four access options that were identified for further study under the Build Alternatives. Therefore, various alternatives that had stronger growth inducing potential were eliminated during Caltrans alternatives analysis (Appendix A). For the Build Alternatives, This Access Option requires the least amount of land conversion (Table 3.1-2). Caltrans is proposing non-continuous access roads to serve the existing low-density, rural land uses in Segment B of the project. As stated in Section 3.1.2, the Preferred Alternative will require land use conversions; however, those will not alter the predominantly rural character of Segment B. The local road network in Segment B will be based on Access Option 12b under the Preferred Alternative. Based upon this design and the results of the Growth Study, no additional avoidance, minimization and mitigation measures are recommended.

3.1.5 Farmlands/Agricultural Lands

3.1.5.1 Regulatory Setting

NEPA and the Farmland Protection Policy Act (FPPA, 7 USC 4201-4209; and its regulations, 7 CFR Part 658) require federal agencies, such as FHWA, to coordinate with the Natural Resources Conservation Service (NRCS) if their activities may irreversibly convert farmland (directly or indirectly) to nonagricultural use. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and lands of statewide or local importance.

CEQA requires the review of projects that would convert existing farmlands, as well as Williamson Act contract lands, to non-agricultural uses. The main purposes of the Williamson Act are to preserve agricultural land and to encourage open space preservation and efficient urban growth. The Williamson Act provides incentives to landowners through reduced property tax assessments to deter the early conversion of agricultural and open space lands to other uses.

Local policies contained in the general plans of communities in the MSN Project area further describe the importance of protecting farmlands and agricultural activities.

Marin Countywide Plan. The primary objectives of the Agriculture Element of the Marin Countywide Plan are to preserve agricultural lands and prevent subdivision of lands under agricultural production. The County's agricultural policies recognize the value of continued agriculture for regional food and fiber and also as an industry for the diversified county economy. Most of the County's agricultural lands are in the western portion of the County, although the area north of Novato to the county line, including the MSN Project area, is also in agricultural or rural uses, as shown earlier in Figure 3.1-1.

Sonoma County General Plan. The main agricultural goal for Sonoma County is to promote a healthy and competitive agricultural industry whose products are recognized as being produced in Sonoma County. Agricultural lands are predominantly in unincorporated areas of Sonoma County, including the area from the southern county line to Petaluma, which encompasses the MSN Project area.

City of Novato General Plan. The primary agricultural goal of the City of Novato General Plan is to encourage continued agricultural use by maintaining parcel sizes large enough to sustain agricultural production; preventing conversion of agricultural land to non-agricultural uses; discouraging uses that are incompatible with agricultural activities; implementing programs that assist agricultural operators and owners to maintain and improve agricultural productivity of their land; and assisting local marketing of locally-produced agricultural products. Most of the agricultural land in the Novato area is outside the city limits, although some agricultural activity still takes place inside Novato.

City of Petaluma General Plan, 1987-2005. Petaluma's primary agricultural goal is to preserve and protect agricultural use on lands surrounding the City of Petaluma. Almost all the remaining agricultural land in the City of Petaluma is located in the northwest region of the city adjacent to Sonoma County farmlands.

3.1.5.2 Affected Environment

Along US 101 in the expressway portion of the project corridor between the San Marin Drive/Atherton Avenue Interchange and San Antonio Road, land uses are primarily agricultural and open space. Agricultural land uses are shown in Figure 3.1-1.

While the MSN Project area is agricultural in nature, there is relatively little land in the corridor that is designated prime farmland, unique farmland, or lands of statewide or local importance, according to the NRCS definitions. Much of the project corridor is classified as grazing.

With respect to Williamson Act lands, there are six parcels dispersed on either side of the San Antonio Creek that are under Williamson Act contracts along US 101, as shown in Figures 3.1-5a and b, two in Sonoma County and four in Marin County.

3.1.5.3 Impacts

Fixed HOV Lane Alternative. The amount of farmland affected in Marin County and Sonoma County is summarized in Table 3.1-4. Farmland that would be affected by the Fixed HOV Lane Alternative occurs almost entirely within Segment B of the project boundaries; therefore, the ultimate amount of farmland affected would depend upon the Access Option identified. Small amounts of farmland in Segment C would also be impacted, although none of this land is

FIGURE 3.1-5a
Parcels under Williamson Act occurring
in the MSN Study Area
SEGMENT B: The Central Segment

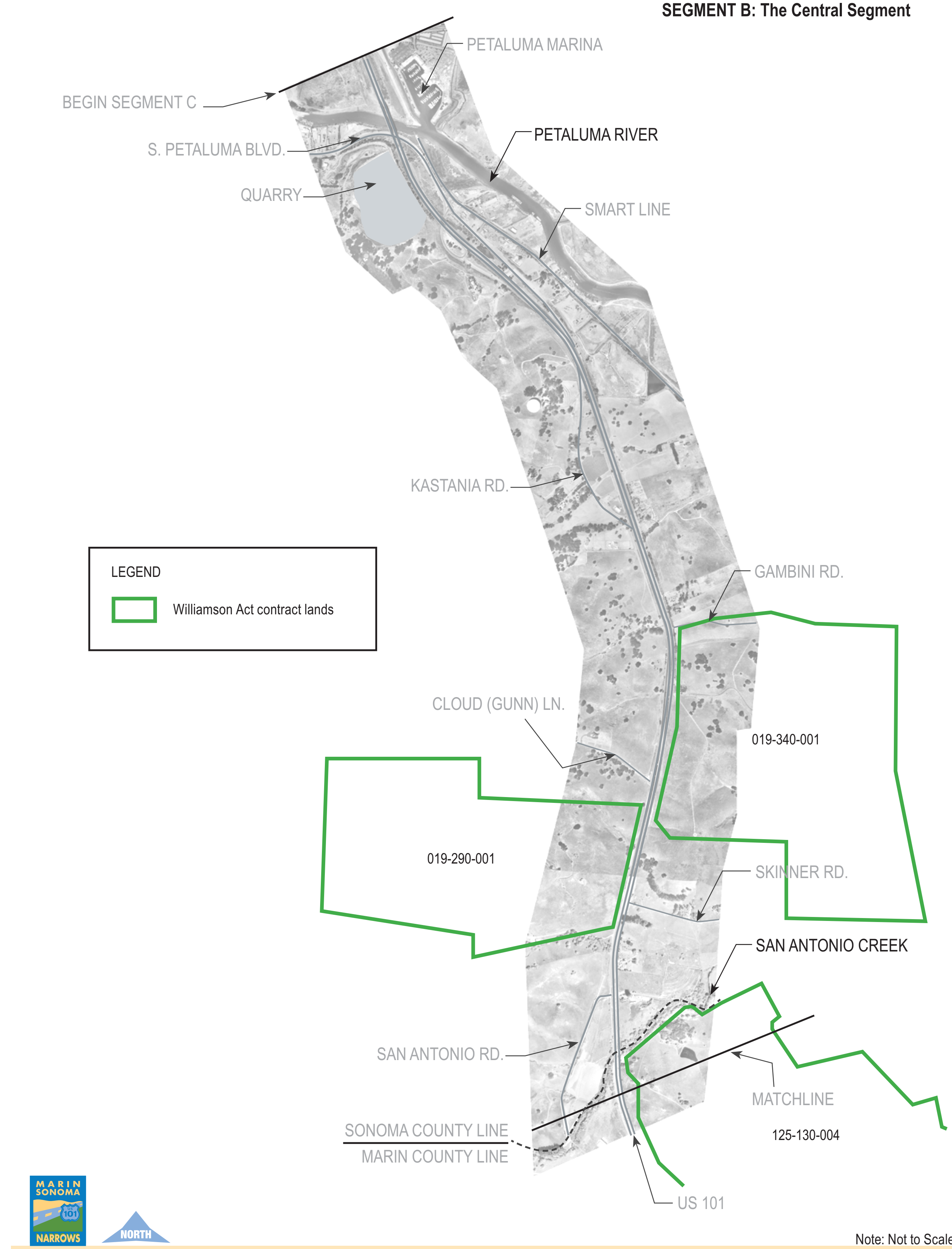
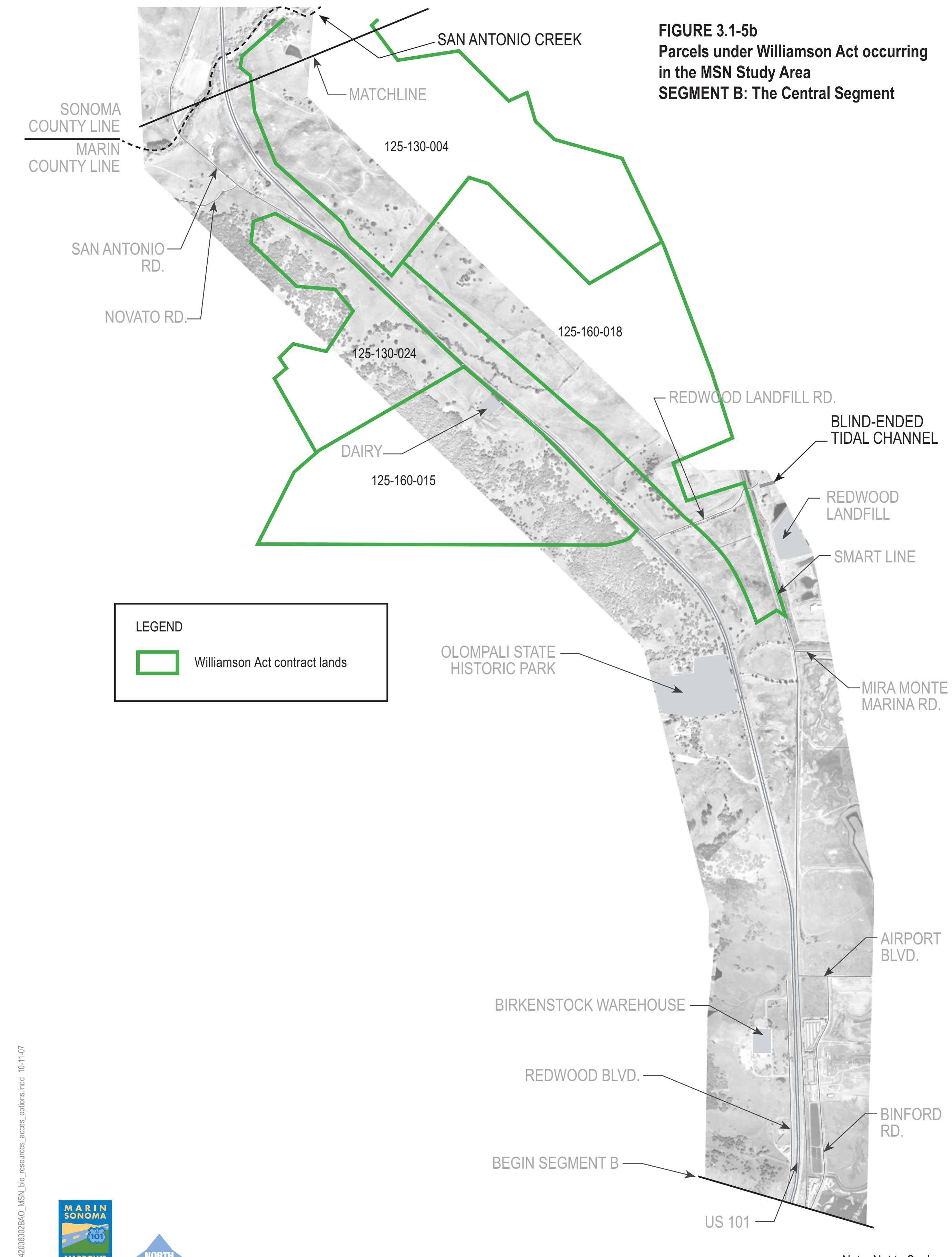


FIGURE 3.1-5b
Parcels under Williamson Act occurring
in the MSN Study Area
SEGMENT B: The Central Segment



considered prime agricultural, of statewide importance, or under Williamson Act contract.

Under the Fixed HOV Lane Alternative, the amount of farmland that would be affected varies by Access Option because of the variations in interchange locations and frontage roads proposed under the different options (Table 3.1-4). These differences are further discussed under Access Options below. In total, the Fixed HOV Lane Alternative would convert between approximately 63.39 ha (156.64 ac) and 73.69 ha (182.09 ac) of farmland in Marin and Sonoma Counties to transportation use.

The proposed right-of-way acquisition associated with the Fixed HOV Lane Alternative would not bisect any parcels or sever existing owners from accessing their properties.

Project-related construction would not interfere with the operations or functions of agricultural land uses.

Reversible HOV Lane Alternative. Since the project footprints for the Build Alternatives are the same, their effects on farmlands would be the same. Thus, the Reversible HOV Lane Alternative would also convert between approximately 63.39 ha (156.64 ac) and 73.69 ha (182.09 ac) of farmland in Marin and Sonoma Counties to transportation use, depending on the Access Option identified.

Access Options. Farmland impacts by Access Option are presented in Table 3.1-4. In terms of total farmland area affected, Access Option 12b would have the least effect across the two counties (63.22 ha, or 156.23 ac); Access Option 14d would have the greatest effect (73.52 ha, or 181.67 ac). By county, farmland in Marin County would be least affected by Access Option 12b and most affected by Access Option 14d. Farmland impacts in Sonoma County would be similar for all the Access Options.

Table 3.1-4 Farmland Impacts by Access Option in Segment B

County	Access Option 4b (ha/ac)	Access Option 12b (ha/ac)	Access Option 14b (ha/ac)	Access Option 14d (ha/ac)
Marin	33.29 (82.27)	30.46 (75.27)	31.33 (77.42)	41.24 (101.91)
Williamson Act Contract Lands	6.40 (15.81)	5.46 (13.50)	10.86 (26.82)	13.50 (33.36)
Sonoma	32.38 (80.00)	32.76 (80.96)	32.27 (79.75)	32.28 (79.77)
Williams Act Contract Lands	2.68 (6.62)	3.07 (7.59)	2.68 (6.62)	2.68 (6.62)
Marin and Sonoma	65.67 (162.27)	63.22 (156.23)	63.61 (157.17)	73.52 (181.67)
Williamson Act Contract Lands	9.08 (22.43)	8.53 (21.09)	13.54 (33.45)	16.18 (39.98)
Prime and Unique*	0.77 (1.9)	0.77 (1.9)	0.61 (1.5)	0.61 (1.5)
Statewide or Locally Important*	0.93 (2.3)	0.93 (2.3)	0.73 (1.8)	0.73 (1.8)

Source: Parsons Corporation, March 2006. County of Marin, Countywide Plan Map Viewer website (http://gisprod1.co.marin.ca.us/CWP/Viewer/bottom/Viewer.asp). Sonoma County Tax Assessor's Office, March 2006.
*Source: Natural Resources Conservation District.

Of total agricultural land converted to transportation use, between 8.53 ha (21.09 ac) and 16.18 ha (39.98 ac) would be converted from Williamson Act use, affecting four parcels in Marin County and two parcels in Sonoma County. In a letter dated April 5, 2007, Caltrans notified the California Department of Conservation (CDC) about the potential conversion of the Williamson Act contract lands in accordance with Government Code Section 51291(b). This coordination will be completed prior to preparation of the final environmental document. Appendix C contains a response letter from CDC dated May 7, 2007.

In accordance with provisions of the Williamson Act regarding retiring enrolled lands for state-approved public improvements, the following findings must be made. The location of the public improvement is not based primarily on a consideration of the lower cost of acquiring land in an agricultural preserve; the location for the project is based upon the need to reduce congestion through the 16-mile project limits. Also, locations for the public improvement are geographically limited. Shifting the mainline alignment westward would not be practical due to hilly/mountainous terrain, and shifting the project to the east would be limited by the Petaluma River and likely increase impacts to farmlands. Therefore, there is no other land within or outside the preserve on which it is reasonably feasible to locate the public improvement.

Caltrans will adhere to the acquisition process, policies and procedures described in the Caltrans Right of Way Manual, including Exhibit 8-EX-l, Article 6, Acquisition Policies, to meet the intent of voiding the Williamson Act (§51295) contracts.

In addition to the Williamson Act land conversions, Table 3.1-4 identifies other important farmlands that would be affected by the Access Options. Access Options 4b and 12b would have identical impacts; Access Options 14b and 14d would affect less important farmlands. As required by Federal Regulations, a form to assess conversion of prime, unique, statewide, or locally important farmlands has been prepared. The rating form indicates that the total site assessment criteria score for the project ranges from 131 to 132, depending upon the Access Option identified (4b=131, 12b=131, 14b=132, 14d=132). According to federal regulations, scores less than 160 points should be given minimal consideration for protection (7 CFR 658.4). A copy of the Farmland Conversion Impact Rating Form along with the Site Assessment Criteria and Point Rating are in Appendix F.

Notably, the proposed farmland conversions would not bisect any parcels or sever existing owners from accessing their properties. Project-related construction would not interfere with the operations or functions of agricultural land uses. However upgrading Segment B to an access-controlled freeway would sever the direct access to US 101 that many property owners currently have via private driveways. In these cases, property owners would reestablish access to US 101 by way of access roads or interchanges proposed under the Access Options. Compensation for property owners who currently have direct access will be determined by Caltrans' Division of Right of Way (see Appendix E for summary of rights and benefits under the Uniform Assistance Programs).

No Build Alternative. Under the No Build Alternative, no right-of-way would be acquired within the study area; therefore, no farmland would be affected.

3.1.5.4 Avoidance, Minimization, and Mitigation Measures

During the alternatives development process, Caltrans minimized right-of-way impacts in Segment B of the project where agricultural land uses predominate. Throughout the design phase, Caltrans will continue reducing right-of-way impacts, where feasible.

Relocation Assistance. Where farmland impacts cannot be avoided and farmlands need to be acquired, Caltrans would comply with the Uniform

Relocation Assistance and Real Property Acquisition Policies Act summarized in Appendix E. Similarly, compensation for loss of direct access to US 101 for property owners who currently have direct-access rights would be determined after identification of a Preferred Alternative and project approval.

3.1.6 Community Character and Cohesion

This section discusses socioeconomics and community facilities within the MSN Project area. Also discussed are relocations under the Build Alternatives. Potential community impacts related to visual quality/aesthetics are discussed in Section 3.1.11.

3.1.6.1 Regulatory Setting

General

NEPA established that the federal government use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings [42 U.S.C. 4331(b)(2)]. FHWA in its implementation of NEPA [23 U.S.C. 109(h)] directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion and the availability of public facilities and services.

Under CEQA, an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. In addition, the State CEQA Guidelines suggest that an important land use consideration is whether a proposed project might physically divide an established community or displace a substantial number of housing/people. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project’s effects.

Relocation Assistance Program

The Department’s Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitable so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. Please see Appendix E for a summary of the RAP.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 U.S.C. 2000d, et seq.). Please see Appendix I for a copy of the Department's Title VI Policy Statement.

3.1.6.2 Affected Environment

Socioeconomics

A socioeconomic profile of the study area communities can be gained by reviewing background land use plans, growth policies, and demographic statistics, which are available in greater detail in Sections 3.1.2, 3.1.4, and 3.1.7, respectively.

Caltrans existing right-of-way in the project area includes the roadway, shoulders, medians, and existing structures, such as bridges, overcrossings, interchanges, and ramps. Generally, there are no demarcations for fencing delineating existing Caltrans right-of-way from adjacent land uses. As shown in Figure 3.1.1, Existing Land Uses, land uses adjacent to US 101 include commercial, agricultural, recreational, and residential.

Major land uses in Segment A that contribute to community character and cohesion include the College of Marin-Indian Valley, Stonetree Golf Club, Vintage Oaks Shopping Center, Novato Community Hospital, Valley Memorial Park, and Marin County Airport/Gnoss Field.

Segment B is defined by a number of large agricultural and institutional land uses that depend largely on the rural, scenic, and natural resources in this stretch. Key businesses and uses in Segment B include Birkenstock®, Buck Institute, Mira Monte Marina, Silveira Dairy, Equine Veterinarian Hospital, and Olompali SHP.

In Segment C, community cohesion is defined by the many residential neighborhoods the US 101 traverses, along with their related commercial and social institutions. Larger community-wide uses that help define the communities in this segment include the Petaluma Golf and Country Club, Adobe Creek Golf

Course, Petaluma Municipal Airport, Rooster Run Golf Club, Petaluma Valley Hospital, and the Santa Rosa Junior College Petaluma Campus.

The three segments are socioeconomically different, with Segment A relating to and similar to the City of Novato; Segment B, to the rural and agricultural community that straddles the county lines; and Segment C, to the City of Petaluma. The approximately 53,700 persons living in the census tracts that comprise the study area exhibit an ethnic composition comparable to the individual communities defining the study area, with about 20 to 25 percent ethnic minorities; the study area has a slightly higher percentage of minorities, attributable to a larger number of Hispanics. Median household income in the study area of about $63,800 is at the median between Marin County and Sonoma County, and very similar to the median household incomes for Novato and Petaluma.

Employment in Marin County is expected to increase more rapidly than population, with a 29 percent increase in jobs anticipated between 2000 and 2030. Employment in the City of Novato is projected to increase by 60 percent during the same period. Sonoma County and the City of Petaluma also are projected to experience rapid employment growth, with a respective 48 and 39 percent increase in jobs anticipated between 2000 and 2030.

These employment increases may indicate an improvement in the jobs/housing balance within Marin and Sonoma Counties as a whole, but projections emphasize continued demand for travel along US 101 with more people in-commuting to jobs within Marin and Sonoma Counties. US 101 is expected to continue being the primary north-south route to local and regional employment and commercial opportunities.

Public and Cultural Facilities

Public services and cultural facilities located in the study area, such as schools, libraries, museums and other community cultural facilities are listed in Table 3.1-5 and shown in Figure 3.1-6. Emergency service providers are also listed, and these are discussed under Section 3.1.8, Utilities/Emergency Services.

Houses of worship and cemeteries, though not discussed here, have the same land use distribution in the study area as that of public and cultural services, in that the availability of these facilities is concentrated within the urban centers of Novato and Petaluma, and absent in the expressway portion of the study area.

Table 3.1-5 Existing Public and Cultural Facilities in the MSN Study Area

No.	City	Name	No.	City	Name
Schools					
Elementary/Middle Schools – Public					
S1	Nov	Hamilton Elementary	S11	Pet	Grant Elementary
S2	Nov	Loma Verde Elementary	S12	Pet	Valley Oaks Alternative Elementary
S3	Nov	Lynwood Elementary	S13	Pet	Kenilworth Junior High
S4	Nov	Rancho Elementary	S14	Pet	McKinley Elementary
S5	Nov	Hill Middle	S15	Pet	Cinnabar Elementary
S6	Nov	San Jose Middle	S16	Pet	Miwok Valley Elementary
S7	Nov	Olive Elementary	S17	Pet	La Tercera Elementary
S8	Nov	Lu Sutton Elementary	S18	Pet	McDowell Elementary
S9	Nov	San Ramon Elementary	S19	Pet	Bernard Eldredge Elementary
S10	Nov	Sinaloa Middle	S20	Pet	Meadow Elementary
Elementary/Middle Schools – Private			High Schools – Public		
S21	Nov	North Bay Christian Academy	S26	Nov	Novato
S22	Nov	Christian Life School	S27	Nov	Marin Oaks High School
S23	Pet	Our Lady - Loretto Elementary	S28	Pet	San Antonio Continuation
Charter Schools			S29	Pet	Valley Oaks Alternative
S24	Nov	Novato Charter School	College/University		
Other School			S30	Nov	College of Marin
S25	Nov	Marin School of Arts and Technology			
Emergency Services					
Fire Stations			Hospital		
F1	Nov	Novato Fire Station #1	H1	Nov	Novato Community
F2	Nov	Novato Fire Station #2	H2	Pet	Petaluma Valley
F3	Nov	Novato Fire Station #3	Police Stations		
F4	Nov	Novato Fire Station #4	P1	Nov	Novato Police Station
F5	Nov	Novato Fire Station #5	P2	Pet	Petaluma Police Station
F6	Pet	Petaluma Fire Station #1	Military Services		
F7	Pet	Petaluma Fire Station #2	M1	Nov	U.S. Coast Guard
F8	Pet	Petaluma Fire Station #3	M2	Pet	National Guard Armory
Other Community Facilities					
Cultural Facilities			Community Centers		
CF1	Nov	Marin Museum of the American Indian	CC1	Nov	Margaret Todd Senior Center
CF2	Nov	Novato History Museum	CC2	Nov	Community House
CF3	Pet	Oldest House North of the San Francisco Bay	Libraries		
Post Offices			L1	Nov	Novato Library
PO1	Nov	Post Office	L2	Pet	Petaluma Regional Library
PO2	Pet	Casa Grande Station	Other Community Facilities		
PO3	Pet	Petaluma Post Office	O1	Nov	Novato City Hall
PO4	Pet	Regional Post Office	O2	Pet	Veterans Memorial Building
Park and Ride Facilities			O3	Pet	Sonoma-Marin Fairgrounds
T4	Nov	Alameda del Prado at US 101	O4	Pet	Boys & Girls Club
T5	Nov	Rowland Boulevard (2 lots) at US 101	O5	Pet	Petaluma Senior Center
T6	Nov	Atherton Avenue (2 lots) at US 101	O6	Pet	Petaluma Community Center
T7	Nov	Atherton Avenue at SR 37	Other Transportation Facilities		
T8	Pet	Lakeville Road at US 101	T1	Nov	Gnoss Field
T9	Pet	Sonoma-Marin Fairgrounds	T2	Nov	Transit Transfer Point
T10	Pet	Petaluma Boulevard at US 101	T3	Pet	Petaluma Marina

Nov = Novato; Pet = Petaluma

Source: Parsons, 2005.

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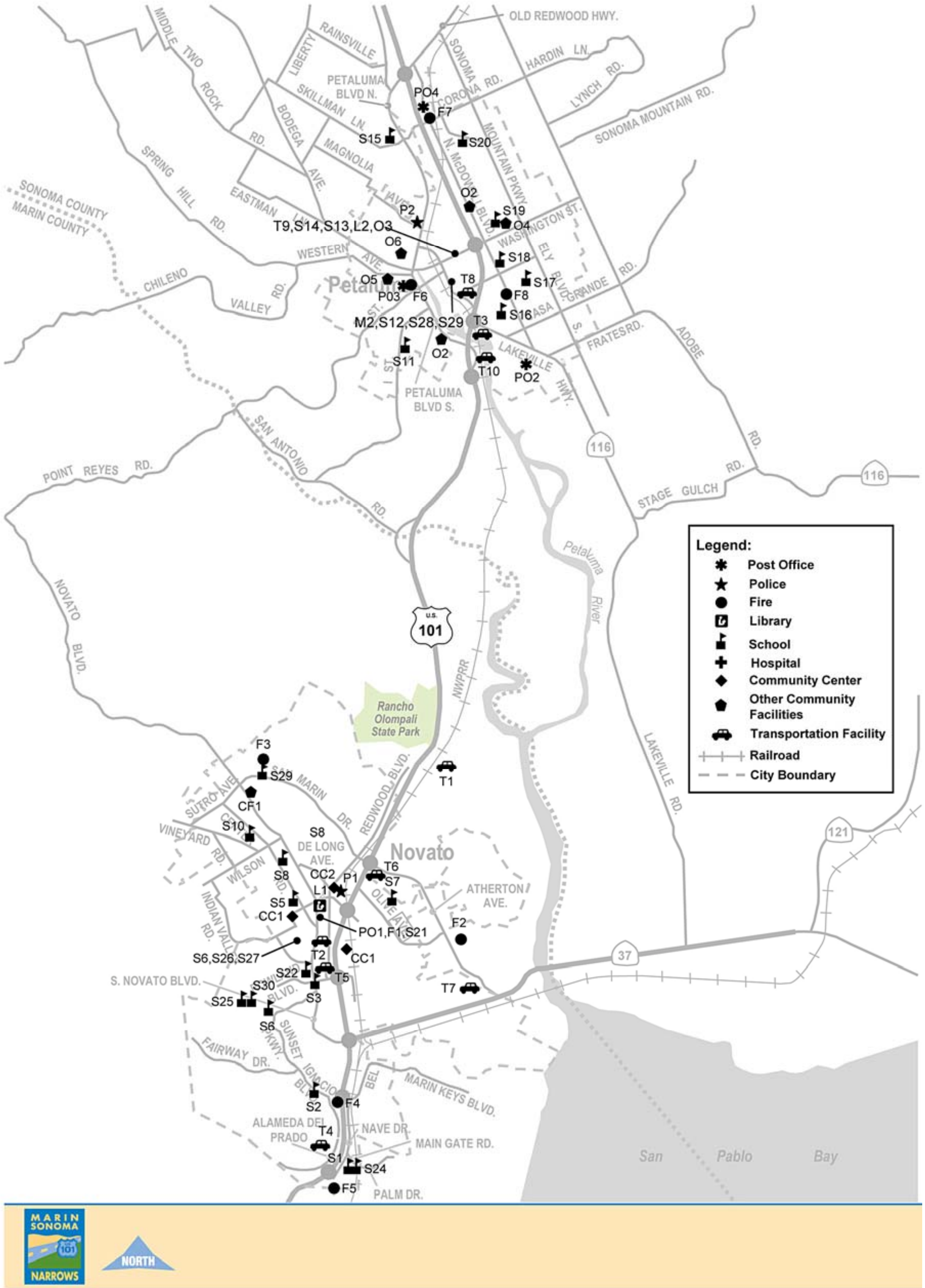
Figure 3.1-6 Public and Cultural Facilities in the MSN Study Area



Schools

There are 25 public and three private elementary, middle, and high schools in the study area. Public schools in the study area are within the jurisdiction of the Novato Unified School District, Petaluma School District, and Old Adobe Union School District. Also located in the study area are the College of Marin-Indian Valley and the Marin School of Arts and Technology, both in the City of Novato.

Libraries

Libraries in the study area include the Novato Library at 1720 South Novato Boulevard and the Petaluma Regional Library at 100 Fairgrounds Drive.

Other Cultural Facilities

There are a number of cultural facilities within the study area, including the Marin Museum of the American Indian, the Novato History Museum, the Margaret Todd Senior Center and Community House in the City of Novato and the Oldest House North of the San Francisco Bay in the City of Petaluma.

3.1.6.3 Impacts

Public and Cultural Facilities

Fixed HOV Lane Alternative. No public schools, libraries, emergency facilities, or cultural facilities would be displaced or impacted by the Fixed HOV Lane Alternative. The long-term effect of the Fixed HOV Lane Alternative would be to reduce congestion and diversion of freeway traffic to local streets, thereby enhancing access to public and cultural facilities. In the short-term, during construction, access to these facilities could be interrupted and community members would be inconvenienced. Under the Fixed HOV Lane Alternative, this temporary disruption could affect facilities in Novato and Petaluma.

Reversible HOV Lane Alternative. Because the footprint, alignment, and scope of work for the two build alternatives is identical, the Reversible HOV Lane Alternative would have the same effects to public and cultural facilities described above for the Fixed HOV Lane Alternative. Short-term disruptions to access could occur during construction, but there would be no long-term impacts to public and cultural facilities.

Access Options. Each Access Option would have a different footprint area, and thus could affect different resources. As mentioned previously, however, the public and cultural facilities in the project corridor are concentrated within the

Novato and Petaluma city limits. There are no public and cultural facilities in Segment B, where the Access Options would be implemented. Therefore, none of the Access Options would have an effect on public and cultural facilities.

No Build Alternative. In the long-term, no public schools, libraries, emergency facilities, or cultural facilities would be displaced or impacted by the No Build Alternative. In the short-term, routine maintenance and upkeep of US 101 could temporarily disrupt access to public and cultural facilities.

Relocations

According to the 2007 Uniform Relocations Assistance Program (Appendix E), one residential unit, situated on an agricultural property approximately 600 m south of Kastania Road on the west side of US 101, would require acquisition prior to construction of the MSN Project. This represents less than 1 percent of the total occupied dwelling units in the study area. Based on 2000 data for Census Tract 1507.01 Block Group 2, approximately two residents would be relocated. Full appraisals would be conducted prior to acquisition of the property to be relocated to determine the market value of the property based on current market conditions.

As there is only one potential relocation, there are adequate resources in the cities of Novato and Petaluma to accommodate relocation of the displaced residential unit.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 U.S.C. 2000d, et seq.). Please see Appendix I for a copy of the Department's Title VI Policy Statement.

Reversible HOV Lane Alternative. Because the Reversible HOV Lane Alternative would have the same footprint and roadway improvements as the Fixed HOV Lane Alternative, the relocation impacts described for the Fixed HOV Lane Alternative also apply to the Reversible HOV Lane Alternative.

No Build Alternative. The No Build Alternative proposes routine maintenance and upkeep of the existing US 101 facility. Since no new improvements or expansion of the right-of-way is included as part of this alternative, the No Build Alternative would not result in any relocations.

3.1.6.4 Avoidance, Minimization, Mitigation Measures

Construction Traffic Management Plan. In order to minimize access impacts to public and cultural facilities during the construction period, a transportation management plan shall be developed to include pre-trip and on-route roadway conditions and information during construction operations. Elements of the plan would address techniques for announcements and public communications. These tools could include a Public Information Campaign, Highway Advisory Radio, and Intelligent Transportation Systems (ITS) elements such as traffic monitoring stations and changeable message signs.

By providing real-time information on highway conditions and construction activities, these measures are expected to reduce construction-related impacts to community facilities. Motorists would tend to continue using the highway instead of diverting to local streets if they could reasonably predict travel times.

Relocation Assistance. Where right-of-way acquisitions cannot be avoided, Caltrans would comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act summarized in Appendix E. Caltrans shall also offer assistance under the Relocation Assistance Program (RAP), based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. Please see Appendix E for a summary of the RAP.

It is Caltrans' policy that persons displaced as a result of highway programs shall receive fair and humane treatment and shall not suffer unnecessarily as a result of programs designed for the benefit of the public. A summary of relocation benefits is included in Appendix E.

Compensation for loss of direct access to US 101 for property owners who currently have direct-access rights will be determined based on Access Option 12b, as part of the Preferred Alternative. The locations of new potential access via roads or interchanges would be developed with input from affected property owners.

3.1.7 Environmental Justice and Title VI of the Civil Rights Act (1964)

3.1.7.1 Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President Clinton on February 11, 1994. This EO directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Low income is defined based on the Department of Health and Human Services poverty guidelines. For 2009, this was $22,050 for a family of four.

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in the project. The Department's commitment to upholding the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix I of this document.

It has been the U.S. Department of Transportation's (DOT) longstanding policy to actively ensure non-discrimination under Title VI of the Civil Rights Act of 1964, and more recently under the DOT's Order to Address Environmental Justice in Minority Populations and Low-Income Populations (1997) and the FHWA's Actions to Address Environmental Justice in Minority Populations and Low-Income Populations 6640.23 (1998). Title VI states that "no person in the United States shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of or be subjected to discrimination under any program or actively receiving federal financial assistance." In accordance with EO 12898 and Title VI, Caltrans conducted a study to determine whether the MSN Project would cause disproportionate impacts to minority or low-income populations within the project study area.

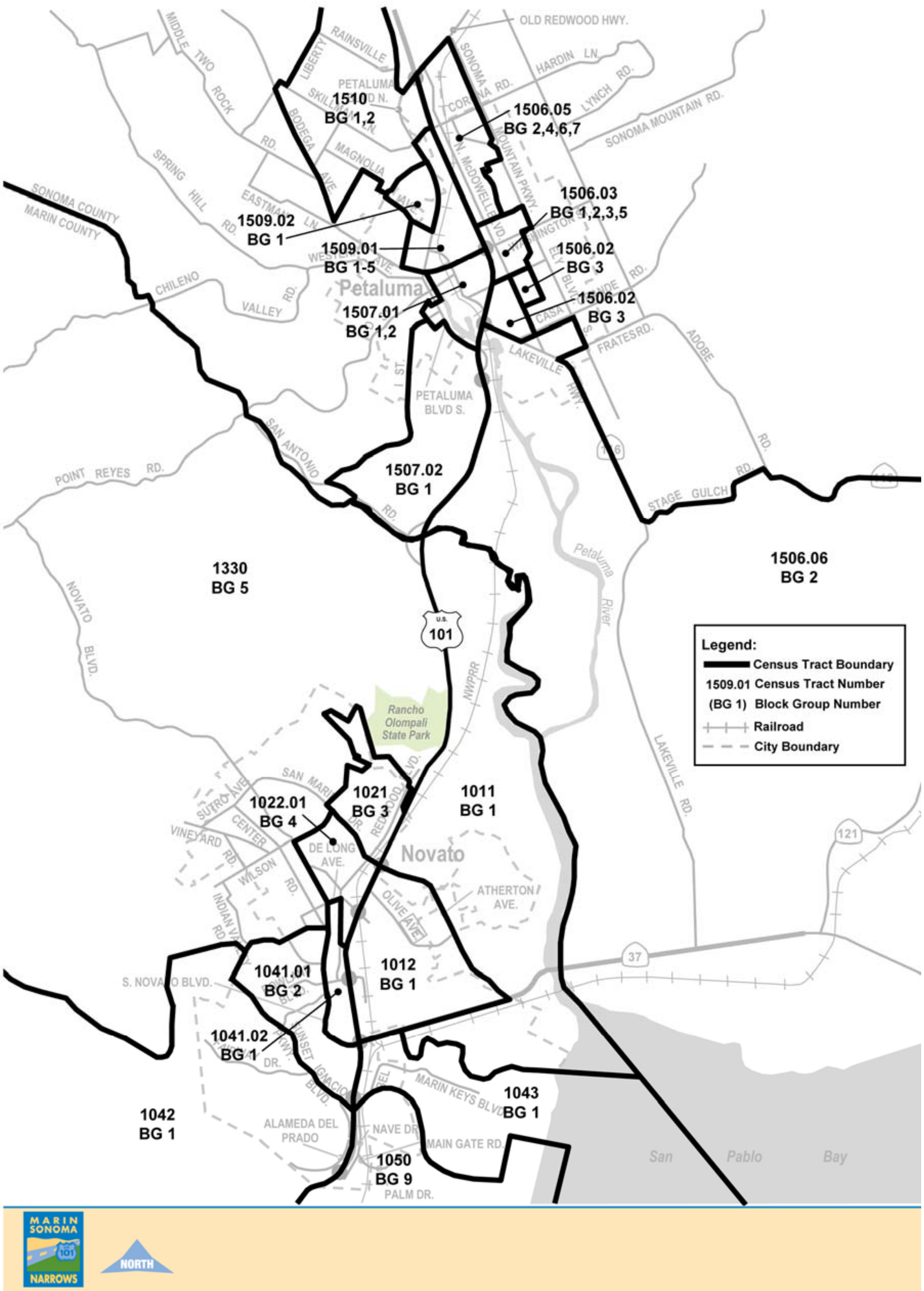
3.1.7.2 Affected Environment

Figure 3.1-7 shows the census tracts used in the socioeconomic study area for the environmental justice study.

Ethnic Composition

The project study area includes a variety of neighborhoods and multi-ethnic populations in proportions comparable to Sonoma County and the cities of

Figure 3.1-7 Socioeconomic Study Area Census Tracts



Novato and Petaluma. The City of Novato is slightly less diverse than the study area with a minority population of approximately 21 percent (Table 3.1-6).

Table 3.1-6 Ethnic Composition

Geographic Area	Total Persons	White	%	Black or African American	%	Hispanic	%
Study Area	57,324	42,563	74%	852	1%	9,320	16%
Marin County	247,614	194,254	79%	6,946	3%	27,351	11%
Sonoma County	458,614	341,686	75%	6,116	1%	79,511	17%
City of Novato	47,639	36,336	76%	893	2%	6,229	13%
City of Petaluma	54,548	41,996	77%	581	1%	7,985	15%

Geographic Area	Asian	%	American Indian/ Alaska Native	%	Native Hawaiian/ Other Pacific Islander	%	Some Other Race/Two or More	%
Study Area	2,495	4%	173	0.3%	92	0.2%	1,829	3%
Marin County	11,078	4%	630	0.3%	330	0.1%	6,700	3%
Sonoma County	13,786	3%	3,477	0.8%	828	0.2%	13,210	3%
City of Novato	2,442	5%	113	0.2%	71	0.2%	1,526	3%
City of Petaluma	2,089	4%	173	0.3%	85	0.2%	1,639	3%
Source: 2000 U.S. Census Bureau								

Income

Table 3.1-7 summarizes information on median income and the percentage of the population under the poverty line within the study area, Marin County, Sonoma County and the cities of Novato and Petaluma. The 2000 median household income in these jurisdictions was $63,733 in the study area, lower than in Marin County, and higher than in Sonoma County, the City of Novato, and the City of Petaluma.

Table 3.1-7 Household Income

Geographic Area	Median Household Income	% Population Below Poverty Level
Study Area	$63,766	6.3%
Marin County	$71,306	5.5%
Sonoma County	$53,076	7.0%
City of Novato	$63,453	4.6%
City of Petaluma	$61,679	5.2%
Source: 2000 U.S. Census Bureau		

In the study area, 6.3 percent of households live below the poverty level, less than in Sonoma County, but more than in Marin County or the cities of Novato and Petaluma.

For the purposes of this analysis, the potential for environmental justice impacts were identified when the population in any census tract block group met or exceeded either of the following criteria:

- The census tract block group contained 50 percent or more minority or low-income population; or
- The percentage of minority or low-income population in any census tract block group was more than 10 percentage points greater than the average in the city and/or county in which the census tract block group is located.

Based on 2000 U.S. Census Bureau data for the study area, populations in five out of 36 census block groups located adjacent to US 101 shown in Figure 3.1-8 qualify as environmental justice communities, for the following reasons:

- Census Tract 1506.03; Block Group 2 – Located east of US 101, just south East Washington Street, this block group has a minority population of approximately 60 percent.
- Census Tract 1506.03; Block Group 5 – Adjacent to the southeast corner of the US 101/East Washington Avenue Interchange, this block group has a low-income population of nearly 17 percent.
- Census Tract 1509.01; Block Groups 1 and 2 – Located west of US 101 and north of Washington Street, these block groups have the highest incidence of low-income population with approximately 27 and 23 percent, respectively.
- Census Tract 1330; Block Group 5 – West of US 101, north of the City of Novato in Marin County, the low-income population accounts for nearly 17 percent of the block group's total population.

1160 Figure 3.1-8 Environmental Justice Communities

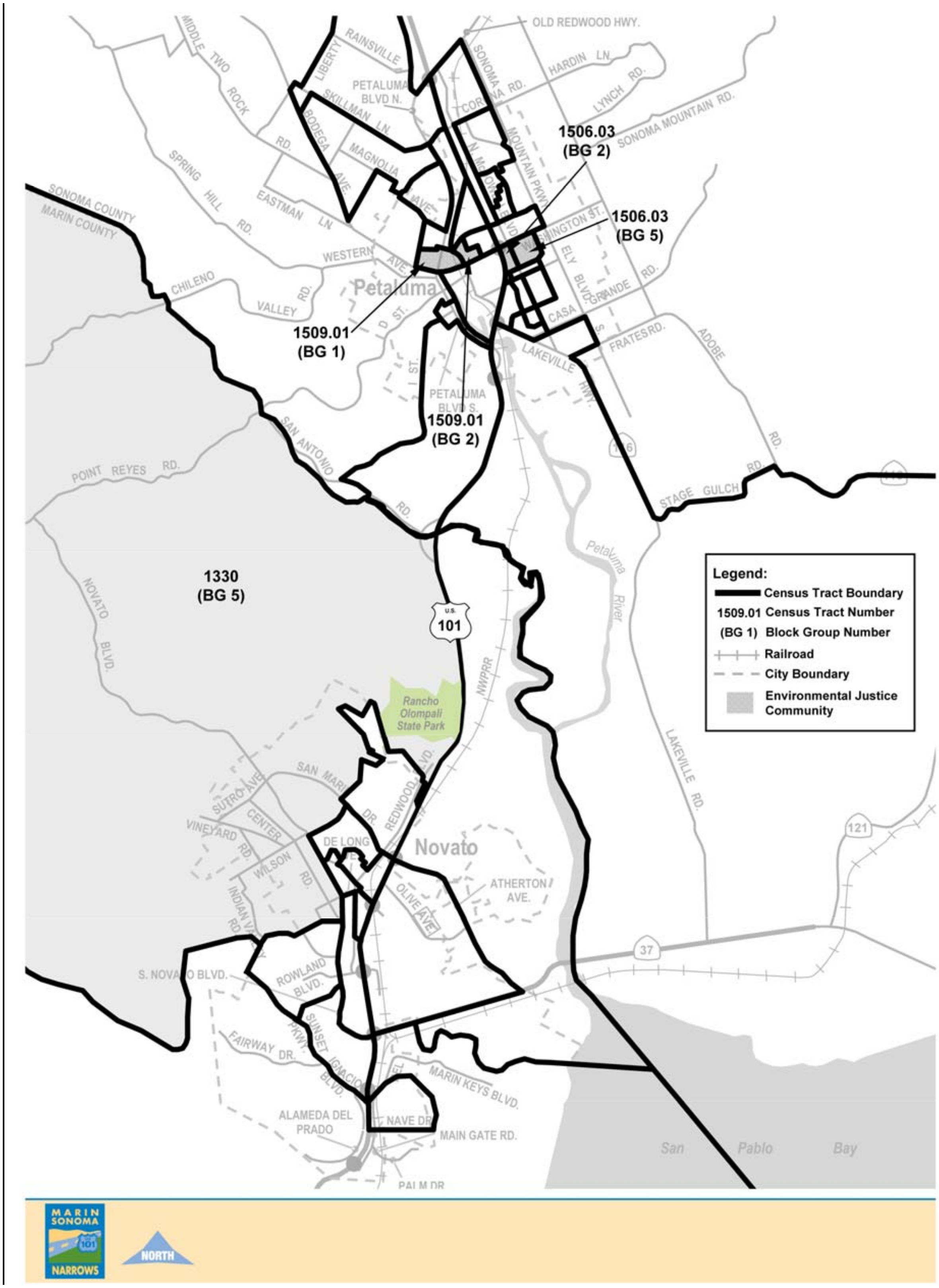


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Table 3.1-8 shows the percentage of minority populations and households below the poverty line in the study area.

Table 3.1-8 Minority and Low-Income Populations in the MSN Study Area[1]

	Study Area[1]	Marin County	Sonoma County	City of Novato	City of Petaluma
% Minority	26%	21%	26%	24%	23%
% Low-Income	7%	7%	8%	6%	6%

Source: 2000 U.S. Census Bureau.

Note:

[1] The Study Area percentages are based on population from Marin County, Sonoma County, Novato, and Petaluma, and therefore the concentration of minority or low-income residents can vary from that from each of the individual jurisdictions.

3.1.7.3 Impacts

Environmental Justice

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would not cause disproportionately high and adverse effects on the minority or low-income populations in the MSN Project corridor, four of which are in Segment C and one of which is in Segment B. Transportation benefits of the Fixed HOV Lane Alternative would accrue equally to area residents. Noise and air quality impacts would be distributed evenly through the project area and would not be concentrated in any area of minority or low-income residents. Noise abatement measures are recommended wherever noise abatement criteria are met and would be expected to prevent disproportionate impacts to any particular area. The single residential displacement is in an area that is not identified as a low-income or minority neighborhood. As a result, the Fixed HOV Lane Alternative would not adversely or disproportionately affect environmental justice communities in the MSN Project corridor.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative has the same footprint and roadway improvements as the Fixed HOV Lane Alternative, except that the HOV lane in the US 101 median would only operate in one direction, depending on the time of day. This one difference in the design of the two Build Alternatives would not result in substantial noise, air, aesthetic, or other considerations such that the five environmental justice communities would be adversely or disproportionately affected. As a result, the analysis presented above for the Fixed HOV Lane Alternative with respect to environmental justice would be identical for the Reversible HOV Lane Alternative. In summary, the Reversible HOV Lane Alternative would not cause disproportionately high and adverse effects on any minority or low-income populations.

Access Options. The four Access Options propose a series of interchanges, frontage roads, and bicycle/pedestrian facilities to replace access and enhance non-automobile connectivity in Segment B. The Access Options are comparable with respect to impacts on land use, public and cultural facilities, utilities, emergency services, transit, parking, bicycle and pedestrian access, noise, air emissions, and hazardous materials. Furthermore, the Access Options would not cause a disproportionate environmental burden on CT 1330 Block Group 5 compared to any other block group in Segment B. Moreover, construction-related impacts such as air, noise, and traffic detours can all be mitigated using best management practices (BMPs). Therefore, the Access Options would not have a disproportionately high or adverse effect on the environmental justice community residing in Census Tract 1330 Block Group 5.

No Build Alternative. The No Build Alternative would involve routine maintenance and upkeep of US 101. As such, occasional improvements would be made throughout the MSN Project corridor and would not be concentrated in Petaluma or the Marin portion of Segment B, where the environmental justice communities are located. Accordingly, the No Build Alternative would not cause disproportionately high and adverse effects on any minority or low-income populations.

3.1.7.4 Avoidance, Minimization, Mitigation Measures

No avoidance, minimization or mitigation measures are needed, because there would be no disproportionate impacts to minority or low-income communities.

3.1.8 Utilities/Emergency Services

3.1.8.1 Affected Environment

This section addresses utilities, such as water, wastewater, and telecommunications, and emergency services provided by various local and state agencies.

Utilities

The North Marin Water District (NMWD) provides water services to approximately 56,000 people living in the City of Novato and surrounding areas. The Marin Municipal Water District (MMWD) currently provides about 40 percent of the annual potable water needs to both North Marin and the MMWD. Waste water collection, treatment and disposal services are provided by the Novato Sanitary District. The District also is responsible for refuse disposal, recycling, and green waste collection through its franchise collector, Novato Disposal Service.

In the City of Petaluma water services are provided by the Sonoma County Water Agency (SCWA) and the City. SCWA facilities include three dams, three reservoirs, five collector wells, six booster stations, and 16 water storage tanks. SCWA sells water to the City of Petaluma, which provides water treatment and distribution to the residents of Petaluma. Waste water collection and treatment are provided by the City of Petaluma and solid waste collection, disposal and recycling are provided by Waste Management.

Telecommunication service providers in the project area include AT&T and Verizon.

Natural gas and electric service is provided to the project area by Pacific Gas & Electric (PG&E).

PG&E owns and operates gas and electric transmission and distribution facilities located within and adjacent to the proposed project.

Police and Emergency Services

Police protection and traffic enforcement in the study area are provided by the Marin County Sheriff’s Office, Sonoma County Sheriff’s Department, California Highway Patrol, and the police departments of the cities of Novato and Petaluma. The Novato Police Department is located at 909 Machin Avenue, Novato; the Petaluma Police Department precinct station is located at 969 Petaluma Boulevard North, Petaluma.

Fire protection and emergency medical rescue services for the study area are provided by the Marin County Fire Department; the Marin County Sheriff’s Office, Office of Emergency Services; Sonoma County Department of Emergency Services; and the fire departments of the cities of Novato and Petaluma. Eight fire stations are located within the study area. Figure 3.1-6 in Section 3.1.6, Community Character and Cohesion, identifies the locations of the vital local services. Table 3.1-9 lists the various emergency providers.

Table 3.1-9 Emergency Service Providers

Number Key	City	Name
F1	Novato	Fire Station #1
F2	Novato	Fire Station #2
F3	Novato	Fire Station #3
F4	Novato	Fire Station #4
F5	Novato	Fire Station #5
F6	Petaluma	Fire Station #1
F7	Petaluma	Fire Station #2
F8	Petaluma	Fire Station #3
H1	Novato	Novato Community Hospital
H2	Petaluma	Petaluma Valley Hospital
P1	Novato	Police Station
P2	Petaluma	Police Station
M1	Novato	US Coast Guard
M2	Petaluma	National Guard Armory

Note:
Refer to Figure 3.1-6 for locations according to the number key.

3.1.8.2 Impacts

Utilities

Fixed HOV Lane Alternative. Under the Fixed HOV Lane Alternative, preliminary utility investigations have identified the location and extent of existing service lines within the project boundaries. Final verifications would be performed during the project's design phase. The need for positive location (potholing) in accordance with Caltrans' Policy on High and Low Risk Underground Facilities within Highway Rights of Way (January 1997) would be determined once utility facilities have been plotted and compared to the proposed right-of-way for the Preferred Alternative.

At this preliminary stage, the proposed widening and mainline realignment under the Fixed HOV Lane Alternative would trigger the need to relocate some existing underground and above-ground utilities outside the right-of-way.

The relocation of utilities would result in localized construction impacts and could result in temporary interruption of service. The affected utilities identified in the preliminary investigations involve gas, electric, telephone, cable TV, sewer, and water. Prior to any relocation, Caltrans would enter into utility agreements with each of the providers, including, but not limited to, the City of Petaluma, PG&E, AT&T, SCWA, and Comcast. All utilities will either be relocated along the access roads, which will eventually be turned over to Marin and Sonoma Counties, or outside of proposed state right-of-way. This will ultimately put all utilities outside of the Caltrans right-of-way.

The areas where the utilities will be relocated have been included in the project study area upon which this FEIR/S is based. Therefore, CEQA review for the relocated utilities is being conducted as part of the FEIR/S. However, the California Public Utilities Commission (CPUC) may need to undergo further CEQA reviews associated with these relocations during the design phase of the project.

Water Services

The MSN Project will require approximately 50 percent or 7.1-miles of NMWD's aqueduct to be relocated between Kastania Road and the City of Novato. Currently NMWD and MMWD both have plans to upsize their current facilities. It is Caltrans policy to replace comparable facilities affected by the construction of a project.

Gas and Electric Transmission

Some PG&E facilities are in conflict with this project will need to be relocated. PG&E may need to relocate approximately 7.7 miles of electric transmission line and 8.5 miles of high pressure gas transmission lines. Appendix P of this FEIR/S identifies the specific gas and electrical transmission stations that will be relocated as part of the MSN Project. A brief, general description of the activities associated with the transmission line relocations follows:

Gas Transmission Facilities

For the segment of pipeline to be relocated, PG&E will need to trench along the new alignment separating topsoil from subsoil, string and weld together sections of new pipe, place the new pipe in the trench, hydrotest the new line and then backfill the trench first with the subsoil and finally with the topsoil. Finally, the new pipeline will be tied into the existing pipeline at the beginning and end of the relocation. Surface restoration will be provided to return the vegetative cover to preconstruction type and density. The existing pipeline affected by the Caltrans project will either be abandoned in place or removed depending on whether its present location would be directly affected by the proposed project. Abandonment involves the cleaning of the pipeline, filling it with either an inert gas such as nitrogen or with a concrete slurry, and capping the ends with steel plates. Removal involves trenching along the line to expose it, cutting the pipe into manageable sections and removing them from the trench, then hauling them from the site for disposal or recycling. The trenching, backfill and surface restoration would be similar to the relocation activity described above. A construction working strip approximately 100 ft wide generally centered on the pipeline alignment is required to conduct the above-described work. Equipment used will be backhoes, dump trucks, excavators, crew trucks and welding trucks and approximately 12 to 16 workers.

Electric Transmission Facilities

PG&E will survey and stake the new pole locations, frame and set the wood poles and then string conductor (wire) on the new line. The existing pole line will need to be de-energized at the beginning and end of the relocation so that the segment of the new pole line may be connected to the existing pole line. If the relocated alignment precludes the use of guy wires, self-supporting tubular steel poles (TSP) may be required for angle points. Depending on the angle, a concrete foundation may be required rather than the direct buried TSP. The old poles will also be removed by cutting them off at ground level and hauling them offsite for disposal. A construction work area approximately 80 ft in diameter at each new pole location and each pole to be removed is required to conduct the above described work. Equipment used will be line trucks and bucket trucks and approximately 8 to 12 workers. A pole setting excavator will be necessary if PG&E does work in the winter months.

Reversible HOV Lane Alternative. The proposed right-of-way for the Reversible HOV Lane Alternative would be the same as the Fixed HOV Lane Alternative. As a result, the project footprints would be the same for the two Build Alternatives, and the impacts on utilities would be the same. The analysis for the Fixed HOV Lane Alternative and the Access Options would therefore apply to the Reversible HOV Lane Alternative.

Access Options. The Access Options involve repaving existing roads, constructing new frontage roads with bicycle and pedestrian facilities, replacement and modified bridgework, and new interchanges. Because the majority of utility relocations will occur in Segment B due to extensive mainline realignment, which will conflict with existing water lines, gas and electric transmission lines, and telephone and sewer lines, all impacts associated with Segment B and disclosed in the FEIR/S can be attributed in part to utility relocation activities. These impacts will be similar to those described under the Build Alternatives. Impacts would also involve installing new smaller feeder lines to individual properties. As with the mainline alternatives, the impacts would be localized construction-related disturbances and possibly temporary service interruptions. Each Access Option would result in comparable impacts to utilities.

No Build Alternative. Under the No Build Alternative, routine maintenance and upkeep of the existing freeway and expressway portions of the project corridor would not be expected to adversely affect utilities; no relocation of sewer, water, telephone, gas and electric service lines would be necessary.

Emergency Services

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would alleviate congestion along US 101 and thereby provide police, fire, and other emergency service providers with improved response times. The upgrading of Segment B from expressway to freeway standards would eliminate the existing at-grade connections, correct the substandard horizontal and vertical curves, and improve circulation through the provision of overcrossings and/or interchanges. All of these improvements would enhance the ability of emergency responders to react to calls for service.

In addition, under the Fixed HOV Lane Alternative, the mixed flow lanes would be adjacent to the HOV lanes, without any barrier separating the two. With this configuration, emergency vehicles would have full maneuverability to move between the mixed flow and HOV lanes.

During the construction period, lane closures, detours, and slow-moving construction vehicles could interfere with and delay emergency vehicle access and response.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would also improve access and response times for emergency service providers, as described for the Fixed HOV Lane Alternative above. In particular, this alternative would also call for upgrading Segment B to freeway standards, which would enable better emergency response.

A key difference, however, is the Reversible HOV Lane Alternative would require barriers to separate the HOV lanes from the mixed flow lanes. These barriers would make it more difficult to remove a disabled vehicle or enable emergency vehicle access. In addition, removing a disabled vehicle from the reversible HOV lane would be more difficult than with the fixed HOV lane because there would be only one location to access the reversible lane. For example, if the reversible lane is operating in the southbound direction and a vehicle becomes disabled near Olompali SHP, a tow truck coming from Novato would have to go north to the Petaluma Blvd South interchange, enter the freeway in the southbound direction to access the reversible lane. With the fixed HOV lane in the same situation, the tow truck could turn around at the Redwood Landfill Overcrossing.

Potential interference with emergency response vehicles during the construction period would be same with the Reversible HOV Lane Alternative as with the Fixed HOV Lane Alternative.

Access Options. Each of the Access Options is designed to maintain access to individual properties and businesses and to serve major and local traffic movements. As a result, each Access Option would preserve emergency access to properties and areas on both sides of US 101 in Segment B. Through a system of interchanges, overpasses, and frontage roads, each Access Option would provide adequate emergence access, and accordingly, no adverse effects would be anticipated.

No Build Alternative. Under the No Build Alternative, there are no roadway and/or interchange improvements proposed other than routine maintenance and upkeep. As a result, the No Build Alternative would not impede emergency response. This alternative would not offer any congestion relief along US 101 in the future, resulting in lengthier response times by emergency vehicles, compared to the Build Alternatives.

3.1.8.3 Avoidance, Minimization, and/or Mitigation Measures

Utilities. It is customary for Caltrans to enter into agreements with utility companies to cover the activities and coordination involved in relocating utilities. These agreements will clearly outline responsibilities to ensure that any interruptions to utility services, if necessary, would be minor. Caltrans will work with utility companies to facilitate the removal of utility lines from the US 101 mainline right-of-way prior to construction of future phases of the project involving the mainline.

Police and Emergency. A Traffic Management Plan (TMP) will be developed for the project in consultation with the local emergency service providers. In the TMP, Caltrans will identify the various emergency service providers in the cities of Novato and Petaluma and Marin and Sonoma counties. Provisions will be included in the construction contract requiring the contractor to coordinate with these providers when developing temporary detour plans and lane closures. The construction contract documents will also require the contractor to notify emergency service a minimum of two weeks in advance of any road closures and detour routes.

3.1.9 Transit and Parking

3.1.9.1 Affected Environment

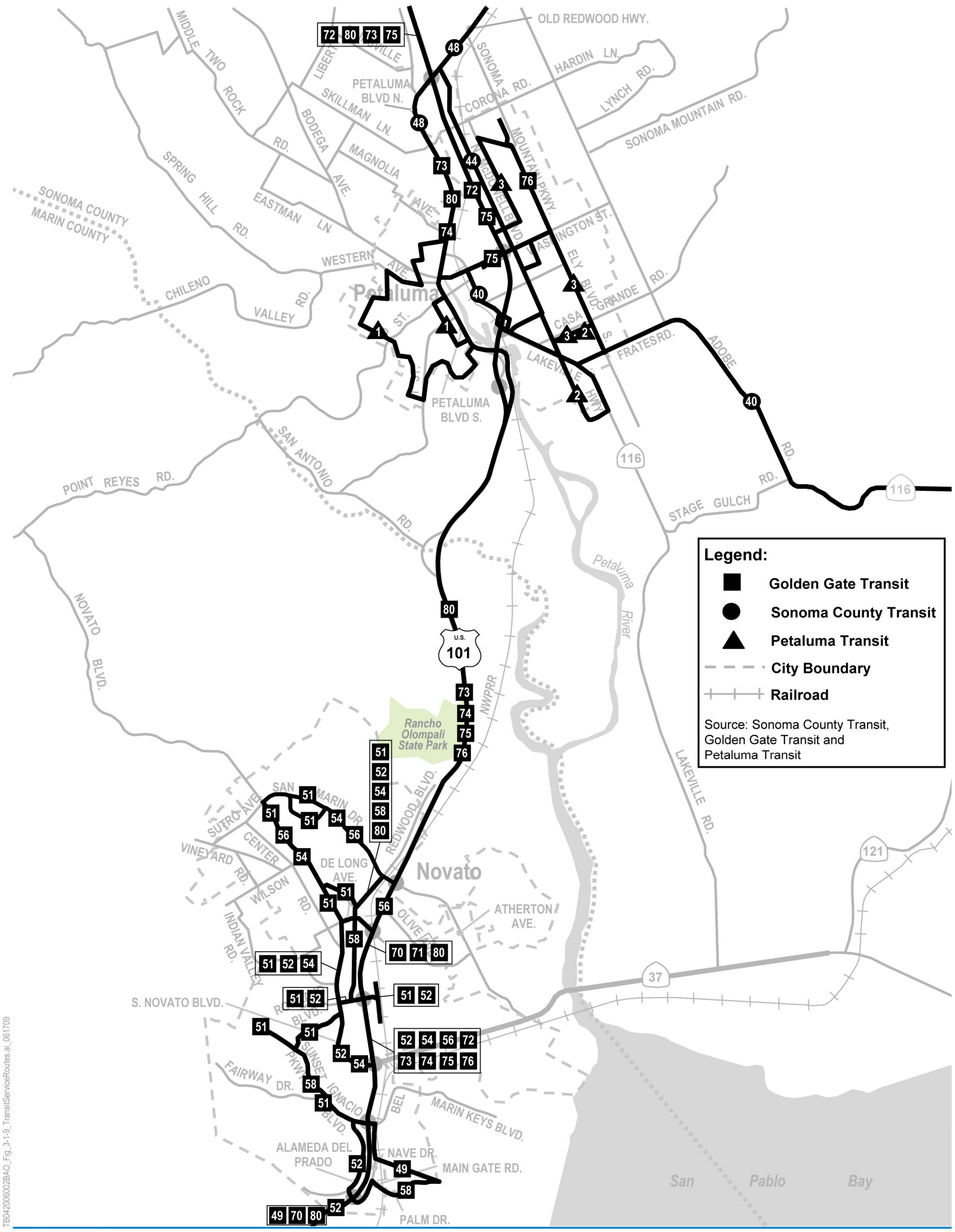
Transit

Transit services in the study area are provided by Sonoma County Transit, Golden Gate Transit, and Petaluma Transit. Figure 3.1-9 shows the service routes in the project study area by transit agencies described below.

Sonoma County Transit. Sonoma County Transit provides intercity service in Sonoma County and local service in Rohnert Park, Cotati, Guerneville, Sebastopol, and Windsor. Sonoma County Transit operates 24 bus routes, including six local and three express routes throughout Sonoma County, and offers connections to local transit services, including Petaluma Transit. Links are also provided to the Mendocino Transit Authority for service to the Sonoma/Mendocino Coast and Golden Gate Transit for regional service to Marin and San Francisco Counties. Sonoma County Transit operates three bus routes in the City of Petaluma: Route 40, which provides weekday, intercity service between Petaluma and Sonoma County destinations; Route 44, which provides daily service between the cities of Petaluma and Santa Rosa; and Route 48, which provides daily service between the cities of Petaluma, Rohnert Park, Cotati, and Santa Rosa. None of these bus routes uses US 101 within the project area.

Golden Gate Transit. Golden Gate Transit provides fixed-route bus service within Marin, Sonoma, San Francisco, and Contra Costa Counties, including the City of Novato. Golden Gate Transit provides service within the project area as

Figure 3.1-9 Transit Service Routes



follows: Routes 49, 51, 52, 54, 56, 58, 70, 71, 80, and 153 operate within Novato; Routes 73, 74, 75, 76, and 80 operate within Petaluma; Routes 52, 54, 56, 70, 71, 72, 72X, 73, 74, 75, 76, and 80 operate along the portions of US 101 affected by the project.

Petaluma Transit. Petaluma Transit provides four local bus routes in the City of Petaluma and connections to Sonoma County Transit and Golden Gate Transit for intercity trips. None of Petaluma Transit's four bus routes use US 101 within the project area.

Sonoma-Marin Area Rail Transit (SMART). The proposed Sonoma-Marin Area Rail Transit (SMART) project would provide passenger rail service along approximately 70 miles of the SMART corridor from Cloverdale in Sonoma County to Larkspur in Marin County, with 14 rail stations, passing sidings, and a rail maintenance facility. The rail line follows an existing rail line that was previously owned by the Northwest Pacific Railroad. The SMART District is sponsoring the project and has completed preliminary engineering and an EIR under CEQA. The SMART District is currently analyzing the potential environmental effects of this project pursuant to NEPA. SMART adopted a Final Supplemental EIR in July 2008 to address the addition of weekend passenger service, alternative site for the Novato South Station, an alternative type of vehicle and changes to proposed NCRA freight service.

There are four crossings between the SMART tracks and US 101: (1) Franklin Overhead (OH), (2) North Novato OH, (3) US 101/SR 116 Separation and Overhead (SOH), and (4) North Petaluma OH.

Parking and Park-and-Ride Facilities

Existing off-street parking in the project vicinity is primarily available at shopping centers, park-and-ride lots, and other businesses adjacent to the US 101 corridor. Parking is also available at park-and-ride lots along the US 101 corridor in Novato and Petaluma. Park-and-ride lots allow commuters to park their vehicles in a parking lot and transfer to transit services and carpool/vanpool opportunities, thereby promoting commute alternatives that reduce travel time and reduce air emissions. As an incentive to carpool, parking is free for carpoolers and serves as a convenient meeting place. Also, park-and-ride lots provide lockers for bike commuters.

The six park-and-ride lots located in the project vicinity are described below.

- Rowland Avenue/US 101 Park-and-Ride, Novato (east side of US 101, within the northeast and southeast quadrants of the interchange): The lot includes 240 parking spaces, 6 bike lockers and 1 bike rack, and is served by Golden Gate Transit.
- Atherton Avenue/US 101 Park-and-Ride, Novato (east side of US 101, adjacent to the northbound on-ramp): The lot includes 58 parking spaces and 2 bike lockers, and is served by Golden Gate Transit.
- South Petaluma Boulevard /US 101 Park-and-Ride (west side of US 101, near the ramp entrance): The lot includes 40 parking spaces and is served by Golden Gate Transit.
- Lakeville Street (SR 116) /US 101 Park-and-Ride (west side of US 101, within the southbound on-ramp loop quadrant): The lot includes 135 parking spaces and 4 bike lockers and is served by Sonoma County Transit and Golden Gate Transit.
- Washington Street/Payran Street Park-and-Ride (east of US 101, in the southwest quadrant of the East Washington Street Interchange): The lot includes 600 parking spaces, and is served by Sonoma County Transit, Golden Gate Transit, and Petaluma Transit.
- North Petaluma Boulevard/Gossage Avenue Park-and-Ride, Petaluma (west of US 101): The lot features 22 parking spaces, a shelter, and is served by Sonoma County Transit and Golden Gate Transit.

3.1.9.2 Impacts

Transit

Fixed HOV Lane Alternative. Under the Fixed HOV Lane Alternative, the long-term impact of the project on transit and carpooling/vanpooling operations would be positive. The HOV lanes provided under the Fixed HOV Lane Alternative would offer dedicated peak-hour capacity and a high level of traffic service to transit and carpool vehicles. This would improve travel times for riders of the Golden Gate Transit lines on US 101 and carpooling commuters, who would experience fewer delays. Not only would transit travel time be reduced but transit schedule reliability would be improved. Carpools and vanpools also would have improved speeds and reduced travel times. The improved speeds and schedule reliability would work as incentives for commuters and other travelers to carpool and/or take advantage of local and express buses that would also use the HOV lanes. The Fixed HOV Lane Alternative would not interfere with proposed commuter rail service on the SMART line.

In the short term, however, construction activities would include modifications to freeway ramps to allow HOV bypasses and ramp metering, widening the median, and realignment of the mainline in Segments B and C. The resultant lane closures, detours, and construction activity would increase transit travel times and make transit schedules less reliable. This effect would be short-term and temporary.

Reversible HOV Lane Alternative. Like the Fixed HOV Lane Alternative, the Reversible HOV Lane Alternative would have a positive long-term impact on transit and carpooling/vanpooling. However, because the reversible HOV lane would only operate in one direction at any given time, those transit operators and carpools/vanpools that are traveling in the opposite direction of the reversible HOV lane would continue to travel in mixed flow and not experience congestion relief.

Access Options. Bus lines through Segment B all use US 101, i.e., none of the bus routes use the local frontage and access roads in this stretch of the project corridor. As a result, implementation of any of the Access Options would not affect transit in this segment in the long term.

During the construction period, lane closures, detours, and slow-moving construction vehicles could interfere with and delay buses and carpools/vanpools. The Access Options would have similar construction-period effects on transit services.

No Build Alternative. The No Build Alternative would not impact current transit operations in the corridor. There may be short-term interruptions during routine maintenance and upkeep of the existing freeway, but these would be minimal. In the long run, without congestion relief, delays on US 101 would worsen as described in Chapter 1, and schedule reliability for transit operators would be more difficult to maintain.

Sonoma-Marin Area Rail Transit (SMART).

Fixed HOV Lane Alternative. This is the Preferred Alternative. Under this alternative, the general location of the SMART railroad tracks in relation to

US 101 will not change. In Segment A of the MSN Project, the SMART corridor will be east of US 101 generally between SR 37 and just south of the De Long Avenue Interchange. Just north of the Novato Community Hospital, the rail line will pass under US 101 at the Franklin Overhead and transition to the west side of US 101. It will remain on the west side until just north of the San Marin Drive/Atherton Avenue Interchange, near the Petaluma Marsh Wildlife Preserve, where the tracks will switch back to the east side of US 101 at the North Novato Overhead.

Throughout Segment B, the SMART corridor would continue east of US 101. In Segment C, the SMART line will cross under the US 101 at the SR 116/ Lakeville Highway Separator and Overhead and proceed along the west side of US 101. A little more than half way through Segment C, the SMART line would cross US 101 for the fourth time at the North Petaluma Overhead.

During the construction of the Petaluma River Bridge, the project contractor will access the north bank of the river from SR 116 along the east side of US 101. The contractor will access the north bank by using an existing road along the SMART railroad tracks. Since access would be used when the railroad arms are open project construction will not affect SMART's operations at this location.

Reversible HOV Lane Alternative: The effects on the SMART rail line from the MSN Project would be identical to the effects under the Fixed HOV Lane Alternative described above.

Access Options: As stated under the Preferred Alternative, the SMART corridor would continue east of US 101 for most of Segment B. The SMART rail line would be accessible from US 101 at South Petaluma Boulevard, and there would be no conflicts with the rail line.

No Build: There would be no impacts to SMART under the No Build Alternative.

Parking and Park-and-Ride Lots

Fixed HOV Lane Alternative. Acquisition of property under the Fixed HOV Lane Alternative would affect approximately six parking spaces at the Plaza North Shopping Center in Petaluma. There are currently 1,500 parking spaces in the shopping center lot and there is sufficient room to reconfigure the lot for no net loss of parking spaces.

There would be no permanent impacts to park-and-ride lots. There would, however, be some temporary impacts as a result of project construction, as follows:

- Rowland Avenue/US 101, Novato: The lot would not be directly affected by operations; however, the northbound on-ramp may be temporarily/periodically closed during construction, possibly requiring lot users traveling northbound to use an alternate route during these times.
- Atherton Avenue/US 101 Park-and-Ride, Novato: Same as above.
- South Petaluma Boulevard/US 101: Although the lot would not be directly affected once mainline widening and realignment begins, the usefulness of the lot would be interrupted until the new roadway and adjacent interchange (with associated ramps) are completed.
- Lakeville Street (SR 116)/US 101 Park-and-Ride: The southbound on-ramp may be temporarily/periodically closed during construction, possibly requiring lot users to travel south.

Reversible HOV Lane Alternative. The effects of the Reversible HOV Lane Alternative on parking and park-and-ride lots would be identical to the effects described above for the Fixed HOV Lane Alternative, because the changes to the interchanges where the park-and-ride lots are identical under both Build Alternatives.

Access Options. The Access Options would not affect parking or park-and-ride lots, since none exist within Segment B.

No Build Alternative. The No Build Alternative would not impact parking or park-and-ride facilities within the project boundaries, since this alternative involves only routine maintenance and upkeep of existing facilities. Any interference or disruption related to mainline or ramp repairs or maintenance would be limited in duration and scope.

3.1.9.3 Avoidance, Minimization, and Mitigation Measures

Transit

Construction Detour Management Plan. Golden Gate Transit, Sonoma County Transit, and Petaluma Transit operate several bus routes along US 101 and local streets in the cities of Novato and Petaluma that would be temporarily affected during construction. Mitigation measures for temporary impacts would include consultation with service providers regarding the selection of detour routes. Advance warning to the public using signs, fliers, and the public media would notify riders to expect delays due to the temporary detours.

Sonoma-Marin Area Rail Transit (SMART). Because no disruptions are anticipated to SMART's operations during MSN Project construction, no mitigation is warranted.

Parking and Park-and-Ride Facilities

There is sufficient room at the Plaza North Shopping Center in Petaluma to reconfigure parking spaces for no net loss of the parking supply; therefore, the parking lot would be restriped or otherwise reconfigured to replace the six parking spaces displaced under either Build Alternative.

3.1.10 Traffic and Transportation

Introduction

This section includes a discussion of the impacts of the Build and No Build Alternatives on future traffic congestion along US 101. The discussion is based upon the Caltrans Traffic Operational Analysis Report, February 2005. The report defines a study area larger than the project boundaries, since traffic "upstream" and "downstream" of the project boundaries affects traffic flow and congestion within the project limits. The study area includes the freeway mainline from the Miller Creek Interchange in Marin County to the Old Redwood Highway Interchange in Sonoma County, including on-ramps and off-ramps.

The traffic study began before Access Options 4b, 12b, 14b, and 14d were identified for evaluation. However, new interchange(s) proposed as part of these Access Options would not alter the results of the forecast freeway volumes or ramp volumes for the two intersections analyzed in the traffic study.

The removal of direct access to US 101 from a number of roadways and driveways in Segment B, as well as the addition of new interchanges, would improve access and circulation in this segment. Access to US 101 from these roadways and driveways would be provided by new interchanges accessed via a new access road system. The proposed interchanges would allow vehicles to accelerate and decelerate on and off the freeway from the interchange on- and off-ramps instead of on US 101 itself. This would make it easier to enter and exit the flow of traffic and eliminate the need to cross on-coming traffic to cross the freeway.

In addition to the US 101 segments, Caltrans identified the following two critical intersections to include in the traffic study:

- US 101 northbound off and on ramps at Atherton Avenue; and
- US 101 southbound off and on ramps at Atherton Avenue.

This section also addresses bicycle and pedestrian routes, which are an important component of the transportation network in Marin and Sonoma Counties.

3.1.10.1 Regulatory Setting

Congestion Management Program

The Congestion Management Program (CMP) was established by voter approval in 1990. The purpose of the program, which applies to all counties in California with populations greater than 50,000, was to establish a flexible and effective transportation planning and programming process to allocate the proceeds from an accompanying nine-cent gas tax increase. In developing their plans, local counties were charged with identifying routes of regional significance, defining acceptable levels of congestion on these routes, monitoring and regularly reporting on the operations of the routes, and establishing a program to maintain acceptable operational levels through trip reduction and travel demand management. Counties were also required to propose a seven-year capital improvement program (CIP) to achieve roadway and transit performance standards.

TAM is the local agency responsible for preparation of the Marin County CMP. The most recent CMP was adopted in 2005. This CMP was notable in that it had the benefit of two new funding sources to supplement existing sources. The new sources included Measure A, a local tax ballot measure approved by Marin County voters in 2004; and Regional Measure 2, a regional measure that increased tolls on all State-owned Bay Area bridges by $1.

The 2005 CMP Update includes eight performance measures that reflect TAM's continued commitment to a multimodal transportation system:

1. Highway Level of Service;
2. Peak-Hour Travel Time;

3. Person Throughput;
4. Vehicle Miles Traveled on Congested Highways;
5. Jobs/Housing Balance;
6. Transit Headways;
7. Transit Coordination; and
8. Pedestrian and Bicycle Investment.

With respect to US 101, roadway segments that operate at a lower level of service (LOS) than the standard that was established in 1991 are “grandfathered” and allowed to continue to operate at a lower LOS standard level until such time as they are improved or the traffic load is diverted. Freeway segments that operated at LOS F in the 1991 CMP qualify as “grandfathered” segments. US 101 is one of the grandfathered roadways.

In developing its CIP, TAM’s procedure for identifying specific highway and arterial projects consider the following:

1. Improvements that reduce traffic congestion to acceptable levels for the most vehicles;

2. Improvements that are the most cost effective;

3. Improvements on facilities with higher existing traffic volumes;

4. Improvements on facilities that are operating poorly based on existing traffic (not projected growth); and

5. Improvements that are lower cost.

Two additional considerations, described below, are used to identifying potential projects for purposes of the CIP.

1. **Operational characteristics.** If the project would result in shifting a capacity problem to another location, the effects of the downstream bottleneck are considered when setting priority for the project that ranks highest for cost effectiveness.

2. **Current deficiencies.** Projects that would eliminate existing deficiencies are prioritized above those that would eliminate future problems.

Based on these factors, the MSN Project is in Marin County’s CIP.

As there is no officially designated Congestion Management Agency for Sonoma County, SCTA produces a Countywide Transportation Plan in lieu of a formal CMP (see discussion below).

Countywide Transportation Planning

Marin County. The Marin County transportation plan, entitled Moving Forward: A 25-Year Transportation Vision for Marin County (Transportation Vision Plan), was completed in February 2003 by the Marin County Congestion Management Agency (CMA), in collaboration with the Marin County Board of Supervisors, Marin County Transit, and local citizens. As a blueprint for the County's transportation future, the Transportation Vision Plan calls for enhanced local bus transit, additional pedestrian and bike options, improved local streets and interchanges, the SMART passenger rail project, increased express bus and ferry service, the development of transit centers as important multimodal hubs, and completion of the US 101 HOV lanes.

The MSN Project falls entirely within the "U.S. 101 Corridor" sub-area of the Transportation Vision Plan. For this corridor, the Plan calls for a variety of improvements including SMART passenger rail, express bus service, a north-south bikeway, HOV lane additions, and ferry service expansion. These improvements are projected to remove nearly 3,400 vehicle trips off of US 101 during peak periods; the equivalent of adding the capacity of one and a half freeway lanes. In addition, the plan estimates that implementation of these projects, including the MSN Project, would reduce delay by nearly 500 person-hours as a result of decreased congestion on US 101 through the Marin-Sonoma Narrows.

Sonoma County. In Sonoma County, SCTA has fulfilled the role of coordinating transportation planning and setting priorities for transportation funding. In 1995, SCTA prepared its final CMP and in 1997, SCTA prepared the Calthorpe Study. The document is the planning document that serves as the source of Sonoma County's input to the MTC for the RTP. In 2001, SCTA adopted the "2004 Comprehensive Transportation Plan for Sonoma County" providing SCTA with policy guidance and specific transportation improvements for development over the next 25 years. This was updated in the 2004 County Transportation Plan.

The 2001 and 2004 Plans are multi-modal plans that incorporate past efforts such as the 1995 Congestion Management Plan, the Sonoma/Marin County

Transportation and Land Use Study, and the Sonoma County Transportation Authority's Getting Around Sonoma County in 2020…A Vision for Our Future. The County Transportation Plan specifically acknowledges US 101 as crucial for the County, because US 101 serves local travel demand, regional commutes, tourism, and goods movement. The vision in the plan for US 101 includes less intense rush hour periods allowing traffic to move at a steady pace, midday traffic moving at the suggested speed limit, and a reduction in the "bottlenecks" at major interchanges and the Petaluma River Bridge.

Given the importance of US 101, Sonoma County also has a construction strategy for US 101 in Sonoma County. The strategy identifies and supports six major projects that involve improvements to interchanges and providing continuous HOV lanes between southern Marin County and Windsor in Sonoma County. As such, the MSN Project is recognized as a key element of the strategy and its implementation will depend on the availability of funding sources.

Bicycle/Pedestrian Facilities

FHWA directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

Caltrans and FHWA are committed to carrying out the 1990 Americans with Disabilities Act (ADA) by building transportation facilities that provide equal access for all persons. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

The Coast Guard approves location and clearances of bridges over navigable waters of the US under the General Bridge Act of 1946, as amended. The purpose of these Acts is to preserve the public right of navigation and to prevent interference with interstate and foreign commerce. The proposed location and clearance of bridges and causeways across navigable waters of the US must be submitted to and approved by the Commandant of the Coast Guard prior to construction. The General Bridge Act of 1946 is cited as the legislative authority for bridge construction in most cases.

3.1.10.2 Affected Environment

Within the study limits in Marin County, US 101 is a divided eight-lane freeway from the Miller Creek Road Interchange south of Novato to the SR 37/South Novato Boulevard Interchange in Novato. US 101 is a divided six-lane freeway from the SR 37/South Novato Boulevard Interchange to north of the Atherton Avenue Interchange, north of Novato. US 101 then continues as a divided four-lane expressway from north of the Atherton Avenue Interchange to the South Petaluma Boulevard Interchange in Sonoma County. From the South Petaluma Boulevard Interchange to the Old Redwood Highway Interchange, US 101 is a divided four-lane freeway.

There are three northbound speed change lanes within the study limits:

- between the Miller Creek Road on-ramp and the Nave Drive off-ramp;
- between the Ignacio Boulevard eastbound on-ramp and the eastbound SR 37 off-ramp; and
- between the westbound SR 37 on-ramp and the Rowland Boulevard off-ramp.

There are also three southbound speed change lanes within the study limits:

- between the South Novato Boulevard on-ramp and the eastbound Ignacio Boulevard off-ramp;
- between the Ignacio Boulevard on-ramp and the Alameda Del Prado off-ramp; and
- between the Alameda Del Prado on-ramp and the Miller Creek Road off-ramp.

Portions of the existing northbound and southbound HOV lanes between the SR 37/South Novato Boulevard Interchange and the North San Pedro Road Interchange in Marin County were also included within the study area. During peak commute periods, these lanes are restricted to vehicles with two or more occupants, motorcycles, and clean air vehicles. Southbound HOV lane hours are from 6:30 A.M. to 8:30 A.M. Northbound HOV lane hours are from 4:30 P.M. to 7:00 P.M.

Existing Mainline Operations

Caltrans' 2003 congestion monitoring studies indicate that recurrent delays occur within the study limits during the A.M. peak traffic period on southbound US 101 and during the P.M. peak traffic period on northbound US 101.

Southbound traffic congestion within the study limits typically occurs between 5:30 A.M. and 8:30 A.M. in Sonoma County, with queues backing up behind the South Petaluma Boulevard on-ramp to south of Old Redwood Highway; and between 6:30 A.M. and 9:30 A.M. in Marin County, with queues backing up in the three-lane freeway section south of the Lincoln Avenue on-ramp. Maximum vehicle delay from the first bottleneck is about nine minutes; maximum vehicle delay from the second bottleneck is about 16 minutes.

Northbound traffic congestion generally develops between 3:00 P.M. and 6:30 P.M., primarily in Marin County. The primary northbound P.M. peak period bottleneck currently develops north of the Atherton Avenue Interchange where the expressway section begins. The maximum vehicle delay from this bottleneck is about six minutes.

Intersection Operations

The 2000 Highway Capacity Manual defines the levels of service (LOS) for signalized intersections in terms of control delay, as illustrated in Table 3.1-10.

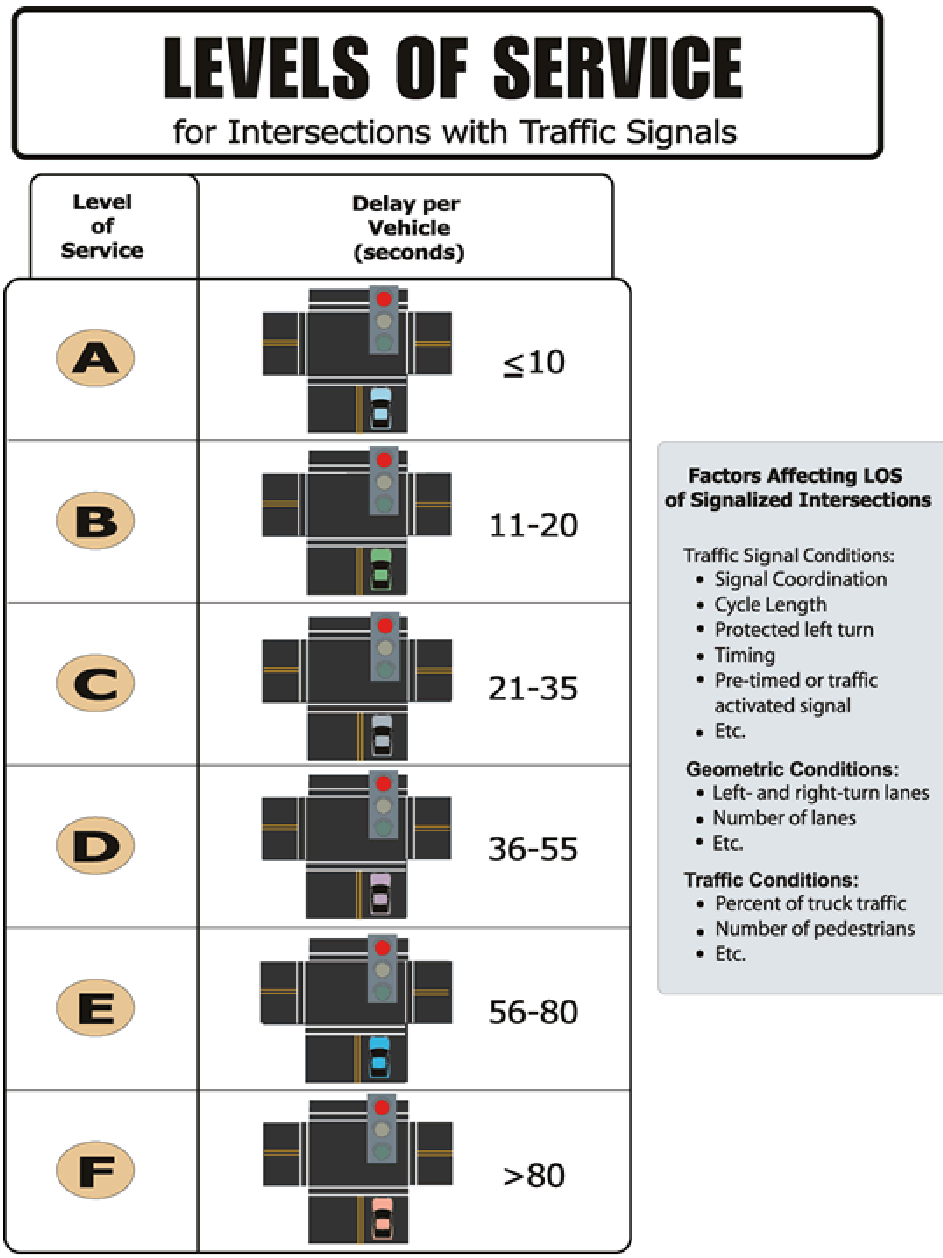
Caltrans analyzed levels of service at the US 101 southbound ramps/Atherton Avenue and northbound ramps/Atherton Avenue intersections based on 2002 A.M. and P.M. peak hour volumes. The analyses show that the intersection of the southbound ramps operates at LOS A, and the intersection of the northbound ramps operates at LOS C, in both the A.M. and P.M. peak hours.

It should be noted, however, that the operation of the southbound ramps/Atherton Avenue intersection is heavily influenced by operations at the adjacent Redwood Boulevard/Atherton Avenue intersection to the west. These intersections are only about 100 m apart and storage is limited to about 12 vehicles per lane per signal cycle. Poor operations occur at this intersection, and the westbound approach queues impact operations at the upstream southbound ramps/Atherton Avenue intersection. Caltrans' Office of Highway Operations field study confirmed that the westbound traffic at the Redwood Boulevard/Atherton Avenue intersection occasionally backs up to the southbound ramps/Atherton Avenue intersection and causes queuing on the US 101 southbound off-ramp in the morning peak period.

Ramp Metering

Ramp metering is currently limited in Marin and Sonoma Counties. In Sonoma County, the only ramps on US 101 wired for metering are south of SR 12 for approximately five miles. In Marin County, the Ignacio Boulevard ramps have partial equipment installed. Metering is currently not in operation in Marin or Sonoma Counties.

Table 3.1-10 Levels of Service



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

Pedestrian and Bicycle Facilities

Pedestrian and bicycle use is prohibited along the freeway portions of the project corridor within Segments A and C. Pedestrian and bicycle use is not prohibited along the expressway portion of the project corridor in Segment B.

As indicated in Figure 3.1-10, the expressway segment (Segment B) is not a designated bicycle route, and there are no pedestrian centers within Segment B. Therefore, the expressway shoulder does not qualify as a 4(f) resource under the Department of Transportation Act (49 U.S.C. 1966). Bicycle use in this area is moderate since there is no continuous route (access road or bikeway) between Novato and Petaluma. Pedestrian use is low due to the rural nature of the area. Existing access roads that allow for pedestrian and bicycle use include Redwood Boulevard between the Atherton Avenue/US 101 Interchange and the Birkenstock Warehouse west of the expressway, and Binford Road between the Atherton Avenue/US 101 Interchange and Airport Road east of the expressway.

Table 3.1-11 defines the Bikeway Classifications according to the Caltrans Highway Design Manual, and is provided as a reference for the following discussion of existing and proposed bicycle paths in the project corridor.

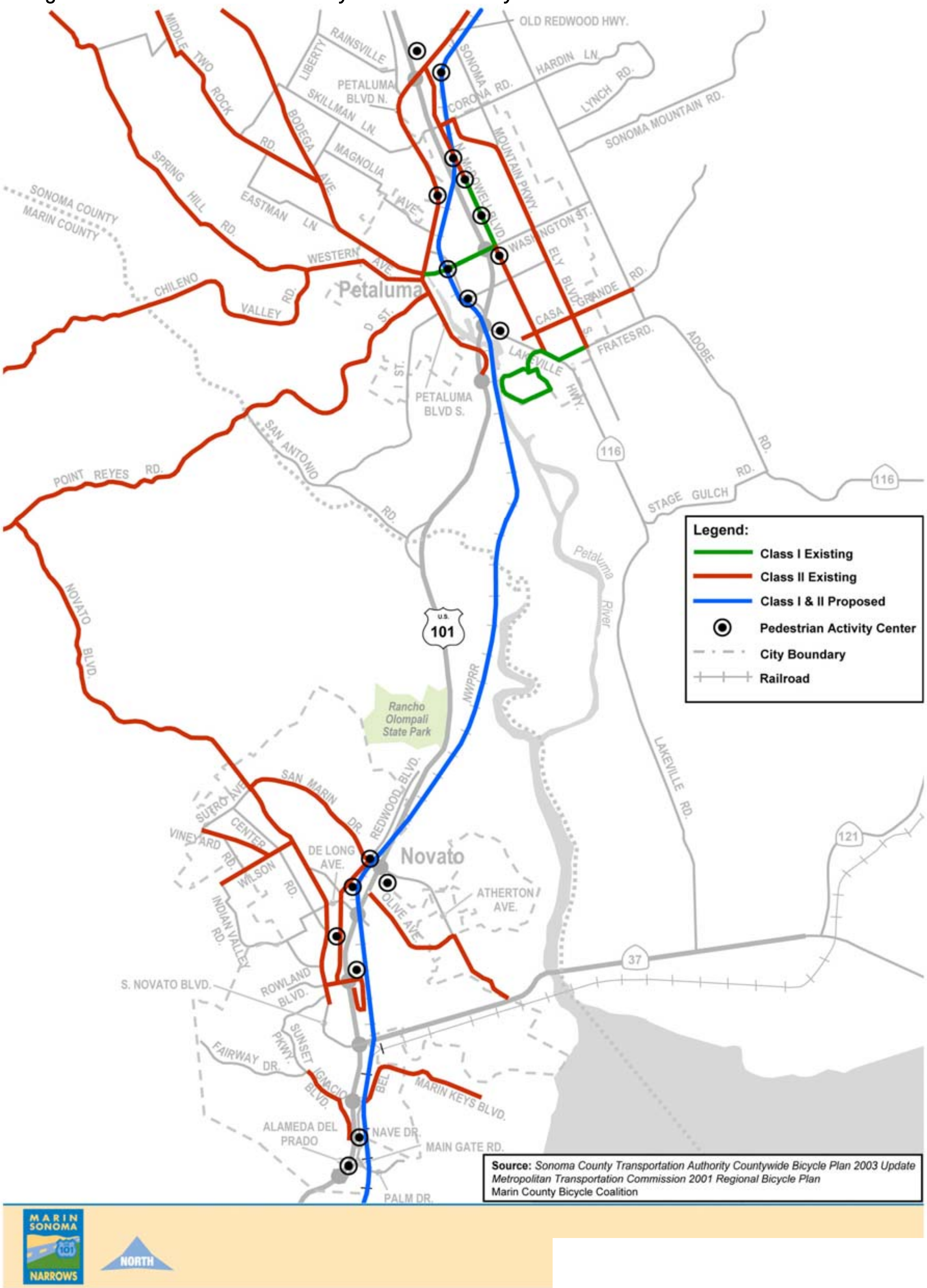
Table 3.1-11 Bikeway Classifications

Bikeway Class	Definition
Class 1 Bikeway (Bike Path)	Provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flow minimized.
Class 2 Bikeway (Bike Lane)	Provides a striped lane for one-way bike travel on a street or highway.
Class 3 Bikeway (Bike Route)	Provides for shared use with pedestrian or motor vehicle traffic.
Source: Caltrans Highway Design Manual, July 1995.	

Marin County

The Marin County Unincorporated Area Bicycle and Pedestrian Master Plan, completed in June 2000, is the primary coordination and planning document for bicycle facilities in Marin County. The existing bikeway system in Marin's unincorporated regions consists of an incomplete system of approximately 14 km (9 mi) of bikeways, including 6 km (4 mi) of multi-use pathways, 3 km (2 mi) of bicycle lanes, and 5 km (3 mi) of signed bicycle routes or other informal routes.

Figure 3.1-10 Pedestrian Activity Centers and Bicycle Routes



Sonoma County

The Sonoma County Transportation Authority Countywide Bicycle Plan Update (2003) contains the countywide plan for bicycle facilities in Sonoma County. The primary goals are to create a countywide non-motorized transportation system that would provide safe and efficient opportunities for bicyclists to access school, work, shopping centers, professional services, and transportation to recreation areas. Bicycle facilities may also serve as recreational paths themselves. Currently, there are over 53 km (33 mi) of off-road Class 1 bicycle paths and 103 km (64 mi) of on-street, or Class 2 bicycle lanes in Sonoma County.

City of Novato

In the City of Novato, an existing Class 2 bikeway runs along Novato Boulevard from just south of Rowland Boulevard to the Novato Boulevard/Point Reyes Road intersection. Another Class 2 bikeway follows Redwood Boulevard and San Marin Drive from Rowland Boulevard to the San Marin Drive/Novato Boulevard intersection. Class 2 bikeways also run along Olive Avenue, Ignacio Boulevard, Bel Marin Keys Boulevard, Wilson Avenue, and Vineyard Road. Proposed bikeway facilities in the Novato portion of the study area will include the North-South Greenway, a multi-use pathway that would parallel US 101 along the old Northwestern Pacific (NWP) railroad right-of-way (see the discussion of the SMART Rail Line, below).

City of Petaluma

In the City of Petaluma, an existing Class 1 and 2 bikeway crosses US 101 at East Washington Street, extending from North McDowell Boulevard to Petaluma Boulevard. East of the highway, another existing bikeway runs along North McDowell Boulevard from south of Casa Grande Road to Redwood Road. Class 2 bikeways include the Casa Grande Road bikeway from Lakeville Highway/SR 116 to Adobe Road and the Ely Boulevard/Sonoma Mountain Parkway bikeway, which extends from Frates Road to Corona Road. West of the highway, several Class 2 bikeways extend from downtown Petaluma to points west, along Bodega Avenue, Middle Two Rock Road, Western Avenue, Chileno Valley Road, and Point Reyes Road. Proposed bicycle facilities in the Petaluma portion of the study area include a Class 1 and 2 bikeway that would follow the route of the old NWP Railway right-of-way (see the discussion of the SMART Rail Line, below).

Sonoma Marin Area Rail Transit (SMART) Rail Line

Although not a state facility, the old NWP Railroad line parallels US 101, and at one time connected Larkspur and Eureka. This rail line, which has not been in service since November 1998, is currently owned by the Sonoma Marin Area Rail Transit (SMART) District, which was created in January 2003. SMART's enabling legislation directed the District to repair the route to return it to freight and commuter/transit use (at least initially between San Rafael and Cloverdale). A pathway for use by bicyclists and pedestrians is being considered. As noted in Section 3.1.9, the SMART passes under the US 101 at four locations within the project boundaries.

Navigation

Petaluma River Bridge No. 20-0154 L&R was built in 1955. The bridges were seismic retrofitted in 1996. In 2001, the barrier rails were upgraded. According to the latest bridge inspection report dated 09/01/2006, the bridges appear to be in good condition. An underwater investigation was completed on 03/24/2004 and no significant defects were observed.

The Petaluma River is a navigable waterway for bridge permitting purposes. The location and clearances of proposed bridges are permitted by the Coast Guard, under the provisions of the General Bridge Act of 1946, as amended. The size and type of vessels operated in the Petaluma River, through the proposed bridge site, have increased to the point that the existing US 101 bridge has become the limiting vertical clearance and the adjacent Haystack Landing Railroad drawbridge has become the limiting horizontal clearance. Historically, the largest vessels on the waterway have been commercial, consisting of tugs pushing barges, approximately 55 ft wide, 300 ft long, and requiring a vertical clearance of 70 ft above the waterline to ensure safe navigation. The existing Petaluma River Bridge provides 30.48 m (100 ft) of horizontal clearance measured between the existing bridge fenders. The existing, to be replaced bridge, minimum vertical clearance, was measured at 21.52 m (70.6 ft) above mean high water at the time of its completion.

The proposed replacement bridge will not reduce the existing navigational opening on the Petaluma River. The US Coast Guard will determine acceptable clearance, such that current and future navigation is not impaired by the structure. Clearance will be stated in the US Coast Guard Bridge Permit.

The Petaluma River, at the proposed bridge site, has an approximate width of 200 feet and is located at a bend in the river, located approximately 404 feet from the Haystack Landing Drawbridge.

3.1.10.3 Impacts

Introduction

Caltrans conducted an analysis of US 101 operations to compare the potential traffic impacts of the two Build Alternatives with the No Build Alternative over the next 20 years. For this comparison, Caltrans developed the following six scenarios:

1. Year 2010 No Build Alternative;
2. Year 2030 No Build Alternative;
3. Year 2010 Fixed HOV Lane Alternative;
4. Year 2030 Fixed HOV Lane Alternative;
5. Year 2010 Reversible HOV Lane Alternative; and
6. Year 2030 Reversible HOV Lane Alternative.

The study area included the freeway mainline from the Miller Creek Interchange in Marin County to the Old Redwood Highway Interchange in Sonoma County with on-ramps and off-ramps.

The Marin/Sonoma Model that Caltrans used for the study is based on land use assumptions from the 1998 base year and 2020 future year trip tables, using ABAG’s Projections 2000 land use data. The 397-zone Marin/Sonoma Model was developed with the assistance of Marin County and Fehr and Peers Associates for the Sonoma Land Use Study Project and was adapted from the Marin County Congestion Management Agency 293-zone model.

The year 2010 and 2030 trip tables were developed by modifying the year 2020 trip tables. Appropriate factors to modify the 2020 trip tables were calculated based on ABAG’s Projections 2002 at the county-to-county level.

ABAG Projections 2005, which was not available at the time the highway operational analysis was conducted, predict slightly lower employment and population in Sonoma County than the ABAG Projections 2002. The 2010 and 2030 trip tables used for this highway operational analysis are therefore somewhat conservative and very similar to those that would have resulted from the use of ABAG Projections 2005 for the factors used to adjust the year 2020 trip tables.

As a general guideline, the year 2010 No Build roadway network reflects existing conditions, plus projects listed in the most recent (2001) RTP with committed funding status, and projects listed in the 2001 Transportation Implementation Plan (TIP). The following projects may impact traffic flow in the study area.

- US 101 widening from Wilfred Avenue to SR 12;
- US 101 widening from SR 12 to Steele Lane;
- Wilfred Avenue Interchange modification and US 101 widening from Wilfred Avenue to Rohnert Park Expressway; and
- US 101 HOV Gap Closure Project from Corte Madera to San Rafael.

The 2030 No Build roadway network is built from the year 2010 network by adding the 2001 RTP Track 1 Projects. These projects may also impact traffic flow in the study area and include:

- US 101 HOV widening from Old Redwood Highway in Petaluma to Rohnert Park Expressway in Rohnert Park; and
- US 101 HOV widening from Steele Lane to River Road in Santa Rosa.

The analysis assumed that HOV lanes in the US 101 corridor in Marin and Sonoma Counties would operate in both the A.M. and P.M. peak hours for both southbound and northbound directions.

Mainline Operations

Unlike other sections in this FEIR/S that separate the analysis of the Fixed and Reversible HOV Lane Alternatives, this discussion of traffic operations presents a comparative assessment to highlight the critical differences among the Build and No Build Alternatives.

Expected traffic conditions during the southbound A.M. peak period, the southbound P.M. peak period, the northbound A.M. peak period, and the northbound P.M. peak period are depicted in Figures 3.1-11 through 3.1-14, respectively, for the above-described six scenarios.

As shown in the figures, queues would be minimized in the study area with implementation of both the Fixed HOV Lane Alternative and the Reversible HOV Lane Alternative. Southbound A.M. peak period queues projected to occur in Segment B under the No Build Alternative would be eliminated. However, the

Reversible HOV Lane Alternative would result in bottleneck queues in Segment C during the southbound P.M. peak period, because this alternative would not provide a southbound HOV lane through Segment B. The lane configuration of southbound US 101 in Segment B under the Reversible HOV Lane Alternative would be similar to the lane configuration under the No Build Alternative.

Southbound Bottlenecks and Queues. As shown in Figure 3.1-11, a new queue would appear between Miller Creek and Nave Drive (south of the project limits) in the southbound direction during the A.M. peak period with implementation of either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative. However, this queue would not develop under the No Build Alternative. The queues shown under the No Build Alternative in Figure 3.1-11 indicate that, if traffic growth occurs as projected, the existing southbound bottleneck at the South Petaluma Boulevard on-ramp in Sonoma County would continue to develop and result in congestion up to East Washington Interchange by 2010. Additional traffic growth projected to 2030 would extend congestion further north to Old Redwood Highway. Although the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative would add enough capacity to eliminate the bottleneck at South Petaluma Boulevard, traffic that was queued before, combined with higher projected 2030 traffic, would result in a new bottleneck developing south of Miller Creek and outside of the project limits. This new bottleneck would result in the queues depicted in Figure 3.1-12.

Northbound Bottlenecks and Queues. As shown in Figure 3.1-13, a new queue would develop along northbound US 101 at Atherton Avenue during the A.M. peak period with implementation of the Reversible HOV Lane Alternative. This queue would develop because the reversible lane would be in operation in the southbound direction, which is where the greater demand would be during the A.M. peak period. However, there would not be enough capacity in the northbound direction during that period to eliminate the bottleneck and queue near Atherton Avenue. This bottleneck would not occur under the Fixed HOV Lane Alternative, because this alternative would include a northbound HOV lane.

As shown in Figure 3.1-14, during the P.M. peak period, the queues depicted in the vicinity of the Miller Creek and Nave/Alameda interchanges would remain with implementation of either of the two Build Alternatives. These queues result from a northward bottleneck between the Nave on ramp and the Ignacio off-ramp during the P.M. peak period. The bottleneck and subsequent queues have no

Figure 3.1-11 Southbound A.M. Peak Period—Expected Traffic Conditions

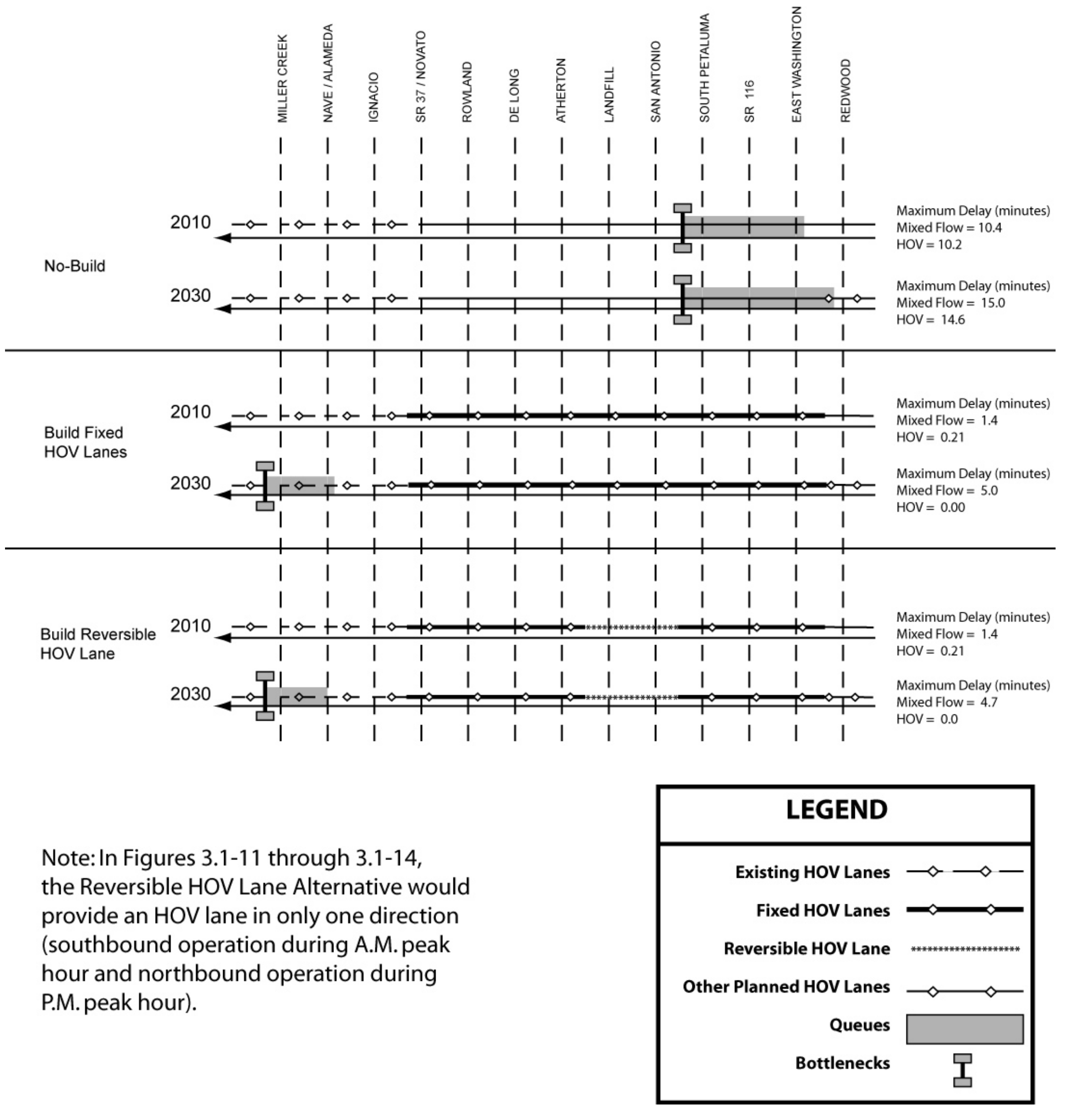


Figure 3.1-12 Southbound P.M. Peak Period—Expected Traffic Conditions

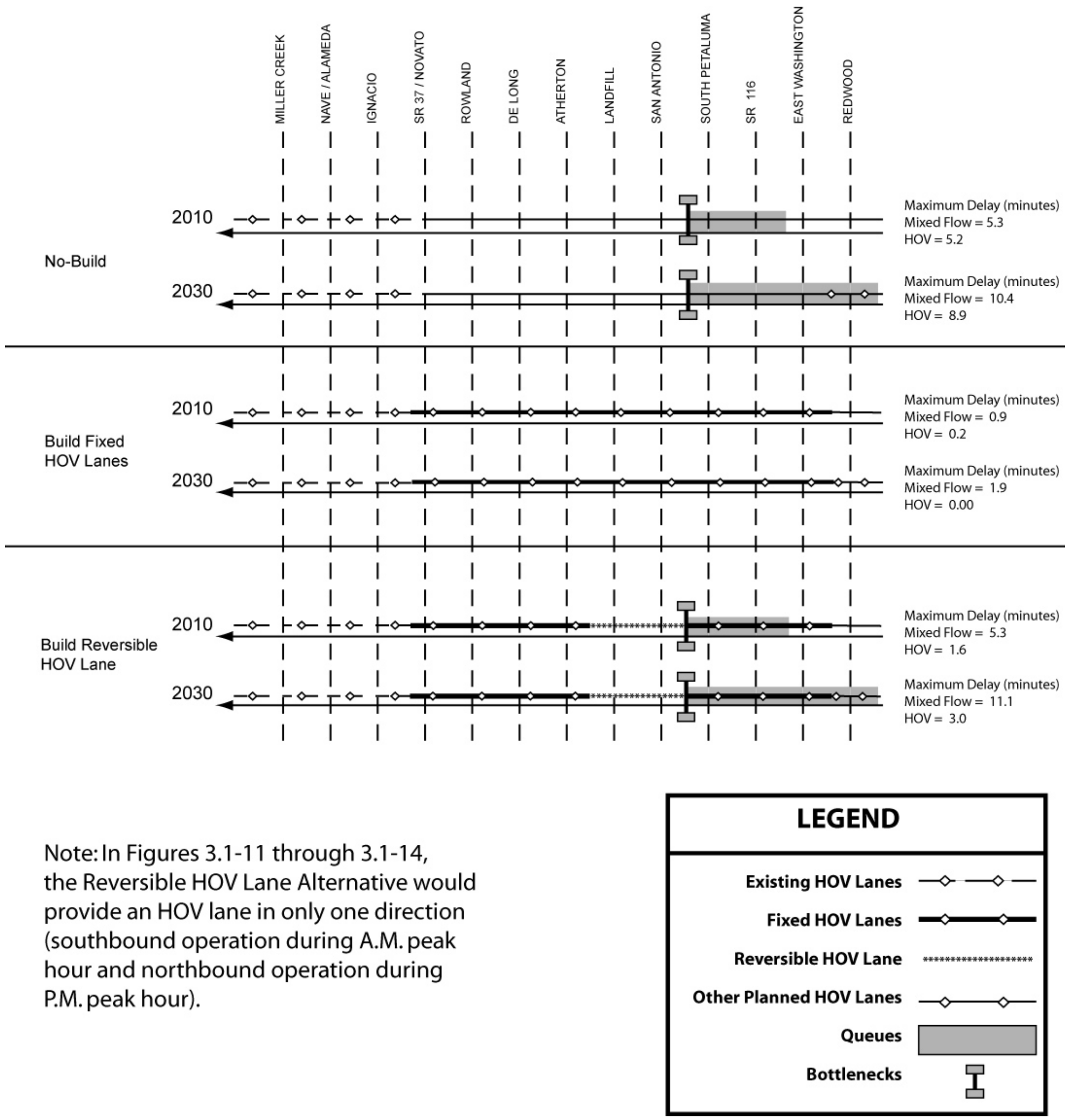
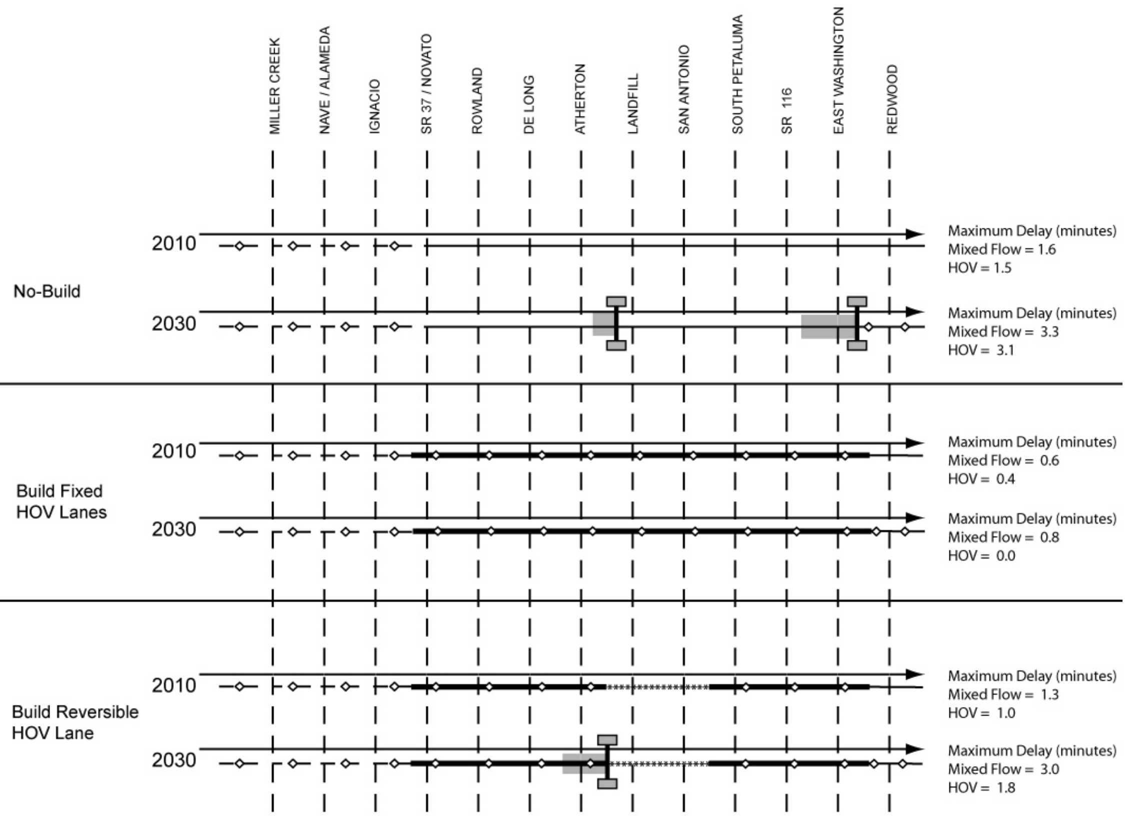


Figure 3.1-13 Northbound A.M. Peak Period—Expected Traffic Conditions



Note: In Figures 3.1-11 through 3.1-14, the Reversible HOV Lane Alternative would provide an HOV lane in only one direction (southbound operation during A.M. peak hour and northbound operation during P.M. peak hour).

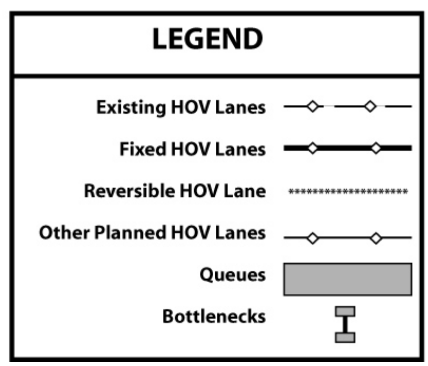
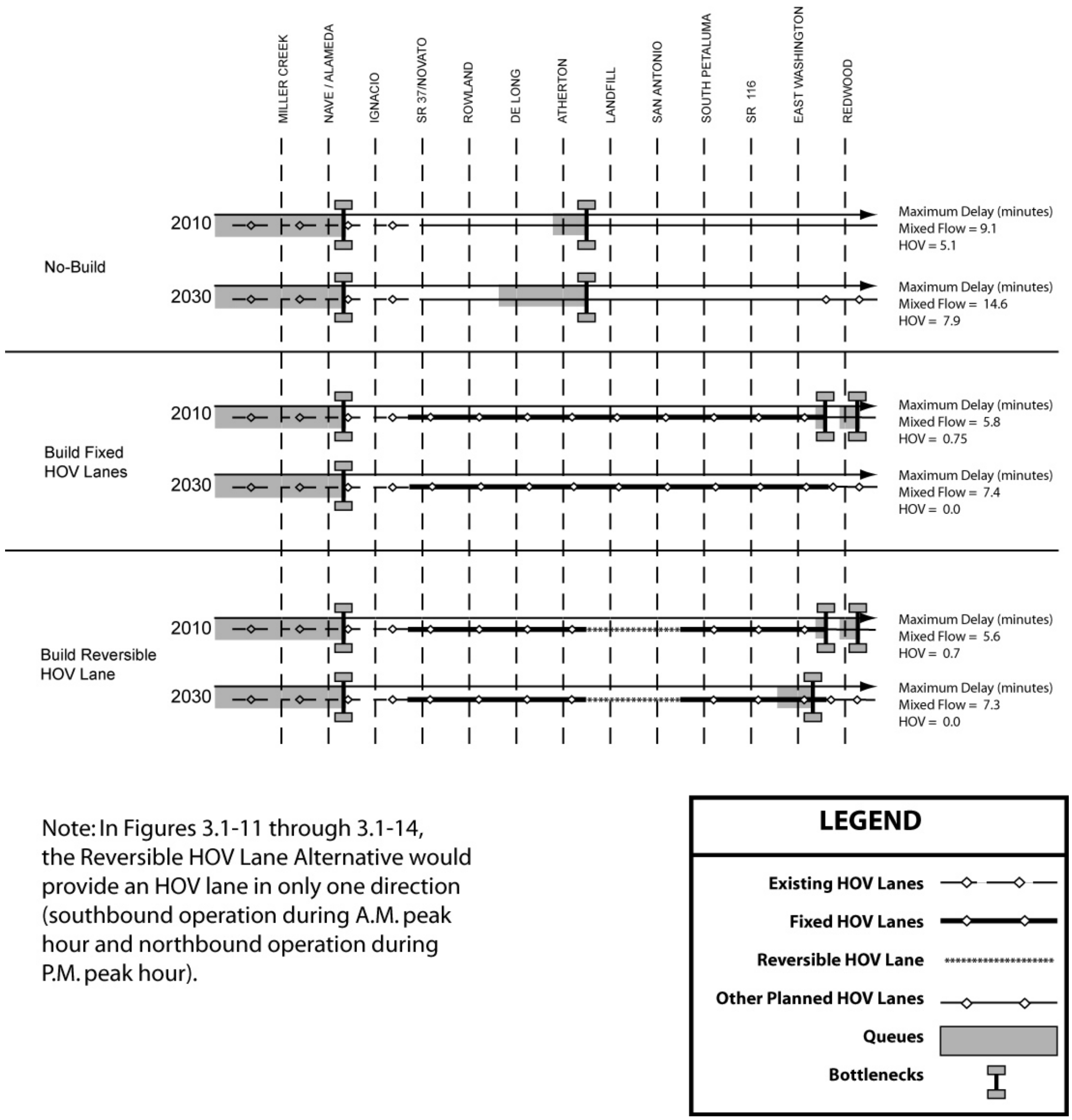


Figure 3.1-14 Northbound P.M. Peak Period—Expected Traffic Conditions



causal connection to the MSN Project, as it appears under all the alternatives in 2010 and 2030. There is a project listed in MTC's Transportation 2030 Plan, called US 101 northbound speed change lane at Nave Drive; however, this project is not yet at the Project Initiation Document stage, and there is no traffic study to indicate whether this would remedy the bottleneck in this location.

Vehicle Delay. Another measure of traffic flow and congestion is an estimate of the amount of delay experienced by motorists, compared to free-flow conditions on the freeway. Tables 3.1-12 and 3.1-13 summarize vehicle delay within the study limits for the above-described six scenarios for both the A.M. and the P.M. peak periods. As shown, implementation of either of the two Build Alternatives would result in a reduction in vehicle delay in both the A.M. and P.M. peak periods for both SOVs that would continue to travel in mixed flow lanes and HOVs when compared with the No Build Alternative. Implementation of the Fixed HOV Lane Alternative would result in the least amount of overall vehicle delay for HOVs. In other words, motorists traveling in the HOV lanes under this alternative would experience the greatest time savings in their trips.

Table 3.1-12 Maximum Southbound Vehicle Delays (minutes)

Alternatives	Occupancy	Year 2010		Year 2030	
		A.M.	P.M.	A.M.	P.M.
No Build	Mixed Flow (SOV)	10.4	5.3	15.0	10.4
	HOV Traffic (2+)	10.2	5.2	14.6	8.9
Fixed HOV Lane	Mixed Flow (SOV)	1.4	0.9	5.0	1.9
	HOV Traffic (2+)	0.2	0.2	0.0	0.0
Reversible HOV Lane	Mixed Flow (SOV)	1.4	5.3	4.7	11.1
	HOV Traffic (2+)	0.2	1.6	0.0	3.0

Table 3.1-13 Maximum Northbound Vehicle Delays (minutes)

Alternatives	Occupancy	Year 2010		Year 2030	
		A.M.	P.M.	A.M.	P.M.
No Build	Mixed Flow (SOV)	1.6	9.1	3.3	14.5
	HOV Traffic (2+)	1.5	5.1	3.1	7.9
Fixed HOV Lane	Mixed Flow (SOV)	0.6	5.8	0.8	7.4
	HOV Traffic (2+)	0.4	0.8	0.0	0.0
Reversible HOV Lane	Mixed Flow (SOV)	1.3	5.6	3.0	7.3
	HOV Traffic (2+)	1.0	0.7	1.8	0.0

It should be noted that completion of the US 101 HOV Lane Project from Old Redwood Highway to Rohnert Park Expressway in Santa Rosa assumed under

2030 conditions would reduce vehicle delay for HOVs when compared with 2010 conditions. This reduction in delay is reflected in the tables.

Table 3.1-14 shows the travel time savings HOV lane users would experience compared with vehicles in the mixed-flow lanes with implementation of either of the two Build Alternatives. As shown, implementation of either of the Build Alternatives would result in peak direction time savings for HOVs of one to five minutes in 2010 and five to seven minutes in 2030. The greater time savings in 2030 is a result of the implementation of the US 101 HOV widening project from Old Redwood Highway to Rohnert Park Expressway in Santa Rosa assumed in the No Build Alternative.

Table 3.1-14 Expected HOV Travel Time Savings (Minutes)

Alternatives and Direction	Year 2010		Year 2030	
	A.M.	P.M.	A.M.	P.M.
Fixed HOV Lane				
Southbound	1.2	0.7	5.0	1.9
Northbound	0.2	5.0	0.8	7.4
Reversible HOV Lane				
Southbound	1.2	3.8	4.7	8.1
Northbound	0.3	4.9	1.2	7.3

Vehicle Miles Traveled (VMT). Table 3.1-15 has been corrected since the DEIR/S; however, the current findings are the same as those reported in October 2007. There is a nominal increase in VMT between the No Build and Build Alternatives which suggests that the reduced congestion on US 101 would attract additional travelers.

Table 3.1-15 Projected Increase in Vehicle Miles Traveled Countywide (in thousands of miles), Year 2030

Alternatives	Project Area		Marin County and Sonoma County	
	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak
No Build	5,312	6,358	16,614	20,133
Build Alternatives	5,318	6,367	16,625	20,154
Difference	6	9	11	21
Percent Increase	0.11%	0.14%	0.07%	0.10%

Replacement Access (Segment B Access Options)

Access Options. Access to US 101 for adjacent property owners throughout Segment B would be provided to via proposed access roads. The specific locations of the access points will be determined during the design phase based upon Access Option 12b, as part of the Preferred Alternative. Based on 12b, access point locations will be developed with input from the individual property owners affected by the project.

Each of the Access Options was evaluated on how well it replaces access to three major areas, Redwood Landfill, San Antonio Creek, and Cloud Lane/Kastania Road. The rating scheme considered both “main” access serving major or heavier traffic movements and “local” access serving individual properties. Main access at Redwood Landfill, for example, covers the traffic movements to and from the landfill, the marina, and Gnoss Airport. In the rating scheme, the ability of an Access Option to provide main access was weighted more heavily to reflect the higher traffic volumes and thus the higher number of motorists served. A more detailed description of the evaluation methodology is provided in Appendix A of this FEIR/S.

Access Option 4b, which includes interchanges at Redwood Landfill and at the San Antonio Overcrossing, was the most highly rated scenario, providing excellent access for the heavier traffic movements around the Redwood Landfill and San Antonio Creek. The other Access Options were scored lower. The overall access ratings for Access Options 12b, 14b, and 14d were identical, but the ratings to individual areas vary. Option 12b, which includes an interchange at Redwood Landfill and no overcrossing at San Antonio Road, was rated excellent for major traffic movements around the Redwood Landfill, good for main access around San Antonio Creek, and poor for local access to the uses around San Antonio Creek. By contrast, Access Options 14b and 14d, which do not include an interchange at Redwood Landfill but do include an interchange at San Antonio Road, rated poor in terms of serving the heavier traffic volumes around Redwood Landfill, but excellent in terms of serving land uses around San Antonio Creek. All four of the Access Options provide good local access to residents and businesses around Cloud Lane and Kastania Road.

In summary, the distinguishing features among the Access Options are the ability to replace access for heavier traffic movements around Redwood Landfill and main and local access around San Antonio Creek:

- For Redwood Landfill, Access Options 4b and 12b rate higher than Access Options 14b and 14d.

- For San Antonio Creek, Access Options 4b, 14b, and 14d rate higher than Access Option 12b.

No Build Alternative. The No Build Alternative would not involve transportation changes in Segment B. Therefore, there would be no need for replacement access and no change to traffic and circulation conditions for main and local access.

Intersection Operations

Traffic conditions were analyzed at the US 101 southbound ramps/Atherton Avenue and northbound ramps/Atherton Avenue intersections for the years 2010 and 2030. The intersection LOS for all three alternatives is shown in Table 3.1-16. As previously stated in Section 3.1.10, the operation of the southbound ramps/Atherton Avenue intersection is influenced by the operation of the Redwood Boulevard/Atherton Avenue intersection to the west. A westbound storage length of 100 m is inadequate to accommodate future A.M. peak hour traffic if poor operations occur at this intersection. Consequently, the westbound approach queue would cause operations to deteriorate at the upstream southbound ramps/Atherton Avenue intersection.

Table 3.1-16 US 101 Levels of Service at Intersections: Southbound Ramps/Atherton Avenue and Northbound Ramps/Atherton Avenue

Alternatives	Year 2010		Year 2030	
	A.M.	P.M.	A.M.	P.M.
Southbound				
No Build	B	A	B	A
Fixed HOV Lane	B	A	B	A
Reversible HOV Lane	B	A	B	B
Northbound				
No Build	B	C	C	D
Fixed HOV Lane	B	C	C	D
Reversible HOV Lane	B	C	C	D

Construction of Roadway

Fixed HOV Lane Alternative. Due to the high-traffic volumes and existing delays, any construction activity on US 101 requires that staged construction be considered to minimize impacts to the traveling public. Preliminary Staged Construction designs have been completed for all major elements of the proposed MSN Project. Through a multi-stage approach, the existing number of lanes would be maintained throughout construction.

The median widening, primarily in Segments A and C, would be performed in three stages. Stages 1 and 2 would widen a 1.7 to 3.6 m (6 to 12 ft) strip adjacent to the existing number 1 lane (the lane adjacent to the median). This work may be done at night and on weekends using lane closures. At the end of each stage, k-rail would be placed to provide a minimum 0.6 m (2 ft) shoulder. Stage 3 would complete the median widening.

Significant portions of the roadway in Segment B would be reconstructed. Some of this work can be constructed in two stages. Alignments have been developed to allow building portions of the roadway on either side of the existing roadway. One direction of traffic would then be shifted onto the newly build roadway. Other portions of the reconstruction, where the existing alignment is being maintained, would require a three stage construction. The median would be constructed during the first stage then used alternately for each direction of traffic while that side is being reconstructed.

Work along the outside shoulder through portions of Segment A would be needed for soundwall construction. This work would be done behind k-rail with shoulder closures after the median widening is completed. Outside widening is also required in Segment C. This work would be done behind k-rail with traffic shifted to the median to provide an outside shoulder.

At this time, it is anticipated that the majority of mainline work can be carried out during typical 8-10 hour work shifts; no 24-hour lane closures are expected. Most access and circulation impacts as a result of street closures and detours would be temporary and construction related. Construction impacts may cause additional traffic delays during peak and off-peak periods. During construction, roadway capacities would be maintained similar to existing conditions, therefore, construction related delays would be minimized.

Reversible HOV Lane Alternative. In Segments A and C, the improvements and scope of work would be identical for the Reversible HOV Lane Alternative and the Fixed HOV Lane Alternative. As a result, the same construction-related impacts of additional delays during peak and off-peak periods described for the Fixed HOV Lane Alternative, above, would apply to the Reversible HOV Lane Alternative.

Access Options. The Access Options proposed for Segment B involve various combinations of interchanges, access roads, and bicycle/pedestrian facilities.

Construction-related access impacts would occur where properties are currently accessed either directly from the mainline or from local roads. Closure of some portions of access roads and/or temporary traffic control measures may be required.

No Build Alternative. The No Build Alternative would involve only maintenance and upkeep of the existing US 101 facilities. No new significant construction would be expected. During rehabilitation, additional delays during peak and off-peak would be expected, as described for the Build Alternatives, although for a shorter duration under the No Build Alternative.

Pedestrian and Bicycle Facilities

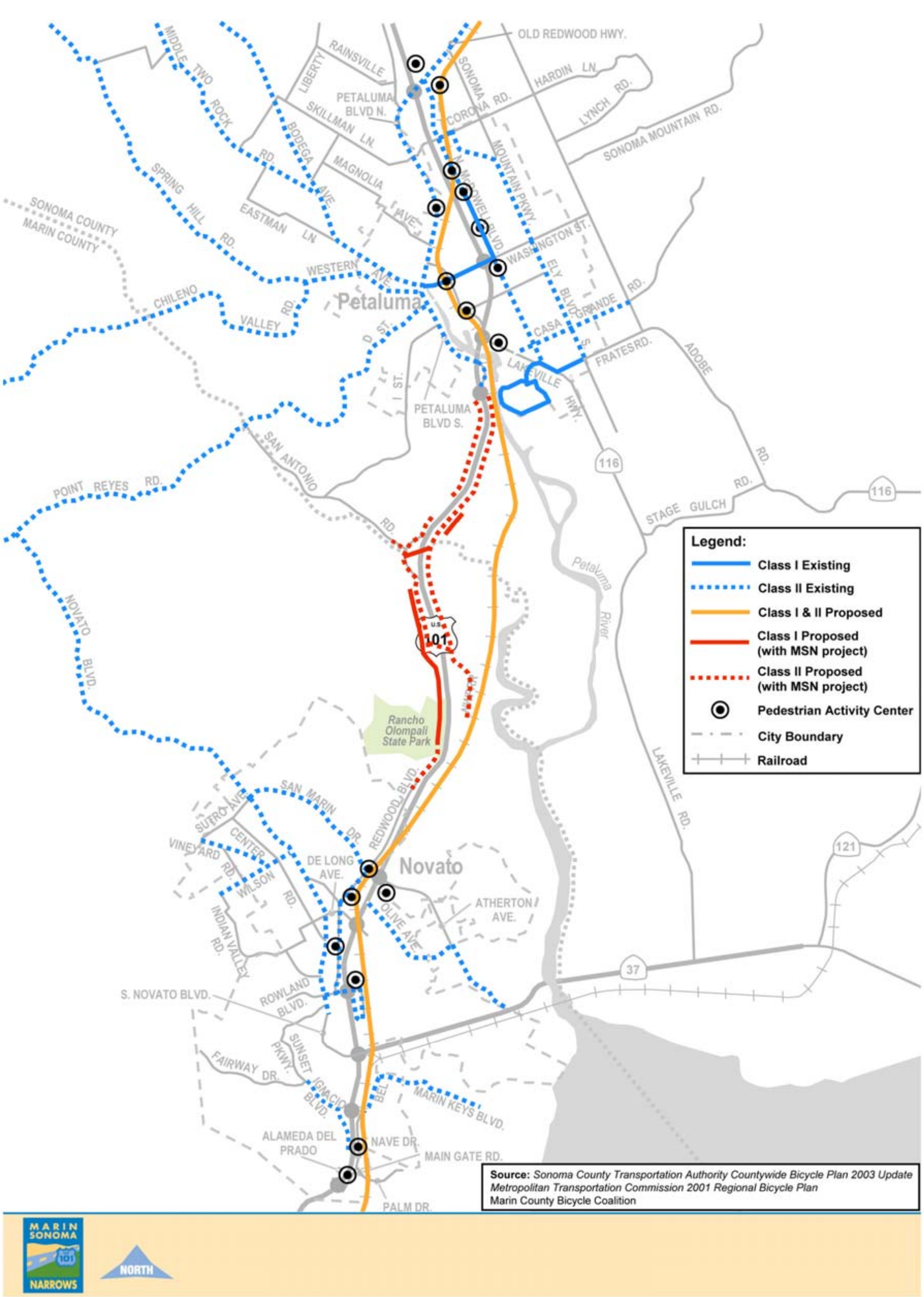
Fixed HOV Lane Alternative. During stakeholder meetings, the bicycle/pedestrian community expressed the importance of being able to access Olompali SHP and San Antonio Road from either the east or west side of US 101, as well as the importance of accessing the SMART corridor that is being proposed as part of the commuter rail proposal. The bicycle/pedestrian paths proposed under the Fixed HOV Lane Alternative would provide these connections.

Under the Fixed HOV Lane Alternative, bicycle/pedestrian paths would be provided throughout the new freeway segment as part of the Access Options (see description, below) to replace existing bicycle access along the expressway shoulder. The construction of access roads within Segment B would also allow construction of a combination of Class 1 and Class 2 bicycle paths between the cities of Novato and Petaluma. Figure 3.1-15 shows the bicycle/pedestrian routes that would be constructed under the Fixed HOV Lane Alternative along with existing and proposed routes in Novato and Petaluma.

In light of the proposals to construct new bicycle/pedestrian facilities that connect desired destinations and other planned or existing paths, the Fixed HOV Lane Alternative would have beneficial effects on bicycle/pedestrian circulation.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would include the same bicycle/pedestrian improvements as the Fixed HOV Lane Alternative (see description of Access Options, below). Accordingly, the Reversible HOV Lane Alternative would have beneficial effects on bicycle/pedestrian circulation.

Figure 3.1-15 Bike/Pedestrian Routes under the Build Alternatives



Access Options. Pedestrian and bicycle paths would be constructed as part of the local road network proposed under each of the Access Options. In general, Class 2 bicycle/pedestrian paths would be provided on access road shoulders and Class 1 bicycle/pedestrian paths would be provided from the terminus of access roads to the next overcrossing. As noted above under the Build Alternatives, the construction of new bicycle/pedestrian facilities that connect desired destinations and other planned or existing paths in Segment B, where none officially exist currently, would be a beneficial effect. Descriptions of the key bicycle/pedestrian facilities under the various Access Options are provided below.

Under all of the Access Options, a Class 2 bicycle/pedestrian path would proceed northward from the Atherton Interchange along a repaved Redwood Boulevard on the west side of US 101.

Under Access Option 4b, a Class 1 bicycle/pedestrian path would be constructed on the west side of US 101 from the Olompali SHP entrance northward past Silveira Dairy (see Figure 3.1-45) and past the proposed South San Antonio Road Overcrossing. From this point, a Class 2 bicycle path would begin northward along a repaved San Antonio Road and over a new bridge just west of the historic San Antonio Bridge, which would be left in place and used for bicyclists and pedestrians (see Figures 3.1-28 and 3.1-29).

Also, under Access Options 4b and 12b, a Class 2 bicycle/pedestrian path would be provided on the west side of US 101 from Cloud Lane, extending northward over Kastania Road and continuing to South Petaluma Boulevard. From this point, the SMART rail corridor would be accessible under all the Access Options.

Under all the Access Options, a Class 1 bicycle/pedestrian path would be constructed between San Antonio Road on the west side of US 101 to the east side of US 101 along San Antonio Creek. A visual simulation of this path is shown in Figure 3.1-38. This bicycle/pedestrian path would become a Class 2 facility along San Antonio Road, as shown in Figure 3.1-38.

Under Access Option 14d, a Class 2 bicycle/pedestrian path would extend from the Redwood Landfill Overcrossing to the San Antonio Overcrossing on the west side of US 101 past Silveira Dairy. Under Access Option 4b, this path is a Class 1 facility and is depicted in Figure 3.1-47. These and other portions of the bicycle/pedestrian networks proposed under Access Options 4b, 12b, 14b, and 14d are shown in Volume 2 of the FEIR/S.

A Class 1 bicycle/pedestrian facility through Segment B within the existing project footprint will be considered during the final design stage if it is determined to be feasible. Although conceptual plans have not been prepared, impacts of a Class 1 facility would be comparable to or less than the impacts discussed in this FEIR/S.

No Build Alternative. There would be no change to the existing bicycle access in the project corridor under the No Build Alternative. Under the No Build Alternative, there would be no impacts to pedestrian or bicycle lanes within Segments A or C.

Under the No Build Alternative, Class 2 bicycle access through Segment B would continue along the expressway shoulder. However, bicyclists and pedestrians would continue using Atherton in Novato or South Petaluma Boulevard to reach destination centers such as Olompali SHP or San Antonio Road. Furthermore, if the SMART bicycle/pedestrian trail becomes operational, bicyclists and pedestrians on the west side of US 101 would not be able to access it along the Segment B due to lack of public overcrossings under the No Build Alternative.

Navigation

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would add an additional lane in both directions on US 101. Due to the age of the Petaluma River Bridge structures and the need to improve the vertical profile of the roadway alignment to current standards in this location, it is proposed to replace these two structures with one single structure.

The existing structures need to be widened to accommodate an additional 3.6 m (12 ft) lane and 3.0 m (10 ft) inside and outside shoulders. There is an existing fender system protecting the bridge bents at each side of the waterway. This fender system will be removed during construction in order to facilitate bridge construction work. The new bridge will meet current and future navigational needs through the waterway. The new Pier 3 will likely be located away from the waterway limit. A new bridge fender system or a closed fill system will likely be required for Pier 4. Two structure alternatives are proposed for the replacement bridge. Both alternatives would construct a 260.5 m (855 ft) long and 35.110 m (115 ft) wide, five-span bridge. Alternative 1 would consist of a reinforced concrete box girder superstructure. Alternative 2 would consist of a Precast/Prestressed Concrete Bulb "T" girder superstructure (see Figures 3.1-39 and 3.1-40 for a visual simulation of the proposed bridge). The substructure for both alternatives consists of reinforced concrete column piers supported on spread footings or on pile caps with cast-in-drilled hole (CIDH) or cast-in-steel shell (CISS) pilings. Both alternatives proposed between three to five columns per pier for a total of between twelve to twenty columns for the four piers. The size of the individual column footing is approximately 10.67 m (35 ft) x 8.5 m (28 ft) x 2.0 m (7 ft) deep. It is anticipated that each column footing will consist of twenty-five to forty 457 mm (18-inch) to 762 mm (30-inch) diameter CIDH or CISS pilings for each of the twelve to twenty columns. No alterations to hydraulic patterns are expected.

Petaluma River Bridge Construction

The bridge will be constructed in three stages. In Stage 1, the middle portion of the proposed replacement bridge will be built in-between the two existing structures. The existing median barriers will be removed in Stage 1. In Stage 2, the existing southbound structure will be removed for the replacement bridge construction. In stage 3, the northbound structure will be removed to allow for the construction of the final portion of the replacement bridge.

The contractor will access the north bank of the river from SR 116 along the east side of US 101. The contractor will access the south bank of the river from South Petaluma Boulevard. Piers 2 and 5 are located above the banks of the Petaluma River. Pier 3 is located on land at the edge of the north bank the river. Pier 4 is located in the river, adjacent to the south bank. It is anticipated that the contractor will need to construct a temporary trestle to gain access to Pier 4 and to gain access to the south side of Pier 3. The contractor will drive temporary piles in the river and place a temporary timber deck on the pilings to create a work platform (trestle) above the river. A temporary cofferdam consisting of sheet pilings will then be installed around the perimeter of Piers 3 and 4. It is anticipated that one large cofferdam, approximately 45.72 m (150 ft) x 11.58 m (38 ft) will be installed per pier location.

Temporary cofferdams may also be used at Piers 2 and 5, if ground water is anticipated. Four additional cofferdams approximately 12 m (39 ft) x 7 m (22 ft) may be used for demolition of the exiting column footings in the river. Cofferdams will be constructed of interlocking sheet pilings, which will be driven by a vibratory hammer. If difficult driving is encountered, an impact hammer may be used for the final few feet of installation.

In order to facilitate the construction of the proposed replacement bridge, temporary falsework may be required. The falsework is used to support construction loads such as bar reinforcing steel, wet concrete and live loads (construction crew, equipment, etc.). The falsework bents may be constructed using steel or timber posts supported on timber pads placed on top of existing ground or piles driven into ground depending on the bearing capacity of the soil. To gain access to falsework and/or temporary erection towers locations in the river, the contractor will extend the north and south temporary trestles towards the center of the river.

After the completion of Stage 1 and Stage 2 proposed replacement bridge construction, the existing northbound and southbound bridges will be removed. For the portion of the structure over the waterway, the structure can be removed by saw cutting between precast concrete girders and then using crane(s) to lift the girders out of place. Subject to the engineer's approval, the crane(s) can be located at the adjacent spans of the bridge or barge cranes can be utilized to remove the girders. Bridge removal protective cover, if necessary, can be attached to the existing bridge soffit/bents. Temporary cofferdams will be required for the removal of the existing columns and/or spread footings at Pier 5 and Pier 6, made accessible by using the temporary trestle. Alternatively, the cofferdams may not be necessary if a closed fill system with sheet pile retaining members is built in the vicinity and along the alignment of the existing bridge fenders. This option will allow for the area between Pier 5 and Pier 6 to its respective banks to be dewatered and backfilled in order to provide temporary access for construction activities.

Existing footings in water and on banks will be removed to a required minimum elevation or distance below original ground.

After completion of the new bridge, all temporary cofferdam, temporary fender system, temporary erection tower, and falsework material will be removed completely from the waterway as required by the U.S. Army Corps of Engineers and the Coast Guard. A new permanent pier protective system consisting of either a closed fill system or a fender system of driven piles and barriers will be placed to protect the new bridge Pier 4. Finally, the creek banks will be stabilized and erosion control BMPs will be placed.

Reversible HOV Lane Alternative. Under this alternative, navigational impacts would be the same as under the Fixed HOV Lane Alternative, and the proposed structures would be the same under either Build Alternative. No alterations to hydraulic patterns are expected.

Access Options

The Petaluma River Bridge replacement does not vary with any of the Access Options. It would be replaced under either Build Alternative; therefore, the navigational impacts would be the same as described above.

No Build Alternative. Under the No Build Alternative, the existing structure of the bridge would remain in place, and no changes to the navigational channel are anticipated.

3.1.10.4 Avoidance, Minimization, and/or Mitigation Measures

Mainline Operations

No mitigation would be required under the Build Alternatives, as long-term impacts of the alternatives on transportation and vehicular traffic would generally be beneficial, considering the reductions in traffic delay throughout the project area. Both Build Alternatives would also provide greater capacity in the mixed-flow lanes, facilitating truck traffic and movement of goods.

Pedestrian and Bicycle Facilities

Completing the new access road system prior to beginning roadway realignment/ widening operations in Segment B would provide pedestrians and bicyclists with an alternate route during construction. These and other options would be considered during the design phase as the traffic management plan is being developed.

Construction Management Plan for Pedestrian/Bicycle Traffic. Most impacts to pedestrian and bicycle facilities as a result of street closures and detours would be temporary and construction related. Closure of some portions of access roads where bicycle and pedestrian access currently exists may be required during the construction phase of the project. It is likely that temporary access roads would be unpaved for an extended period of time.

Construction-phase measures will include providing netting under structure falsework (or other measures) to ensure that debris would not fall onto existing pedestrian and bicycle paths, and additional signage to alert bicyclists and pedestrians of construction work zones.

Coordination with Local Jurisdictions and Pedestrian/Bicycle Advisory. Caltrans will work with the counties, the cities of Novato and Petaluma, and the Bicycle Pedestrian Advisory Group to ensure that the Build Alternatives conform with existing and proposed facilities.

Construction Traffic Management Plan. Caltrans will develop a traffic management plan to safeguard work-zone safety, minimize mobility impacts, and provide up-to-date information to the public during roadway stage construction.

This plan will include a program to provide the public with information on temporary traffic impacts (e.g., detours and temporary lane closures). ITS would be in effect to provide pre-trip and en-route roadway condition information, such as advanced traveler information systems and changeable message signs. ITS also includes coordination of freeway service patrols to remove disabled vehicles as necessary.

The traffic management plan will be developed with the assistance of Caltrans Highway Operations, Traffic Management and Traffic System. Marin County, Sonoma County, the cities of Novato and Petaluma will also be consulted in the development and implementation of this plan. Caltrans will also work with the Coast Guard concerning Petaluma River Bridge operations.

Bridge Construction. Proposed construction plans, including falsework construction plans, will be submitted to the Coast Guard at least 30 days prior to the start of construction. The Coast Guard and Caltrans will coordinate with waterway users to ensure any proposed temporary structures do not impede navigation during construction. A fender system may be installed around any temporary structure erected in the waterway to protect the falsework and/or erection towers from being hit by a vessel.

3.1.11 Visual/Aesthetics

Key viewpoints were identified to represent the visual character of the project setting (Figure 3.1-16) and evaluate visual quality. The assessment of existing visual quality for each of the landscape units was based upon three criteria as defined in the FHWA Visual Impact Assessment (VIA) methodology: vividness, intactness, and unity (FHWA, 1988). These criteria are defined as follows:

- **Vividness** is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- **Intactness** is the visual integrity of the natural man-made landscape of the immediate environs and its freedom from encroaching elements.
- **Unity** is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

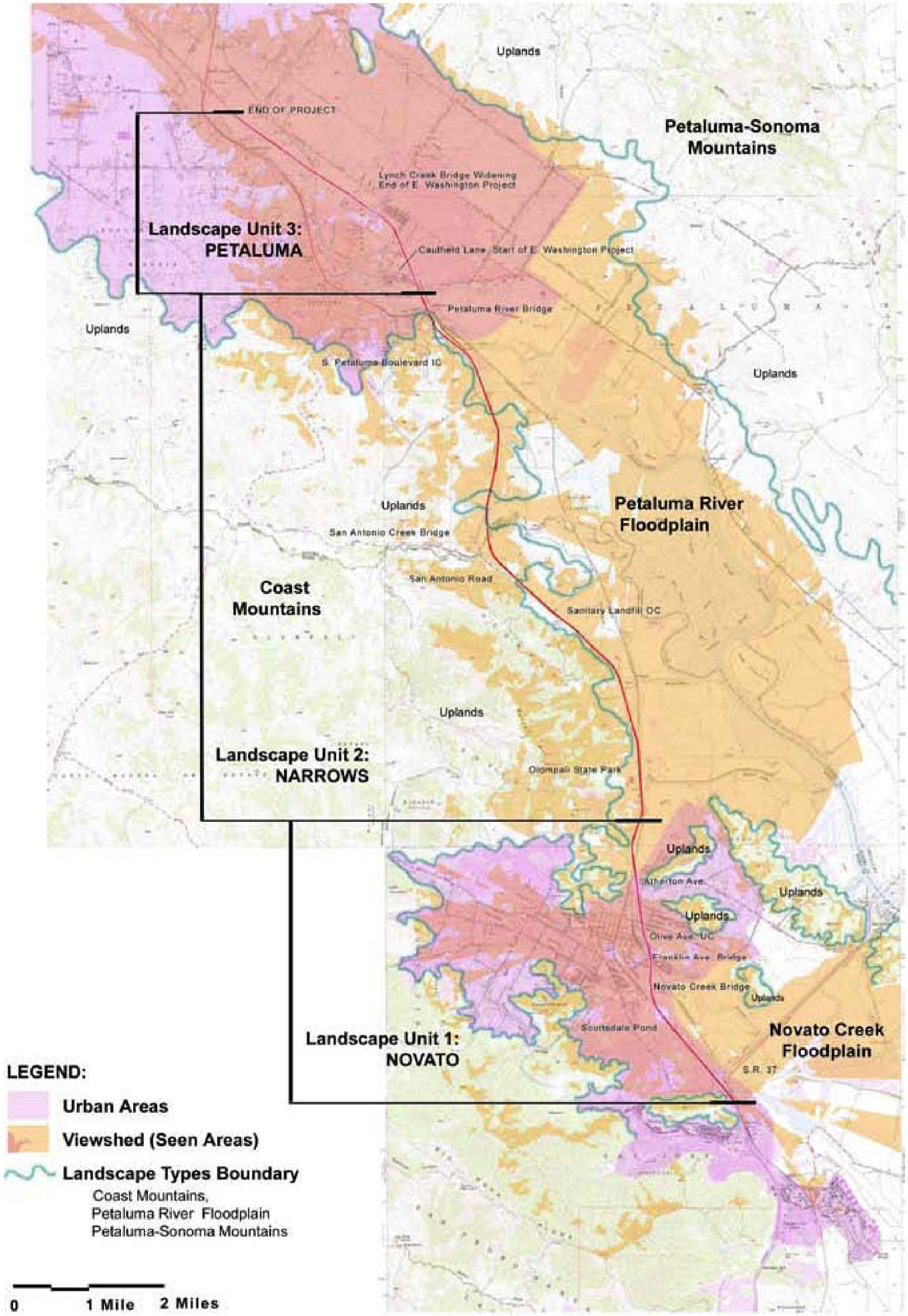
Following the FHWA methodology visual impacts are evaluated in terms of change in overall visual quality, in the context of viewer exposure and anticipated viewer sensitivity, based primarily on viewer activity type and expressions of public policy.

3.1.11.1 Regulatory Setting

NEPA establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings [42 U.S.C. 4331(b)(2)]. To further emphasize this point, the Federal Highway administration in its implementation of NEPA [23 U.S.C. 109(h)] directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

Likewise, the CEQA establishes that it is the policy of the state to take all action necessary to provide the people of the state "with…enjoyment of *aesthetic*, natural, scenic and historic environmental qualities." [CA Public Resources Code Section 21001(b)]

Figure 3.1-16 Visual Impact Assessment Study Areas



3.1.11.2 Affected Environment

The viewshed of the MSN Project area is generally bounded to the west by slopes of the Coast Range and to the east by the Petaluma-Sonoma Mountains. For purposes of analysis, the project area was divided into three major landscape units corresponding approximately to the distinctive geographic segments of the City of Novato, the Novato Narrows, and the City of Petaluma (Figure 3.1-16).

Landscape Unit 1: City of Novato (Southern Segment)

The City of Novato includes a mixture of urban and open space visual elements. As a landscape unit, the City of Novato is well-defined by intact, high wooded slopes that enclose the urbanized portions of Novato Valley on three sides to elevations of over 450 m (1,558 ft) at Burdell Mountain. These hills are visually characterized by a native live oak and mixed evergreen forest canopy. The landscape is also typified by low-rise suburban development on the valley floor and lower slopes of the Novato Valley, whose visual intactness is enhanced by a nearly continuous tree canopy that provides a visually unifying natural character to views (Figure 3.1-17).

Within the City of Novato the highway corridor is also characterized by substantial areas of open space in the immediate visual foreground, including the Anderson Rowe Open Space, Ehreth Pond Wildlife Preserve, Scottsdale Pond and Marsh, and open spaces created by portions of the SR 37 and Rowland Boulevard Interchange. Views from the highway mainline to wetland open spaces and San Pablo Bay to the east, however, are limited, constrained by topography and foreground development.

Because of intact mountain slopes and ridges to the west, the preponderance of tree canopy on the valley floor, and the abundance of public open space within the highway foreground, the visual quality in this unit, despite its urban character, is moderately high.

Landscape Unit 2: Novato Narrows (Central Segment)

North of the City of Novato the project corridor is largely undeveloped and scenically intact. The slopes of Burdell Mountain, including Olompali SHP and extensive oak woodland and grassland, dominate views to the west (Figure 3.1-18). Roadside light industrial facilities, including Gnoss Field Airport, are visible in the southernmost portion of this landscape unit but remain visually

Figure 3.1-17 Landscape Unit 1: City of Novato

Landscape Unit 1: City of Novato (Southern Segment)

View of U.S. 101 in City of Novato, looking north toward Mount Burdell

Open Space within highway corridor, City of Novato, looking east from U.S. 101

View of City of Novato, looking west from U.S. 101

Figure 3.1-18 Landscape Unit 2: Novato Narrows

Landscape Unit 2: Novato Narrows (Central Segment)

View of Petaluma River and floodplain, looking east from U.S. 101

Coast Range hills, oak and mixed evergreen woodland, looking west from U.S. 101

Riparian woodland, rolling oak/ grassland landscape near San Antonio Creek subordinate to the intact natural features of the landscape, including the Petaluma River to the east. The Birkenstock building and Buck Foundation, because of their distinctive architecture, contribute vivid elements to the view. The recently completed Sanitary Landfill Road Overcrossing is located north of Olompali SHP and has resulted in a decline in intactness and visual quality in the immediate vicinity. North of Olompali SHP, the landscape is also characterized by high visual quality, comprising predominantly rolling foothills with intact oak woodland/grassland, punctuated by vivid corridors of tall riparian vegetation, notably at San Antonio Creek. Southbound vistas also include dramatic views of high ridges of the Coast Mountains in the approach toward San Antonio Creek. Roadside vegetation is largely native, with segments of roadside ornamental landscaping north of Gambini Road and in the approach to the Petaluma River Bridge.

Visual sensitivity of motorists throughout the Novato Narrows is considered to be moderate to high, reflecting the high level of visual quality and a higher corresponding level of scenic orientation and expectation. Visual sensitivity of nearby residences is potentially high, but the number and exposure of such viewers in this unit are very limited.

Visual quality in the vicinity of South Petaluma Boulevard is mixed, with relatively intact pastoral hillsides near to industrial uses with moderately low visual quality. The City of Petaluma General Plan nevertheless identifies South Petaluma Boulevard as an historic city gateway. Consequently, viewer sensitivity is considered to be moderate to high in this area.

The elevated Petaluma River Bridge crossing presents panoramic views of the river and associated marshlands, valley floor, and mountains to the east. Although views are partially obscured by an opaque side barrier, this view from the south of the river and valley is an important scenic vista, marking the gateway into the City of Petaluma. From the nearby City Marina and Bay Trail, the existing viaduct and support columns of the Petaluma River Bridge are simple, uncluttered, and possess a moderate to high degree of vividness and unity within the view of river and mountains.

Overall, the visual quality of this relatively undisturbed and scenic greenbelt is high.

Landscape Unit 3: City of Petaluma (Northern Segment)

The City of Petaluma in this part of the project area includes the rapidly urbanizing valley floor and the southern end of a string of low-lying valleys that extend northward past the City of Santa Rosa (Figure 3.1-19). Although the highway corridor traverses the most urbanized portions of Petaluma between the SR 116/US 101 Lakeville Highway Separation and Overhead and Lynch Creek Bridge, that segment of highway is also landscaped with tall 20+ m (65+ ft) continuous roadside hedgerows, primarily Eucalyptus and Redwood. The Redwoods in these hedgerows show considerable stress and their long-term viability in these locations is questionable. Nevertheless, the hedgerows currently lend a vivid, recognizable community image to this segment as seen from the road, in the approach to the East Washington Interchange, a primary city gateway. Adjacent land uses in this segment, such as the Sonoma-Marin Fairgrounds to the west and residential and commercial uses to the east, are not strongly evident from the road due to dense screening by roadside trees.

Freeway overcrossings at Caulfield Lane, East Washington Street, and Corona Road punctuate views from the road but remain subordinate to the tall, visually dominant tree rows. Occasional large tree groupings also provide ornamental screening in the vicinity of the North Petaluma and Corona Road Bridges.

Sensitive visual receptors in the project area include very high numbers of motorists on US 101, with moderate levels of anticipated viewer sensitivity; and a moderately high number of homes directly adjoining the roadway in the northwest and southeast quadrants, with potentially high levels of anticipated viewer sensitivity.

Between Lynch Creek to the project terminus just north of Corona Road, tree hedgerows give way on the west to large tracts of open, level pastureland with sporadic roadside landscaping. The open terrain also provides views of the tree canopy of the Petaluma River riparian corridor a short distance of roughly 200 m (650 ft) west. These views westward are interrupted by the Petaluma Factory Outlet Mall but otherwise remain intact and of generally high visual quality. Land use types east of the highway include a nearly continuous combination of industrial, commercial and residential uses, with stands of roadside tree screening in the vicinity of the North Petaluma Railroad Overhead and a segment south of Corona Road.

Figure 3.1-19 Landscape Unit 3: City of Petaluma

Landscape Unit 3: City of Petaluma (Northern Segment)

Roadside tree hedgerows, looking north from U.S. 101, City of Petaluma

Commercial development in highway corridor, looking west from U.S. 101

Redwood groupings south of North Petaluma Overhead crossing, looking north from U.S. 101

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Unity and intactness in this urbanizing landscape unit are compromised, particularly in the segment from Lynch Creek southward, and despite more intact and scenic vistas north of Lynch Creek, overall visual quality is moderate.

3.1.11.3 Impacts

This section describes the anticipated visual impacts of the Build Alternative by landscape unit. A number of key viewpoints were identified throughout the project corridor to represent the viewshed at points where project actions could potentially result in visual impacts. Computer-generated visual simulations from several of these viewpoints are included in the impacts discussion. Please note that several visual simulations depict the project area showing full mitigation after 20 years of vegetative growth. Final determination on which soundwalls will be constructed as part of the MSN Project is discussed in Section 3.2.7. Because soundwalls could be constructed that in some locations could result in an adverse visual impact, the visual simulations have been prepared to show the worst-case conditions.

Landscape Unit 1: City of Novato (Southern Segment)

Table 3.1-17 summarizes existing resources and potential sources of impact under the MSN Build Alternative within Landscape Unit 1.

Table 3.1-17 Resources and Sources of Potential Impact within Landscape Unit I (Southern Segment)

Existing Resources	Potential Sources of Impact
Open median	Paving and concrete median barrier
Bicycle path, community connector at Franklin Overhead Bridge and Olive Avenue Undercrossing	Bridge center widening
Existing landscaping at Redwood Boulevard, Armstrong Avenue, Franklin Overhead Bridge	New soundwalls
Wetland vegetation at Scottsdale Pond	Vegetation removal and construction of new retaining wall, off-ramp realignment

Northbound and Southbound HOV Lanes

Fixed HOV Lane Alternative. This is the current Preferred Alternative. Under the Fixed HOV Lane Alternative, northbound and southbound HOV lanes and a concrete center median barrier will be accommodated through widening of the center median. No median landscaping currently exists within the City of Novato, and the existing six-lane freeway is already highly dominant in character. The qualitative increase in visual scale and dominance in this segment due to center widening will thus be moderate and will not result in a marked decline in visual quality. In the context of moderate viewer sensitivity of motorists in this landscape unit, this visual change will be moderate (see Figures 3.1-20 and 3.1-21).

Reversible HOV Lane Alternative. This alternative would be identical to the Fixed HOV Lane Alternative within Landscape Unit 1 (Southern Segment).

No Build Alternative. Under the No Build Alternative, there would be no aesthetic impacts due to center widening, addition of HOV lanes, or new center median barriers.

Soundwalls, Retaining Walls, and Associated Vegetation Removal

Fixed HOV Lane Alternative. This is the current Preferred Alternative. A soundwall location was studied east of Redwood Boulevard and south of Scottsdale Pond (see Figure 3.1-22 and Figure 3.1-23). Construction of the wall will require removal of existing landscaping, particularly at Redwood Boulevard, where existing landscaping provides substantial screening of the freeway for nearby residences, and a vivid landscape element for freeway motorists. The new walls will introduce strongly contrasting, large-scale hardscape structures into motorists' immediate visual foreground, in place of the existing views of landscaping. This strong form, color and texture contrast with the existing setting will represent a substantial change in character as seen by very high numbers of motorists, with a corresponding decline in visual quality. In the context of moderate anticipated viewer sensitivity of motorists in this urban segment, this represents a potentially substantial adverse effect.

In addition, a new 220 m (722 ft) retaining wall will be constructed on the eastern edge of Scottsdale Pond in connection with improvements to the southbound Rowland Avenue on-ramp, with associated removal of existing wetland vegetation; and a 155 m (508 ft) retaining wall will be constructed east of South Novato Boulevard. It is expected that revegetation will rapidly replace lost vegetation at Scottsdale Pond, and the new retaining wall will be designed to match the simulated stone finish of other visible concrete structures within the public park. The net long-term impacts of these measures at Scottsdale Pond will be beneficial as off-road areas with views of the South Novato Boulevard wall are virtually unused. Thus, the proposed wall will be little noticed by the nearest viewers. This wall is expected to have no impact.

Figure 3.1-20 Existing View from US 101, City of Novato, Looking North

Figure 3.1-21 Simulated View from US 101, City of Novato, Looking North

Figure 3.1-22 Existing View from Freeway Looking Northwest toward Redwood Boulevard

Figure 3.1-23 Simulated View from Freeway Looking Northwest toward Soundwall under Consideration at Redwood Boulevard with Mitigation

Reversible HOV Lane Alternative. The impacts of this alternative would be identical to the Fixed HOV Lane Alternative within Landscape Unit 1 (Southern Segment).

No Build Alternative. Under the No Build Alternative, there would be no aesthetic impacts due to new structures or loss of vegetation.

Bridge Widening

Fixed HOV Lane Alternative. This is the current Preferred Alternative. Under the Fixed HOV Lane Alternative, center widening of the Novato Creek Bridge, the Franklin Overhead Bridge, the Olive Undercrossing Bridge and North Novato Overhead Bridge will require the filling of center gaps between northbound and southbound structures. One result will be less penetration of sunlight causing a decline in visual quality.

The Novato Creek and North Novato Bridges are not heavily used by pedestrians and bicyclists. Due to the absence of sensitive receptors, impacts will be minor in those locations.

The road under the Franklin Overhead Bridge is currently used by pedestrians and bicyclists for access between the residential neighborhoods to the west and east of the freeway. This road also provides the community with access to Slade Park and other nearby open spaces. The bridge is relatively tall, allowing greater sunlight than bridges of more typical height. Nevertheless, center widening of the bridge will reduce the daylight that currently illuminates the pedestrian passage under the bridge, and degrading its visual quality and potentially undermining its use as a pedestrian and bicycle route. Because there are no nearby alternative undercrossings in the vicinity, viewers may have moderately high levels of sensitivity. In that context these impacts could be moderately adverse.

Similarly, Olive Avenue is a major connector between residential neighborhoods to the east of the freeway and the central downtown area to the west. The Olive Avenue undercrossing is currently landscaped with trees and receives moderate levels of use by motorists, pedestrians, and bicyclists traveling to and from downtown. The center widening of the Olive Avenue Bridge will result in the removal of trees and will reduce sunlight that currently illuminates the undercrossing. This loss of sunlight will create approximately 50 m (164 ft) of unlit passageway, making it less attractive and potentially deterring pedestrian use. Viewers may have moderately high levels of sensitivity to this change to a major gateway to downtown. In this context these impacts could potentially be substantially adverse (see Figures 3.1-24 and 3.1-25).

Reversible HOV Lane Alternative. This alternative would be identical to the Fixed HOV Lane Alternative within Landscape Unit 1 (Southern Segment).

No Build Alternative. Under the No Build Alternative, there would be no bridge widenings. Therefore, there would be no impacts to the community access routes.

Light and Glare

Fixed HOV Lane Alternative. Under the Fixed HOV Lane Alternative, light and glare impacts will result primarily from temporary nighttime construction activities in proximity to various sensitive receptors, including motorists, pedestrians, and nearby residences and businesses.

Reversible HOV Lane Alternative. This alternative would be identical to the Fixed HOV Lane Alternative within Landscape Unit 1 (Southern Segment).

Landscape Unit 2: Novato Narrows (Central Segment)

Table 3.1-18 summarizes existing resources and potential sources of impact under the MSN Build Alternative within Landscape Unit 2.

Table 3.1-18 Resources and Sources of Potential Impact within Landscape Unit 2 (Central Segment)

Existing Resources	Sources of Potential Impact
Open median	HOV Lane center median paving and concrete median barrier
Intact oak woodland/grassland landscape	Improvements to Redwood Landfill Road IC under Access Options 4b, 12b
Intact oak woodland/grassland landscape	San Antonio Road Interchange (Access Options 4b, 14b, 14d)
Intact oak woodland/grassland landscape	New access roads parallel to mainline
Undeveloped, partially intact landforms	Major grading, landform alteration from cut slopes near Cloud Lane
Tall riparian vegetation of San Antonio Creek Large stand of Eucalyptus at San Antonio Creek	San Antonio Mainline Bridge New San Antonio Creek Bridge
Panoramic views of Petaluma River and marshlands, valley floor and mountains	New Petaluma River Bridge
City of Petaluma southern gateway	South Petaluma Boulevard Interchange

Figure 3.1-24 Existing View of Olive Avenue Bridge Undercrossing from Olive Avenue

Figure 3.1-25 Simulated View of Olive Avenue Bridge Undercrossing from Olive Avenue

HOV Lanes and Center Median Barrier

Fixed HOV Lane Alternative. This is the current Preferred Alternative. The change of US 101 from a four-lane roadway separated by an unpaved median to a single six-lane paved expanse with concrete median barrier will substantially increase the dominance of the roadway as seen by motorists. This effect will be further emphasized in some locations by the effect of new adjacent access roads and interchanges.

The increased dominance of the roadway will cause a pronounced qualitative change in the overall character of the landscape to a more urban, highway-dominated setting, with a noticeable decline in visual intactness and vividness. In the context of moderately high viewer sensitivity in this scenic unit, these impacts will potentially be substantially adverse. A typical representation of this change is depicted in Figure 3.1-26 and 3.1-27, in a view near the Olompali SHP entryway.

Reversible HOV Lane Alternative

The principal difference between the two Build Alternatives is in the configuration of HOV lanes and associated median barriers. Under the Reversible HOV Lane Alternative, a single HOV lane with 3 m (10 ft) shoulders on each side would be constructed in the center median, separated from adjacent mixed flow lanes by 0.6 m (2 ft) concrete barriers and a 1.5 m (5 ft) shoulder on each side. The total center median area between barriers would thus be 9.6 m (32 ft) in width. Access would be adjusted to allow southbound travel during the A.M. peak period and northbound travel during the P.M. peak period. The overall project cross-section would be the same as that under the Fixed HOV Lane Alternative, i.e., 34.2 m (114 ft).

Although there would be minor qualitative differences in the appearance of the two build alternatives, the total paved area would expand the same amount under both build alternatives, and the visual effects of new median barriers and increased traffic, though not identical, would be similar overall. The change in visual character and decline in visual quality under this alternative would thus be comparable to the Fixed HOV Lane Alternative. In the context of moderately high viewer sensitivity in Landscape Unit 2, this impact would potentially be substantial.

Figure 3.1-26 Existing View toward Olompali State Historic Park Entrance Looking North

Figure 3.1-27 Simulation of Typical HOV Lane Widening and Median Barrier within Landscape Unit 2 at Olompali State Historic Park Entrance Looking North

No Build Alternative. Under the No Build Alternative, there would be no addition of an HOV lane or frontage roads, and therefore no resulting impacts to the visual character of the Novato Narrows (Central Segment).

Major Project Structures

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative with Access Option 12b is the current Preferred Alternative. Under this Build Alternative, major project structures and Access Options in the Central Segment will be essentially the same. Under the preferred Access Option 12b, the Redwood Landfill Overcrossing will be modified to a diamond interchange. Impacts under Access Option 4b would be the same as under 12b at the Redwood Landfill Overcrossing. Access Options 14b and 14d call for only slight modifications to the overcrossing to convert the facility from private to public access. Overall, impacts at Redwood Landfill Road due to the Access Options will be incremental and relatively minimal, since substantial disruption and intrusion due to the recently constructed overcrossing have already taken place (Figure 3.1-28). In addition, additional oak tree removal associated with expansion of the interchange will nevertheless leave the extensive adjacent oak and mixed evergreen forest as a vivid, visually dominant element in the view, with little net change in overall visual quality as a result.

Under Access Options 4b, 14b, and 14d, a new San Antonio Road Interchange would be constructed between Silveira Dairy and San Antonio Creek. Figures 3.1-29 and 3.1-30 depict the existing conditions and a simulation of this new interchange, respectively. The interchange would have strong visual contrast and dominance against the existing natural/pastoral setting, with a strong resulting decline in visual quality due to major grading, engineered fill embankments, a new over-crossing bridge, and associated ramps, access roads, signs and lighting. In the context of moderately high viewer sensitivity in this unit, this would represent a substantial adverse effect. Affected viewers would consist primarily of highway motorists. However, there are also several residences associated with the Silveira Dairy within foreground distances of the interchange that could experience some impact due to visibility of various interchange features. For these reasons, Access Option 12b, which will not introduce a new San Antonio Road Interchange, has been considered somewhat preferable to the other options from a visual perspective. Access Option 12b is the current Preferred Alternative.

Figure 3.1-28 View of Existing Landfill Interchange (June 2006)

Figure 3.1-29 The Narrows, North of Olompali State Historic Park Approaching San Antonio Road on West Side of US 101

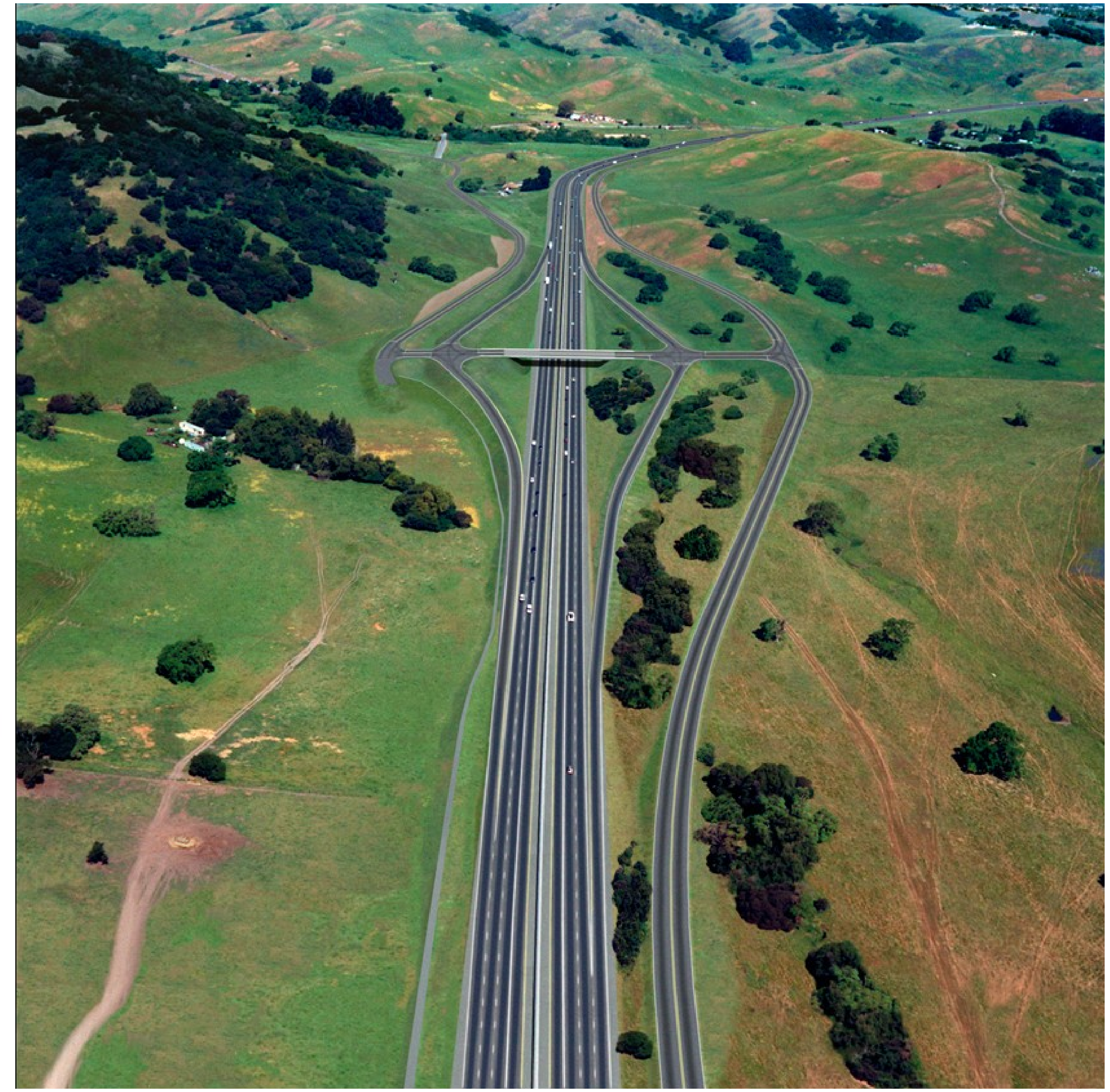

Figure 3.1-30 Proposed San Antonio Road Interchange showing Access Option 14b
Access Options 4b with Mitigation; 12b, and 14d not shown

A new interchange is proposed at South Petaluma Boulevard under all Access Options. Although the affected setting is less intact than at the San Antonio Interchange site, this area is identified as an historic southern gateway to the City of Petaluma in the Petaluma General Plan, and is thus assigned a moderately high level of viewer sensitivity, with high exposure to large numbers of motorists. Visual changes will be similar to those of the San Antonio Interchange, with a strong resulting decline in visual quality and thus, potentially substantial adverse effects. In addition to highway motorists, a small number of nearby residents could also potentially be affected by the interchange.

Figure 3.1-31 shows the existing US 101 at South Petaluma Boulevard looking north towards the City of Petaluma and Figure 3.1-32 is a simulation of the proposed South Petaluma Boulevard Interchange.

The freeway mainline will be realigned westward on a newly constructed San Antonio Creek Freeway Bridge. A portion of the existing freeway bridge will be retained to serve an adjoining access road, and the remainder will be removed. Figures 3.1-33 shows the existing San Antonio Creek Freeway Bridge and Figure 3.1-34 shows the simulation. The principal visual effect of the construction of a new San Antonio Creek Freeway Bridge will be loss of riparian trees at the creek crossing in views from the road. Because the bridge will be constructed on a new alignment, portions of the existing freeway bridge to be removed will expose un-vegetated portions of the creek. These, together with portions cleared for construction of the new bridge, could represent a conspicuous loss of riparian forest in the freeway foreground as seen by high numbers of viewers with moderately high sensitivity, a potentially substantial adverse impact. With recommended re-vegetation however these areas are expected to be fully restored within a fairly short period of time (roughly five years), with no net adverse long-term impact.

Effects on nearby residents and future bike path users from increased visibility of the freeway bridge will be moderate due to the very small number of affected viewers and the limited visual prominence of the highway even at this relatively short distance (Figures 3.1-35 and 3.1-36).

As in existing pedestrian undercrossings in Novato and Petaluma, a proposed bicycle path undercrossing beneath the freeway bridge will require artificial lighting to facilitate safe use.

Figure 3.1-31 Existing US 101 South Petaluma Boulevard Looking North toward the City of Petaluma

Figure 3.1-32 Simulation of the proposed South Petaluma Boulevard Interchange with Mitigation Looking North toward the City of Petaluma
All Project Alternatives are the Same at this Location.

Figure 3.1-33 Existing View of San Antonio Creek Freeway Bridge, Looking North

Figure 3.1-34 Simulation of Proposed San Antonio Creek Freeway Bridge and Freeway Realignment; Access Option 4b with Mitigation
Alternatives 14b and 14d are the same as 4b at this location; Alternative 12b is not shown

Figure 3.1-35 Existing View toward Location for a New San Antonio Creek Mainline Bridge from Proposed Bike Path

Figure 3.1-36 Simulated View toward New San Antonio Creek Mainline Bridge from Proposed Bike Path with Mitigation

A new San Antonio bridge is proposed to serve westbound traffic from an extension of existing San Antonio Road. Figures 3.1-37 and 3.1-38 show the historic San Antonio Creek Bridge and the proposed new San Antonio Frontage Road Bridge. The historic San Antonio Creek Bridge will be retained and striped for one lane and Class 2 bicycle/pedestrian access. A new frontage road bridge will be constructed for two-way vehicular traffic and a Class 2 bicycle/pedestrian path to accommodate motorists traveling to and from destinations to the west. The new roadway and structure will have a minor impact on visual quality of views to and from the road; the principal impacts of construction at this location will be due to removal of riparian trees within the bridge construction footprint; and partial removal of a large stand of tall Eucalyptus northwest of the new bridge. Removal of riparian trees for bridge construction will leave prominent remaining adjacent riparian woodland and have a minor visual effect. The removal of Eucalyptus trees will represent the loss of a large, vivid landscape feature but will not appreciably detract from the intactness and unity of the highly natural setting overall. Therefore, the net overall change in visual quality in this location will be minor.

Under the Fixed HOV Lane Alternative, the existing Petaluma River Bridge will be replaced (see Figure 3.1-39). Two preferred bridge design alternatives are under consideration and involve construction of a shorter structure than the existing bridge. Both will require extension of the north embankment southward toward the river to meet the shorter new span. This extension of the earth embankment will somewhat reduce westward views from the Bay Trail and City Marina. One design alternative is a cast-in-place box girder structure with parabolic haunched soffit to provide a visually pleasing curved pattern, supported by five tapered concrete columns. The other is a pre-cast “tee girder” structure, supported by five round concrete columns. A curtain wall could be installed on the outer edges to simulate a haunched soffit. Both alternatives will include pattern-texture on railings and the MSE retaining wall on the east side of the northern embankment, as shown in Figure 3.1-40.

Among the range of feasible designs under consideration, none represent a substantial decline in the overall existing visual quality of on- or off-road views. Views beneath the bridge to the west from the Bay Trail and Petaluma Marina, although reduced somewhat, will be substantially retained. The bridge and retaining wall will incorporate design enhancements that could represent a beneficial impact to visual quality.

Figure 3.1-37 Historic San Antonio Creek Bridge

Figure 3.1-38 Historic San Antonio Creek Bridge, and to the West, New San Antonio Creek Access Road Bridge under Build Alternative

Figure 3.1-39 Existing Petaluma Bridge Looking East

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2822 Figure 3.1-40 Simulation of Proposed Petaluma River Bridge Design (Pre-cast Tee Girder Option)

Reversible HOV Lane Alternative. Under the Reversible HOV Lane Alternative, major project structures and Access Options would be essentially the same as under the Fixed HOV Lane Alternative. Anticipated visual impacts would thus be as described above.

No Build Alternative. Under the No Build Alternative, there would be no change in the visual character of the Narrows due to new structures, except for the Sanitary Landfill Road Overcrossing. As already noted, this recently completed structure has impacted the visual character of the Novato Narrows (Central Segment) in the vicinity of Olompali SHP.

Tree and Vegetation Removal

Fixed HOV Lane Alternative. All aspects of the two build alternatives, except for center widening, will result in some tree and vegetation removal, through mainline realignment, roadway profile changes, new interchange construction, and building new access roads. The two build alternatives are essentially identical with respect to potential tree and vegetation removal within the Central Segment.

New interchange construction would result in tree and other vegetation removal, with the greatest occurring under Access Option 12b due to an additional access road on the western side of US 101(see access road alignment in Volume 2 of the FEIR/S). Although the total number of trees to be removed represents a small portion of the existing tree population within the corridor viewshed, the affected tree stands in the highway visual foreground represent an important, defining component of the landscape character. Therefore, tree removal could have substantial adverse effects in specific locations, such as stream crossings, interchanges, and swales. In the context of moderate to high motorist visual sensitivity, this impact could be substantially adverse. Despite the greatest occurrence of tree loss under Access Option 12b, it is the current Preferred Alternative and has the least overall negative visual impacts.

Reversible HOV Lane Alternative. Under the Reversible HOV Lane Alternative, tree and vegetation removal would be essentially the same as under the Fixed HOV Lane Alternative. Anticipated visual impacts would thus be as described above.

No Build Alternative. Under the No Build Alternative, there would be no vegetation or tree removal other than that currently underway for construction of the City of Novato Sanitary Landfill Road Overcrossing. The mitigation plantings under this recently completed project would mature and reduce aesthetic impacts over time. The remainder of the Novato Narrows (Central Segment) would be unchanged.

Mainline Realignment Cut Slopes

Fixed HOV Lane Alternative. This is the current Preferred Alternative. Since the centerline, profile and overall project footprint are be the same, mainline realignment, profile changes and cut slopes will be essentially identical under both Build Alternatives. Mainline realignment and profile changes, as well as the construction of access roads and new interchanges, could involve major grading and alteration of existing landforms. Cut slopes and fill embankments in various locations may result in prominent, unnatural landforms that contrast with the existing topography. These impacts could alter the natural landscape character and result in a decline in visual quality. In general, new fill slopes may not to be noticed by freeway travelers, but be more evident to off-road viewers, who in this project segment are very few in number. Large cut slopes on the other hand will be noticeable to motorists, particularly where they result in artificial, geometric surfaces along the roadway. In some segments, particularly between San Antonio Road and Gambini Road in the vicinity of Cloud Lane, extensive cuts of up to 13 m (43 ft) in depth could be required to lower the existing mainline vertical profile to conform to freeway standards. The most extensively affected segment at the crest of the hill is already characterized by substantial cut slopes from previous roadway construction, which have a flat, geometric, engineered character in contrast to the natural landforms of the rest of the corridor, particularly to the south (Figure 3.1-41).

The proposed roadway realignment will substantially increase the scale of those existing geometric slopes. Despite the already compromised condition of landforms in this segment, this large-scale alteration will represent a highly prominent change in landscape character and a strong decline in visual quality, with a marked loss of both intactness and unity. On the other hand this hillcrest segment marks a dividing line between north- (toward Petaluma River) and south-facing (toward San Antonio Creek) viewsheds of the corridor, and the lowering of the crest profile, together with road widening, will increase and improve freeway motorists’ long views both northward (to the Petaluma Mountains) and southward (to the Coast Mountains), enhancing vividness to a degree, a somewhat beneficial effect. Overall, however, in the context of moderate-to-high viewer sensitivity, these landform changes will be substantially adverse (Figure 3.1-42).

Figure 3.1-41 Existing View of Proposed Mainline Horizontal and Vertical Realignment in Vicinity of Cloud Lane, Looking North

Figure 3.1-42 Simulated View of Proposed Mainline Horizontal and Vertical Realignment in Vicinity of Cloud Lane, Looking North with Mitigation, shown here with Access Option Alternative 12b

Reversible HOV Lane Alternative. Since the centerline, profile and overall project footprint are the same, mainline realignment, profile changes and cut slopes would be essentially identical under both build alternatives.

No Build Alternative. Under the No Build Alternative, there would be no grading or alterations to landforms in the Novato Narrows (Central Segment) of the project boundaries.

New Access Roads and Bike Paths

Fixed HOV Lane Alternative. Four Access Options are under consideration for the Novato Narrows (Central Segment). Under these four options, proposed major project features are broadly comparable, except for Access Option 12b, which will not introduce a major new interchange at San Antonio Road and will not require a new access road between San Antonio Interchange and Skinner Road, as under the other three options. For this reason, Access Option 12b is considered somewhat superior to the others from a visual perspective, and is the current preferred Access Option. Similar to the other Access Options, 12b will provide various new roads and bike paths will provide local access to adjoining land uses between the existing Landfill Interchange and the proposed South Petaluma Boulevard Interchange. These access roads will each contribute to an overall decline in visual quality of the highway corridor in the Narrows due to the additional paving, grading, and tree removal within the corridor visual foreground, and a resulting increased road dominance as seen from the freeway. These effects will be accentuated where road cuts are required. This increase in visual scale of the roadway will represent a potentially substantial adverse effect without mitigation to screen and soften views of the access roads.

Similarly, the experience of bicyclists on proposed bike paths paralleling the freeway could be strongly compromised by the dominance of the freeway without re-vegetation between the bike paths and freeway to provide screening.

Wherever access roads or bike paths parallel to the freeway occur, native re-vegetation planting will be installed in the visual foreground of the Novato Narrows (Central Segment) between the freeway and access roads in order to counter both site-specific and corridor-wide declines in visual quality and existing rural character (Figures 3.1-43, 3.1-44, and 3.1-45).

Figure 3.1-43 Existing View of Typical Proposed Access Road Location, West of Mainline Near Dairy

Figure 3.1-44 Simulated View of Proposed Access Road West of Mainline Near Dairy; Access Option 14d with Mitigation

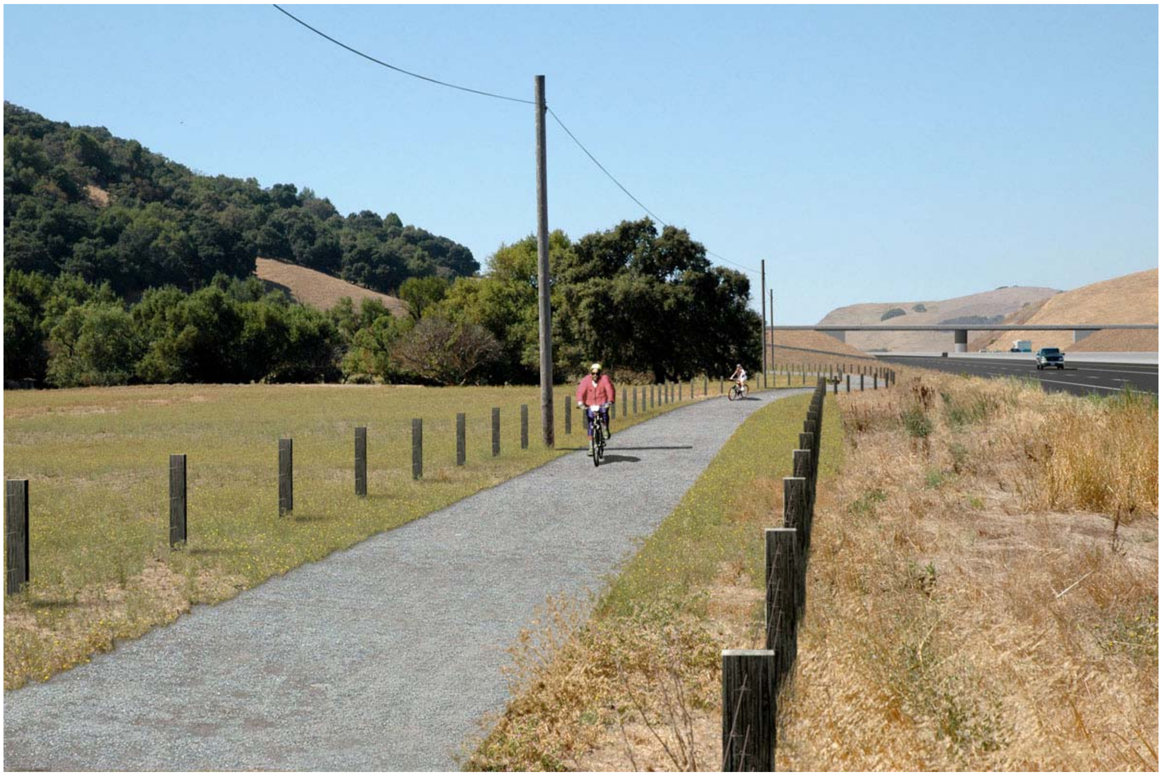


Figure 3.1-45 Simulated View from Typical Bike Path West of Mainline Near Dairy; Access Option 4b with Mitigation; Access Options 12b and 14b not shown

Reversible HOV Lane Alternative. Under the Reversible HOV Lane Alternative, Access Options would be essentially the same as under the Fixed HOV Lane Alternative. Anticipated visual impacts would thus be as described above.

No Build Alternative. Under the No Build Alternative, no new access road would be constructed and no impacts would be anticipated.

Potential Light and Glare Impacts

Fixed HOV Lane Alternative. This is the current Preferred Alternative. Potential light and glare impacts will result primarily from temporary nighttime construction activities in proximity to various sensitive receptors, including motorists, pedestrians, and nearby residences and businesses. In addition, interchange lighting and new headlight glare could potentially affect some residences near the new interchanges.

Reversible HOV Lane Alternative. Potential light and glare impacts of this alternative would be the same as the Fixed HOV Lane Alternative, as described above.

No Build Alternative. Under the No Build Alternative, no new sources of light and glare are expected and no impacts are anticipated.

Landscape Unit 3: City of Petaluma (Northern Segment)

Major visual components of the Build Alternative within Landscape Unit 3 are described in detail below under the discussion of new project structures.

In Landscape Unit 3 the No Build Alternative includes the East Washington Interchange Improvement Project, which will precede the MSN Project and include new northbound and southbound on-ramps. Soundwalls would not be required under the No Build Alternative.

Table 3.1-19 summarizes improvements proposed under the MSN Build and No Build Alternative within Landscape Unit 3.

Table 3.1-19 Existing Resources and Sources of Potential Impact within Landscape Unit 3 (Northern Segment)

Existing Resources	Sources of Potential Impact
Build Alternatives	
Open median	Paving of HOV lanes and concrete median barrier
Redwood and Eucalyptus hedgerows northwest and southeast of the East Washington Interchange	Removal of approximately 2,580 linear m (8,464 linear ft) of existing Redwood, Eucalyptus and oak due to speed change lane widening and soundwall construction.
Redwood trees adjoining Lynch Creek Bridge	Removal of existing Redwood trees due to bridge widening.
Existing trees at fence-line of homes on Lynch Creek Way	Removal of existing trees and replacement with 230 m (754 ft) soundwall north of Lynch Creek.
Eight mature, healthy Redwood tree groupings between Lynch Creek and Petaluma Outlet Mall	Loss of Redwood groupings in right-of-way due to North Petaluma Overhead Bridge replacement.
Landscaping within East Washington Interchange	Potential removal of Redwoods within East Washington Interchange due to bridge widening, off-ramp and connecting loop reconfiguration.
Young Redwood hedgerow east of US 101 south of Corona Road	Potential removal of Redwood trees for widening and safety south of Corona Road.
Screening of adjacent residents from auto light and glare by existing roadside tree hedgerows	Temporary exposure to headlight glare due to tree removal.
No Build Alternative	
	No impacts

Northbound and Southbound HOV Lanes

Fixed HOV Lane Alternative. This is the current Preferred Alternative. Paving into the center median for the addition of HOV lanes and a concrete median barrier will increase the paved area from four to six lanes. Due to the highly urbanized existing character of the highway corridor in this segment, the resulting qualitative change in the roadway environment will be less dramatic than in the Novato Narrows (Central Segment). In the context of moderate sensitivity of motorists in this landscape unit, this change will represent a moderately adverse effect.

Reversible HOV Lane Alternative. Within the Northern Segment, this alternative would be essentially identical to the Fixed HOV Lane Alternative, described above.

No Build Alternative. Under the No Build Alternative, there would be no lane additions, increased paving in the median, or concrete center median barrier. Therefore, there would be no aesthetic impacts under this alternative.

New Project Structures

Fixed HOV Lane Alternative. Major new structural features under this Build Alternative include:

- **Bridge Widening/Replacements:** replacement of the northbound US 101/ SR 116/Lakeville Highway separation and overhead bridge; widening of the southbound SR 116/US 101 separation and overhead bridge; widening of the Washington Creek and Lynch Creek Bridges; replacement of the North Petaluma overhead bridge; associated ramp widening including addition of HOV bypass and ramp metering;
- **New Soundwalls:** new soundwall locations were studied on the west side of the Lynch Creek Bridge; on the western highway shoulder between the Lynch Creek Bridge and the East Washington Interchange; on the eastern (northbound) highway shoulder between the East Washington Interchange and SR 116; and at the eastern (northbound) shoulder directly north of Lynch Creek; and
- **New Auxiliary Lanes:** a new northbound speed change lane will be introduced between Caulfield Road and the East Washington Interchange; and a new southbound speed change lane will be introduced between the Lynch Creek Bridge and the East Washington Interchange, requiring outside widening of the highway. On-ramp re-configuration at the SR 116/US 101 Interchange could also require additional roadway widening on the east side of the highway south of Caulfield Road.

Overall, the proposed bridge widenings and replacements will modify existing structures but the resulting condition will appear qualitatively similar to the existing and not be highly conspicuous to motorists after completion of construction. No adjacent residences or other sensitive off-road land uses are present to be strongly affected by these bridge improvements. The primary visual effect of these actions will result from temporary construction activities.

The principal project visual impacts in Landscape Unit 3 will result from introduction of proposed speed change lanes, the soundwalls that were studied, and associated roadside tree removal.

From the vicinity of Ponderosa Drive and Cedarwood Lane to Caulfield Lane, the northbound on-ramp of the SR 116/US 101 Interchange will be widened to accommodate ramp metering. Widening of the on-ramp could potentially require tree removal south of Caulfield Road on the east side of the highway. In the worst case, the existing hedgerow of live oak trees could potentially be removed, an adverse impact on visual quality and community image as seen from the road. If tree removal is required, replacement planting will be implemented, substantially reducing potential impacts in the long term.

A new northbound speed change lane will be introduced on the eastern (northbound) edge of roadway between Caulfield Road and the East Washington Interchange. A roughly 1,760 m (5,775 ft) –long and 3.7 m (12 ft) –high soundwall on the eastern (northbound) highway shoulder between SR 116 and the East Washington Interchange would also be introduced. If approved, the entire soundwall would be located at the edge of shoulder. The speed change lane widening and wall construction will require removal of the existing hedgerows of Eucalyptus and some Redwood that currently line the highway in this segment, as discussed further below. Figure 3.1-46 depicts the view of the existing eastern highway shoulder between Caulfield Road and the East Washington Interchange, looking northeast; Figure 3.1-47 depicts a simulated view.

Similarly, a new speed change lane was studied and a roughly 795 m (2,608 ft) -long and 3.7 m (12 ft) -high soundwall on the western (southbound) highway shoulder between the Lynch Creek Bridge and the East Washington Interchange. If approved, the entire soundwall will be located at the edge of shoulder, continuing into the reconfigured East Washington Interchange. The speed change lane widening and wall construction in this northwest quadrant will require removal of the existing Redwood and Eucalyptus hedgerows that currently line the highway in this segment. Figure 3.1-48 shows the existing view looking north from the East Washington Avenue Overcrossing. Figure 3.1-49 is a simulated view looking north, depicting the studied soundwall northwest of the interchange, and a potential cumulative project impact on-ramp northeast of interchange.

For adjacent residences in the northwest and southeast quadrants of the East Washington Street Interchange, existing views to the road now dominated by the tall tree rows will be transformed into views of the soundwall, partly screened by existing backyard fencing, and with a soil slope descending from the edge of

Figure 3.1-46 Existing View of Shoulder North of Caulfield Road Looking Northeast

Figure 3.1-47 Simulated View of North of Caulfield Road Looking Northeast, shown with Soundwall and Vine Planting

Figure 3.1-48 Existing View Looking North from East Washington Avenue Overcrossing

Figure 3.1-49 Simulated View Looking North, Depicting Soundwall Location Studied Northwest of Interchange and Cumulative Project On-ramp Northeast of Interchange

shoulder to existing grade at the project right-of-way. Figure 3.1-50 depicts a typical existing view of the highway shoulder as seen from the residential side, looking northwest from the pedestrian bridge near Stuart Drive and McKenzie Avenue. Figure 3.1-51 depicts a simulated view as seen from adjoining residences, with the East Washington Interchange project southbound on-ramp depicted across the freeway.

A new 230 m (754 ft) soundwall will be introduced on the east (northbound) highway right-of-way directly north of Lynch Creek.

If constructed, the three proposed soundwalls will represent prominent, visually dominant new hardscape structures, with adverse visual effects for motorists, adjoining residents, and other off-road viewers. These impacts could be experienced in connection with the loss of Redwood and Eucalyptus trees, discussed below.

Reversible HOV Lane Alternative. The new project structures would be the same as those introduced under the Fixed HOB Lane Alternative. The impacts would be the same as those described above.

No Build Alternative. Under the No Build Alternative, no new structures are proposed.

Tree and Vegetation Removal

Fixed HOV Lane Alternative. This is the current Preferred Alternative. The soundwall and speed change lane construction described above will require removal of all or most of the hedgerows of Eucalyptus and Redwood trees in the northwest and southeast quadrants of the East Washington Interchange, that currently visually dominate Landscape Unit 3 between the SR 116/US 101 Interchange and Lynch Creek. These nearly continuous hedgerows reach heights of over 20 m (65 ft) and provide almost complete screening between the highway and adjoining land uses. The MSN Project will result in the removal of approximately 820 m (2,690 linear ft) of mixed Eucalyptus and Redwood hedgerow in the highway quadrant northwest of the East Washington Interchange to Lynch Creek; and approximately 1,760 linear m (5,774 ft) of live oak, Eucalyptus, and some Redwood in the southeast quadrant from the SR 116/ US 101 northbound on-ramp to the East Washington Interchange. As discussed in Chapter 5, Cumulative Impacts, these impacts in combination with similar impacts of other potential future projects in the vicinity of the interchange could

Figure 3.1-50 Typical Existing View of Highway Shoulder (Northern Segment) as seen from the Residential Side, Looking Northwest from the Pedestrian Bridge near Stuart Drive and McKenzie Avenue

Figure 3.1-51 Simulated View as seen from the Pedestrian Bridge near Stuart Drive and McKenzie Avenue, shown with Soundwall

result in the total cumulative removal of this visually dominant landscape feature that currently defines the landscape character of the Northern Segment between SR 116 and Lynch Creek.

The loss of vividness, intactness and unity from loss of the tree hedgerows and their replacement by speed change lanes and soundwalls will represent a pronounced decline in existing visual quality of Landscape Unit 3 as viewed from the road. This decline in visual quality of motorists will result both from the loss of the tree canopies and from the loss of screening and resulting exposure of views of fencing and residences, with a further decline in visual unity and intactness. The poor existing health of many of the affected Redwoods suggests that many may be in decline and could eventually die. Nevertheless, the change in visual character and quality will represent a substantial adverse decline in the visual quality of motorists' views and of community image at a City gateway. This change to motorists' views in the northwest interchange quadrant was depicted in Figure 3.1-49, above, with recommended vine planting on walls. In the southeast interchange quadrant, this change was depicted in Figure 3.1-47 and Figure 3.1-51, above.

For residents adjacent to the highway, removal of the existing tree rows at their property line will represent a substantial decline in vividness and intactness. In the northwest interchange quadrant, the loss of tree canopy will be experienced along with the introduction of tall soundwalls at the back lot lines. In the southwest quadrant, the loss of trees will also partially expose views of the freeway. With recommended replacement planting, however, freeway screening will be restored over a period of a few years. Among the residences to the southeast and northwest of the East Washington Interchange, many who reportedly experience the existing Eucalyptus as a nuisance could perceive their removal as a beneficial impact (Payran/McKinley Neighborhood Action Committee, 2002).

Substantial tree removal will also take place on both the east and west sides of the Lynch Creek Bridge to accommodate bridge widening and soundwall construction, with a moderate resulting decline in visual quality for pedestrians and bicyclists on the Lynch Creek trail in views toward the road, as depicted in Figure 3.1-52, showing the existing condition, and Figure 3.1-53, showing the simulated view.

Figure 3.1-52 Existing Lynch Creek Bridge from Bike Path Looking East

Figure 3.1-53 Proposed Lynch Creek Bridge with Soundwall

In addition to those trees removed for widening of the Lynch Creek Bridge, additional trees near western property line of residences on Lynch Creek Way will be removed due to soundwall construction, resulting in a temporary loss of screening and a decline in visual quality for the affected residents.

Re-configuration of the northbound off-ramp and connecting loop at the East Washington Interchange as part of the MSN Project could potentially result in removal of some or all prominent existing Redwood trees on the interchange embankment, resulting in further decline in the visual quality of the community gateway image as viewed from the road.

Raising of the US 101 vertical profile in order to construct a new replacement North Petaluma Overhead Bridge in the segment roughly between Lynch Creek and the Petaluma Outlet Mall will result in the removal of all or portions of eight major mature, healthy Redwood tree groupings within the project right-of-way. These groupings represent a vivid, highly distinctive scenic feature of the Petaluma portion of the highway foreground viewshed. Their removal will represent a substantial decline in visual quality of this segment, and a substantial adverse visual effect.

Proposed shoulder widening southeast of the Corona Road Interchange could require removal of roughly 400 linear m (1,312 ft) of existing young Redwood trees (predominantly 8 m (25 ft) or less in height), resulting in a decline in visual quality for freeway motorists. If the trees require removal, this will also constitute a substantial decline in screening and visual quality for the adjacent residents. In the context of high assumed viewer sensitivity of residents, this will represent a potentially substantial impact. The effects in this location are depicted in Figure 3.1-54, showing the existing condition, and in the simulated view shown in Figure 3.1-55, with recommended replacement planting.

Taken as a whole, the proposed tree and vegetation removal within the Northern Segment would represent a prominent decline in the visual character and quality of the project setting, and a potentially substantial adverse visual impact for both motorists and adjacent residents.

Reversible HOV Lane Alternative. Within the Northern Segment, this alternative would be essentially identical to the Fixed HOV Lane Alternative, described above.

Figure 3.1-54 Existing Highway Shoulder Southeast of Corona Road, Looking Southeast from Corona Road Overcrossing

Figure 3.1-55 Simulation of Proposed Road Widening Southeast of Corona Road, shown with Mitigation Planting

No Build Alternative. Under the No Build Alternative, no improvements would take place and thus no visual change would occur.

Visual Impacts to Pedestrians from Bridge Widenings

Fixed HOV Lane Alternative. Widening into the center of the Lynch Creek Bridge will reduce daylight for bicyclists and pedestrians underneath the structure, thereby degrading its visual quality. Because there are no comparable pedestrian routes across the freeway in the vicinity and the creek trail receives substantial use, viewer sensitivity is potentially high and this will represent a potentially substantial adverse impact. The existing and proposed improvements at Lynch Creek were previously shown in Figures 3.1-52 and 3.1-53.

Reversible HOV Lane Alternative. Within the Northern Segment, this alternative would be essentially identical to the Fixed HOV Lane Alternative, described above.

No Build Alternative. Under the No Build Alternative, bridge center widening would not take place and no impacts would be anticipated.

Light and Glare

Fixed HOV Lane Alternative. Potential light and glare impacts will result primarily from temporary nighttime construction activities in proximity to various sensitive receptors, including motorists, pedestrians, and nearby residences and businesses.

Temporary adverse impacts from headlight glare could also occur to residents southeast and northwest of the East Washington Interchange after removal of existing tree hedgerows and prior to completion of new soundwalls in both quadrants.

Reversible HOV Lane Alternative. Within the Northern Segment, this alternative would be essentially identical to the Fixed HOV Lane Alternative, described above.

No Build Alternative. Under the No Build Alternative, existing trees lining US 101 would continue to screen nearby residences southeast and northwest of the East Washington Interchange from headlight glare.

Potential Construction Impacts

Fixed HOV Lane Alternative. Under this Build Alternative temporary but substantial visual impacts could potentially result from various roadway, interchange, bridge and soundwall construction activities, and from construction staging. Although temporary, many construction impacts could last a considerable period of time and, in the case of vegetation and ground disturbance, continue for 1-2 seasons following completion of construction.

Reversible HOV Lane Alternative. Within the Northern Segment, this alternative would be essentially identical to the Fixed HOV Lane Alternative, described above.

No Build Alternative. Under the No Build Alternative, construction-staging impacts associated with on-ramp construction of the East Washington Interchange Improvements Project would be anticipated. These impacts would be smaller in extent and duration than the Build Alternative, but would be qualitatively similar and substantial.

3.1.11.4 Avoidance, Minimization, and/or Mitigation Measures

The following general mitigation measures are grouped to correspond to generic impact types occurring throughout the project corridor, as identified in the impact discussions above.

Corridor-Wide Mitigation Design Concepts

Corridor-wide and project segment-specific aesthetic design considerations for the MSN Project shall be reviewed in coordination with the Policy Advisory Group (PAG). Topics shall include architectural design treatments: soundwalls, retaining walls, bridges; highway planting, bike trail development, interchange, City-wide, and corridor design themes; and others pertinent to the aesthetic integrity of the project. Committee recommendations will also be considered as mitigation measures. Representatives from Caltrans Office of Landscape Architecture, the cities of Novato and Petaluma, and Marin and Sonoma County participate in this committee. Its ongoing work is intended to stimulate discussions with the public through the PAG and other informational meetings.

Mitigation Measures for increased dominance of roadway and decline in overall roadway visual quality as a result of road widening and addition of new center median barriers

- Standard project landscaping and additional re-vegetation shall be employed that will increase the existing amount of landscaping in the freeway visual foreground over the long term, in order to enhance its vividness and intactness to compensate for loss of visual quality due to increased roadway dominance.
- Concrete center median design treatments shall be implemented in Landscape Unit 2, including scoring, sand-blast, and other treatment as determined by Caltrans and the PAG.

Mitigation Measures for visual intrusion/alteration of landscape character by introduction of prominent new project structures

- Standard project landscaping and additional re-vegetation shall be employed to increase the existing amount of landscaping in the freeway visual foreground over the long term, in order to provide screening and enhance its vividness and intactness to compensate for corridor-wide loss of visual quality
- Landscaping measures shall include tree and shrub plantings in areas between the mainline and proposed access roads and bike paths to provide screening and reduce overall roadway dominance
- Architectural design measures shall be applied to major structures including bridges, soundwalls, and interchange overcrossings, to enhance visual compatibility with the surrounding community, reduce visual monotony and add visual variety and interest. Such measures may include concrete surface texture and color treatments, community identity design themes, specification of non-standard fixtures and accoutrements, and other measures as developed by Caltrans in consultation with the PAG.
- Where feasible, clinging vines and/or shrubs shall be planted to cover and screen views of all new soundwalls and retaining walls from the road and from any adjacent off-road sensitive receptors in the shortest feasible period of time.
- Right-of-way fencing within Landscape Unit 2 (Central Segment) shall be Caltrans standard rural fencing. In the frontage of Olompali SHP, wood fencing shall be employed.

Mitigation Measures for tree/vegetation removal

Minimization or avoidance of tree/vegetation removal due to construction:

- In areas where maximum protection of vegetation is desirable, as specified in the VIA or in the field during the project design phase, clearing and grubbing is only to occur within excavation and embankment slope limits.
- Existing vegetation outside of clearing and grubbing limits shall be protected from the contractor's operations, equipment, and materials storage.
- Tree trimming by the contractor shall be limited to that required in order to provide a clear work area.
- High visibility protective fencing shall be placed around trees to be protected prior to the commencement of roadway construction.
- All trees to be removed shall be field marked by the Engineer and approved by the Engineer prior to removal
- Wherever feasible, slope lines shall be adjusted to avoid tree removal
- Design exceptions shall be implemented where feasible to avoid removal of significant existing vegetation. Design exceptions may include reducing the width of the standard grading catch line to minimize vegetation removal; steepening of cut and fill slopes; installation of guardrails around selected trees to allow retention at the shoulder; or other measures as recommended in the VIA or in the field during the project design or construction phases.
- If interchange realignments require removal of existing Redwoods, replacement planting of Redwoods and other trees, if feasible, shall be implemented within the East Washington Interchange to restore the community gateway image.
- In order to off-set declines in vividness and intactness due to tree removal elsewhere in the project segment, additional new Redwood and other tree plantings shall be installed on the earth embankments within the interchange, particularly near the mainline, to the degree feasible and consistent with required standard sight lines and other safety considerations.

Replacement Landscaping (Standard Highway Planting, Revegetation):

- Replacement landscaping shall be implemented per Caltrans safety standards
- Replacement landscaping shall be funded through the parent roadway contract and completed as a separate contract within two years of completion of all roadwork.
- Revegetation: All disturbed areas shall be provided with permanent erosion control grasses and, additionally, appropriate, locally native annual, shrub and tree species. Areas of disturbed native vegetation shall be replaced at a 5 to 1 ratio in place and in kind wherever feasible in the Central Segment. Where in-place planting is not practical, planting will be replaced, where feasible, off-site in the visual foreground of the corridor.

Standard Highway Landscaping

Mitigation Measures impacts to community access routes at freeway under-crossings due to bridge widening

- Lighting shall be provided beneath the under-crossings to provide sufficient illumination for pedestrian and bicycle use at all times, including daylight hours in order to create an attractive and visually appealing setting.
- Structure design features such as bridge parapet and slope paving color or texture shall be implemented as developed under the corridor design concepts.
- Landscaping shall be provided at undercrossing entrances to enhance the gateway statement and emphasize their use as access routes, including in areas outside the under-crossing where feasible.
- Design enhancements such as opportunities for community-sponsored artwork shall be considered in development of corridor design concepts.

Mitigation Measures for major grading and landform alteration

- Contour grading and contour rounding shall be employed at slope transitions in all major grading activities, to minimize the artificial, engineered appearance of resulting slopes and to blend with the natural topography to the greatest feasible extent.
- Where the alignment of the freeway or ramps are to be superseded, existing pavement and roadbed shall be removed and contour graded to provide a

natural appearance and blend with the adjacent landform, and graded areas re-vegetated.

- Trees and shrubs shall be planted at cut/fill transition areas to help screen or soften prominent grade transitions and reduce the artificial appearance of engineered slopes.

- Grading shall utilize techniques such as slope rounding, slope sculpting, and variable gradients to approximate the appearance of natural topography.

Mitigation Measures for light and glare impacts

- Where substantial headlight glare is anticipated to permanently affect residences near new interchanges, landscape screening shall be introduced to block such headlight glare in the shortest time feasible.

- Hardscape surfaces shall avoid highly reflective materials and colors. Where adverse reflective glare is anticipated on soundwalls or other hardscape structures, surface texturing shall be employed to minimize reflectivity, and vines or other vegetation shall be planted to further reduce potential adverse reflective glare.

Mitigation Measures for construction impacts

- Unsightly material and equipment storage and staging shall not be visible within the foreground of the freeway corridor to the extent feasible. Where such siting is unavoidable, material and equipment shall be visually screened to minimize visibility from the roadway and nearby sensitive off-road receptors.

- Construction, staging and storage areas shall be screened by visually opaque screening wherever they will be exposed to public view for extended periods of time.

- Construction activities shall be phased to minimize the duration of disturbance to the shortest feasible time.

- All areas disturbed by construction, staging and storage shall be re-vegetated.

- Construction Lighting: Construction activities adjacent to residences or businesses shall limit all construction lighting to within the area of work and avoid light trespass through directional lighting, shielding, and other measures as needed.

3.1.12 Cultural Resources

3.1.12.1 Regulatory Setting

"Cultural resources" refers to all historical and archaeological resources. Laws and regulations dealing with cultural resources are described below.

The National Historic Preservation Act of 1966 (NHPA), as amended, sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP). Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) among the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. While the PA does not take the place of the Advisory Council's regulations, 36 CFR 800, it does streamline the Section 106 process by delegating certain responsibilities to Caltrans to allow for a more efficient compliance process for highway projects in California.

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties. Notably, Section 4(f) does not apply to archaeological resources that are important chiefly because of what can be learned from data recovery and have minimal value for preservation in place [23 CFR 771.135 (g)(2)].

Historical resources are considered under the CEQA, as well as California Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources. PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet NRHP listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way. Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with the State Historic Preservation Officer (SHPO) before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the National Register or are registered or eligible for registration as California Historical Landmarks.

As defined in the Section 106 regulations, the Area of Potential Effects (APE) means "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects cause by the undertaking" [36 CFR 800.16(d)]. While the CEQA Guidelines do not require delineation of a study area, the APE does take into account all properties with historical resources that may be significantly affected by the project. Properties adjacent to the US 101 corridor are also included in the APE where there may be right-of-way acquisition, temporary construction easements, or soundwalls. Caltrans also consulted historic landmarks lists, which included the National Register of Historic Places, California Register of Historical Resources, California Historical Landmarks, and California Points of Historical Interest.

Public participation and Native American consultation are an essential element of the Section 106 compliance process (36 CFR 800.2). The Native American Heritage Commission (NAHC) was contacted for a search of their sacred lands files and for a list of interested Native American groups and individuals in May 2001 and again in May 2002. Letters were sent to groups and individuals named on the list received from the NAHC on June 5, 2002 to solicit views and information regarding the project. The Federated Indians of Graton Rancheria responded with an interest in obtaining consulting status with Caltrans. The interested parties met with Caltrans regarding potential project-related concerns. In addition, tribal representatives participated in all field work and laboratory studies. Because consultation is an ongoing exchange of views and information, those groups that have expressed an interest would be included in future phases of this project.

3.1.12.2 Affected Environment

For the MSN Project, no properties were identified that meet California Register criteria. Therefore, there is no difference between the compliance methodology for "historic properties" under federal law and "historical resources" under state law. For the purposes of this environmental document, the term "historic properties" is hereafter used to represent both the federal term "historic properties" and state term "historical resource."

Archaeology

A records and literature search was undertaken to determine the proximity of previously documented prehistoric and historical archaeological resources to the APE and to help establish a context for resource significance. The records of the Northwest Information Center, California Historical Resources Inventory System were consulted and appropriate site records obtained. The record search included the study area and a buffer zone of one mile. An archaeological field reconnaissance of the project area was conducted during 2002 and 2003; additional subsurface testing and evaluation phases were completed in 2005. The entire APE and surrounding study area were surveyed on foot. In those instances where there was high potential for buried deposits not visible on the surface, subsurface augering was undertaken.

In total, eight previously recorded prehistoric sites were identified in the field and five isolated artifacts were found in the survey area, as well as seven historic sites. Three previously recorded sites, CA-MRN 319, MRN-325, and MRN-326, could not be identified in the field. Evaluative studies were undertaken at eight archaeological sites (CA-MRN-192, MRN-194, MRN-195, MRN-196, MRN-197, MRN-327, MRN-507/H, and MRN-526) located within the APE. Based upon subsequent assessments, Caltrans found that five of the sites are clearly eligible for listing in the National Register. These sites, CA-MRN-194, MRN-195, MRN-196, MRN-327, and MRN-526, have demonstrated an expected ability to provide significant information about the past, thus meeting NHPA criteria set forth at 36 CFR 60.4d. Two sites, MRN-197 and MRN-507/H, do not initially appear to have those characteristics that would make them eligible, but limitations to the study precluded clear boundary definition and relationships to nearby deposits. When right-of-way access is acquired, further studies at these locations will be undertaken. The eighth site, CA-MRN-192, does not appear to retain integrity or potential for additional value in understanding regional prehistory.

CA-MRN-192

A large shellmound in both extent and depth was originally located by Nels Nelson, an archaeologist, in 1907. The site was excavated in 1967 due to the impending construction of the freeway. Although the site was listed as destroyed in the past, the current survey located evidence of intact portions of the shell midden. Limited hand excavation and mechanical trenching indicated that the remaining portion of the site had been highly disturbed. The site does not appear to retain integrity or potential for additional value in understanding regional prehistory. Site MRN-192 is not eligible for listing to the National Register or California Register. The SHPO has concurred with this determination.

CA-MRN-193

Although not within the project APE, the Olompali Village site has been extensively studied in the past and the proximity of the cluster of sites within the APE requires the inclusion of the site in the defined Olompali Complex for the purposes of this assessment. Excavations at the site have recovered a large sample of artifacts, with a temporal range of Middle Archaic to Phase I of the Late Period and intensive protohistoric and historic occupation. The site is predominantly situated on the Burdell Mountain fan, but may descend into the project area along the Burdell Creek drainage. The site is best described as an extensive midden with marine shell, obsidian, chert, and bone, and numerous features including housepits and human burials.

CA-MRN-194

The site is a small shellmound originally recorded by Nelson in 1907. Although the site had been reportedly destroyed, the current survey found the site had been misplotted, but apparently remains intact. Excavation at this site revealed a largely intact, deep, and varied midden representing several periods of occupation. Evaluative testing found that the site retains high research potential and is considered a significant resource and is eligible for listing in the NRHP. The SHPO has concurred with this determination.

CA-MRN-195

Although partially destroyed by previous construction, a large portion of the site remains intact. The site retains good temporal integrity and contains a diverse collection of cultural remains. Evaluative testing found that the site retains high research potential and is considered a significant resource and is eligible for listing in the NRHP due to its ability to provide significant information about the past, thus meeting NHPA criteria set forth at 36 CFR 60.4d. The SHPO has concurred with this determination.

CA-MRN-196

The site includes a deep midden deposit that contains an abundant and varied assemblage of artifacts and subsistence debris. Data sets recovered during the evaluative testing were among the strongest acquired for the project. Research found that small pockets of intact midden remain within the site boundaries. Evaluative testing found that the site retains high research potential and is considered a significant resource and is eligible for listing in the National Register due to its ability to provide significant information about the past, thus meeting NHPA criteria set forth at 36 CFR 60.4d. The SHPO has concurred with this determination.

CA-MRN-197

This site is a highly disturbed shellmound initially recorded in 1907. The shellmound was reportedly leveled in the 1960s. Although previous survey efforts have located remnants of the midden, the present survey located only sparse artifacts in the vicinity of the site. The site does not appear to retain integrity or potential for additional value in understanding regional prehistory. However, significant areas between MRN-196 and MRN-197 were not studied due to lack of permission to access private property. Full evaluation of the significance of MRN-197 and its relationship to the boundaries of MRN-196 will be conducted if right-of-way acquisition becomes necessary.

CA-MRN-327

This site, a nearly complete, marginally disturbed shellmound, was originally recorded in 1907 as an elongated mound with considerable depth. Evaluative testing results revealed strong implications for economic/sociopolitical organization and ethnic identity. The site retains high research potential and is considered a significant resource and is eligible for listing in the National Register due to its ability to provide significant information about the past, thus meeting NHPA criteria set forth at 36 CFR 60.4d. The SHPO has concurred with this determination.

CA-MRN-507/H

This site, a sparse lithic scatter with low density, demonstrates high disturbance due to previous land use activities. The site does not appear to retain integrity within the APE limits and does not appear to hold potential for additional value in understanding regional prehistory. However, because of the proximity of MRN-507/H to other significant resources and the potential for associated buried deposits, full evaluation of the site will be conducted if right-of-way acquisition becomes necessary.

CA-MRN-526

This site is a complex deposit containing multiple pockets of archaeological remains spread across a large area. Portions of the site may be among the oldest documented components in Marin County. Although the recovered material from the site is not extensive, it does exhibit a long period of occupation with large variability in settlement and technological organization. The site retains high research potential and is considered a significant resource and is eligible for listing in the National Register due to its ability to provide significant information about the past, thus meeting NHPA criteria set forth at 36 CFR 60.4d. SHPO has concurred with this determination.

CA-MRN-325 and CA-MRN-326

These sites could not be located and were not formally assessed as part of the project. They are presumed to have been destroyed by previous construction of US 101.

Olompali and San Antonio Clusters

An apparent clustering of archaeological sites at two locations, one within Olompali SHP (CA-MRN-194, 195, 507/H and 526) and the other at San Antonio Creek (CA-MRN-196 and MRN-197), suggests that their boundaries may not have been fully evaluated due to limited access, and thus determination of eligibility for all of the sites may require further studies.

In a letter received from the SHPO dated April 22, 2006, in response to the Determination of Eligibility within the Historic Property Survey Report documentation, the SHPO requested that, until further studies can be conducted to determine site boundaries and evaluate eligibility for National Register listing, all sites within the Olompali and San Antonio Creek clusters be considered eligible, with the addition of CA-MRN-193, the Olompali Village site. Although not within the defined APE, the proximity of CA-MRN-193 to the Olompali Complex necessitates its inclusion in the evaluation of project effects.

Architectural History

The APE for this project includes 17 properties that were built in 1955 or earlier and were evaluated in the Historic Resources Evaluation Report (HRER).

Of the 17 properties evaluated in the HRER, one is eligible for National Register listing: the Freeman-Parker residence, south of Petaluma in Sonoma County. This residence, built ca. 1854, is a rare, intact example of a vernacular residence from the first decade of California statehood and qualifies for the National Register under Criterion C. The SHPO has concurred with this determination. The historic property boundary is the fenced yard immediately surrounding the house, and does not extend to the barns and garages on the large 99.76-ac parcel. US 101 abuts the western edge of the historic property boundary as the Freeman-Parker Residence currently has direct access to the highway from a private driveway.

A second property within the APE, Olompali SHP, is listed in the National Register of Historic Places. Olompali's built resources are located above the highway on the hillside, surrounded by mature tree growth. Currently, the existing highway is barely visible from the pedestrian level in the immediate vicinity of the built resources.

A third property, the San Antonio Road Bridge over San Antonio Creek (Bridge 27C0051) was previously determined eligible for listing in the National Register of Historic Places as a part of Caltrans' Statewide Historic Bridge Survey of 1986. Built in 1917, this bridge is one of the earliest concrete T-beam bridges constructed by the California Division of Highways. It retains a high degree of integrity and remains eligible for the National Register. There are 38 bridges within the project APE. Seventeen of these were built before 1960 and therefore were included in the recent Statewide Historic Bridge Inventory Update of 2002-04. Excluding the historic San Antonio Road Bridge, none of the bridges within the project APE are eligible for the National Register.

The properties within the APE for this project were also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. Three properties are considered historical resources for the purpose of compliance with CEQA: Olompali SHP, the San Antonio Road Bridge, and the Freeman-Parker Residence.

3.1.12.3 Impacts

To comply with Section 106 of the NHPA, Caltrans must assess effects on any properties listed or eligible for the NRHP by applying the Criteria of Adverse Effect [36 CFR 800.5(a)]. An Adverse Effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. This includes physical destruction of or damage to all or part of a property.

Archaeology

Fixed HOV Lane Alternative. Caltrans, in consultation with the SHPO, has found that five archeological sites within the APE, CA-MRN-194, MRN-195, MRN-196, MRN-327, and MRN-526, satisfy NRHP eligibility criteria set forth at 36 CFR 60.4d and would be adversely affected by construction of the Fixed HOV Lane Alternative. Two sites, MRN-197 and MRN-507/H do not initially appear to have those characteristics that would make them eligible, but limitation to the study precluded clear boundary definition and relationships to nearby deposits. Construction of the Fixed HOV Lane Alternative would have an adverse effect on the two site complexes in the APE. The Olompali Complex would be entirely or partly destroyed by construction of the project. The second complex of sites at the San Antonio Creek Bridge (MRN-196, MRN-197) would also be entirely or partially destroyed by removal of the bridge and/or construction of access roads.

CA-MRN-327 is not presently in the area of direct impact, so that the effect to this site may not be adverse if it is protected during construction.

Section 4(f) applies to all archaeological sites that are on or eligible for inclusion on the National Register and that warrant preservation in place. This includes those sites discovered during construction. Section 4(f) does not apply if FHWA, after consultation with SHPO and/or THPO, determines that the archaeological resource is important chiefly because of what can be learned by data recovery (even if it is agreed not to recover the resource) and has minimal value for preservation in place](23 CFR 771-135 (g)]. Based upon SHPO’s concurrence with FHWA and Caltrans that the archaeological sites are eligible under Criterion D (see letters from SHPO in Appendix D), the archeological sites discussed here are exempt from the Department of Transportation Act, 1966.

Reversible HOV Lane Alternative. Because the Reversible HOV Lane Alternative would have the same footprint as the Fixed HOV Lane Alternative, the impacts identified above for the Fixed HOV Lane Alternative would also apply to the Reversible HOV Lane Alternative. Accordingly, this alternative would have an adverse effect on two site complexes around Olompali and the San Antonio Creek Bridge.

Access Option. The Access Options involve repaving existing roads, constructing new frontage roads with bicycle and pedestrian facilities, replacement and modified bridgework, and new interchanges. The areas of potential disturbance in undeveloped areas are fairly similar for Access Options 4b, 14b, and 14d. Access Option 12b would not include a San Antonio Road Interchange or any frontage road on the east side of US 101 between the Redwood Landfill Overcrossing and San Antonio Creek. As a result, the potential to affect archaeological resources would be similar for three of the Access Options and less with Access Option 12b.

No Build Alternative. Under the No Build Alternative, there would be no impacts to archaeological resources, because this alternative would involve only routine maintenance and upkeep of US 101 and there would be no direct or indirect change to the properties identified as eligible for, or listed in, the National Register.

Architectural History

Fixed HOV Lane Alternative. There are three historic properties, all occurring within the Segment B. There would be no direct or indirect adverse effects to these resources. Consequently, a 4(f) evaluation is not necessary under the Department of Transportation Act of 1966 (49 U.S.C. 303). The historic properties are described below.

Olompali SHP. The centerline of the proposed freeway would be moved further to the east in the vicinity of the park, away from the park boundary. While work is proposed at the driveway entrance to the park to realign the park road access, this entrance is contemporary and the proposed work would not enlarge the entrance or directly impact any historic architectural resources. The proposed freeway would not be any more visible from the buildings at the park. The changes to the surrounding landscape (outside the boundary of the park) would be visible from the visitor parking area and from the grounds closer to the US 101 corridor; however, this setting is not a contributing feature to the park because the highway in its current form was existing at the time of the National Register listing of Olompali in January 1973. Therefore, Caltrans has found, and SHPO has concurred, that the MSN Project would not have an adverse effect on Olompali SHP.

San Antonio Road (Bridge No. 27C0051). The Fixed HOV Lane Alternative would construct a new bridge to the west of the San Antonio Road Bridge to serve two-way vehicular access across San Antonio Creek. The existing historic bridge would be retained as is for vehicular and bicycle/pedestrian access. No rehabilitation of the bridge is planned at this time. Concrete bollards may be placed on San Antonio Road immediately north and south of the bridge to prevent vehicular crossing. No changes are proposed to the existing bridge itself. While the setting of the bridge would be modified with the addition of a new bridge upstream, the immediate surroundings of San Antonio Road Bridge would not change to a significant degree. Significant for its early concrete T-beam construction, the bridge's character-defining construction, materials, and design would be retained. The bridge would still be able to convey those features which are integral to its National Register significance. The proposed construction of a new bridge and the proposed work to widen the shoulders of the existing San Antonio Road as part of the Fixed HOV Lane Alternative would not diminish nor adversely affect the bridge's character-defining features. Therefore, Caltrans has found, and SHPO has concurred, that the project would not have an adverse effect on the bridge.

Freeman-Parker Residence, 4555 Redwood Highway, Petaluma. The Fixed HOV Lane Alternative would shift US 101 to the west in the vicinity of this historic property. An access road is proposed in the existing footprint of the northbound lanes, and right-of-way acquisition on the western side of the existing roadway to shift the freeway's centerline west, away from the Freeman-Parker Residence. The driveway to the residence would be rebuilt to provide access to the proposed frontage road. However, there would be no property take from the Freeman-Parker Residence, the proposed driveway would be constructed on existing state right-of-way and connect to the internal access road within the large rural parcel. While access to the residence would be modified under the Fixed HOV Lane Alternative, the proposed construction near the Freeman-Parker Residence would not diminish nor adversely affect the property's character-defining features. The residence's integrity would be retained; the alteration of the property's setting by the proposed construction would not a significant effect since the setting was previously significantly altered when the highway was first upgrade in the middle of the last century. Therefore, Caltrans has found, and SHPO has concurred, that the Fixed HOV Lane Alternative would not have an adverse effect on the Freeman-Parker Residence.

Reversible HOV Lane Alternative. Because the Reversible HOV Lane Alternative would have the same footprint as the Fixed HOV Lane Alternative, the impacts to the Olompali SHP, the San Antonio Road Bridge, and the Freeman-Parker residence identified above for the Fixed HOV Lane Alternative would also apply to the Reversible HOV Lane Alternative. Accordingly, this alternative would not have adverse effect on historic properties.

Access Options. The improvements in the vicinity of the three historic properties are identical under all the Access Options. The impacts to these properties are identified above under the discussion of the Build Alternatives. SHPO has concurred with Caltrans that there would not be an adverse effect on the three historic properties.

No Build Alternative. Under the No Build Alternative, there would be no effects to architectural history resources, because there would be no change to the three properties identified as eligible for, or listed in, the National Register and there would be no change to the setting of these properties.

3.1.12.4 Avoidance, Minimization, and/or Mitigation Measures

Archaeology

Caltrans' project development process involved modifications to the Build Alternatives to avoid and minimize project-related impacts to cultural resources in consultation with professionally qualified staff, SHPO and the Federated Indians of Graton Rancheria. Consequently, excavation of archaeological sites was minimized and testing for buried deposits was constrained in order to reduce impacts to the subject archaeological sites. Nevertheless, total avoidance of archaeological resources is not achievable because of the scale of the proposed construction, tight grade areas, and turning constraints.

Implementing the mitigation measures stipulated below will be necessary for both Build Alternatives and will comply with Section 106 regulations regarding assessment and treatment of known historic properties as well as assessment and treatment of potential subsequent historic properties discoveries during the project.

Memorandum of Agreement to Protect Archaeological Resources. To resolve adverse effects of the proposed project on the archaeological sites, FHWA and Caltrans has consulted with the SHPO and interested Native American groups. A

Memorandum of Agreement (MOA) has been developed to identify mechanisms for treatment of historic properties, primarily through recovery of significant data that would be destroyed by construction of the project (Appendix D). The MOA will also outline the process for finishing identification of subsurface contexts that might contain historic properties that might be affected by the project and will also outline procedures for treatment of historic properties inadvertently discovered during construction. To protect sites not in the area of direct construction impacts, a provision for archaeological monitoring during construction will be stipulated. Under this MOA, a Historic Property Treatment Plan (Treatment Plan) will be prepared for the project prior to construction. The Treatment Plan will be consistent with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation. Interested Native Americans will be invited to participate in the development of the Treatment Plan.

Architectural History

The finding for the three architectural historic resources in the APE is that no adverse effect would occur as a result of the MSN Project. Therefore, as no physical alteration would occur, no mitigation is proposed for any of these resources.

If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find.

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC) who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact District 4 Environmental Branch, so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

3.2 Physical Environment

3.2.1 Introduction

This section addresses all aspects of the physical environment. These aspects include hydrology, water quality, geology, soils, seismicity, topography, hazardous materials, air quality, noise, and energy. The section describes the physical environmental attributes of the corridor, and the potential hazards that can result construction of the MSN Project, as well as concerns raised by construction of the transportation improvements in potentially hazardous areas. Many of the concerns described in this section relate to the short-term construction period and how building the mainline improvements, the HOV lanes, the interchanges, and bridge modifications can result in erosion, exposure to geotechnical hazards and/or contaminated soils or ground water, water quality and air quality impacts, and increased noise levels over the background conditions.

3.2.2 Hydrology and Floodplains

This section describes the surface water and groundwater conditions in the project corridor. The primary focus of analysis is whether the MSN Project would exacerbate existing flood hazards within the project boundaries or expose the roadway and the public to new flood risks. The information presented here is based upon the *Floodplain Evaluation Report Summary*, August 2005 (Appendix G); the *Caltrans Preliminary Drainage Report*, January 2006 and Caltrans *Draft Water Quality Report*, updated March 2007. Information in those reports is supported by several extensive on-site field reviews conducted by Caltrans Hydraulics personnel to locate and visually assess the size and condition of drainage facilities within the limits of the MSN Project study area. A total of 181 existing drainage crossings (not including bridges) have been surveyed within the project boundaries. The field reviews also included gathering information from and coordinating with maintenance personnel, representatives of the Sonoma County Water Agency (SCWA), and the public works departments of the City of Novato and the City of Petaluma.

3.2.2.1 Regulatory Setting

EO 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The FHWA requirements for compliance are outlined in 23 CFR 650 Subpart A. In order to comply, the following must be analyzed:

- The practicality of alternatives to any longitudinal encroachments;
- Risks of the action;
- Impacts on natural and beneficial floodplain values;
- Support of incompatible floodplain development; and
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by a project.

The 100-year floodplain is defined as "the area subject to flooding by the flood or tide having a 1 percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the 100-year floodplain."

Changes to the floodplain will require concurrence from the Federal Emergency Management Agency (FEMA). FEMA Flood Insurance Rate Maps (FIRM) can be reviewed in Appendix G.

3.2.2.2 Affected Environment

Regional Hydrology

According to the FEMA Marin County Flood Insurance Study (2006), the climate of Marin County is characterized by warm, dry summers, and mild, wet winters. The rainy season is from October to April with an annual rainfall ranging from 76 centimeters (30 inches) in the northern portions of the county to 152 centimeters (60 inches) along the higher ridges of the county.

According to the FEMA Sonoma County Flood Insurance Study (1997), the climate of Sonoma County is Mediterranean with mild winters and dry summers. The rainy season is from November to April. Precipitation in southeastern Sonoma County, the MSN Project area, ranges from less than 51 centimeters (20 inches) to 102 centimeters (40 inches).

Ground Water Resources

The MSN Project area overlies three major ground water basins: the Wilson Grove Formation Highlands, the Petaluma Valley Basin, and the Novato Valley Basin. According to the United States Department of Agriculture, Natural

Resources Conservation Service website, there are several locations in the MSN Project area where the ground water is relatively shallow (less than 6 ft or 1.8 m, below the surface), resulting in water-saturated zones. These locations are directly related to water bodies that cross the MSN Project:

- near the intersection of US 101 and Lakeview Road, adjacent to the Petaluma River;
- north of Oak Shade Lane near Black John Slough and Rush Creek;
- the Arroyo Creek crossing of US 101; and
- near Frosty Lane that also crosses US 101.

Furthermore, the Geotechnical Report (Caltrans 2005) for the MSN Project summarizes historic borings within the project boundaries. Ground water depths ranged from 0 to 10 m below existing grade. A majority of the sites with available ground water information were at or adjacent to creeks or water bodies. Ground water depths tend to be higher at these locations.

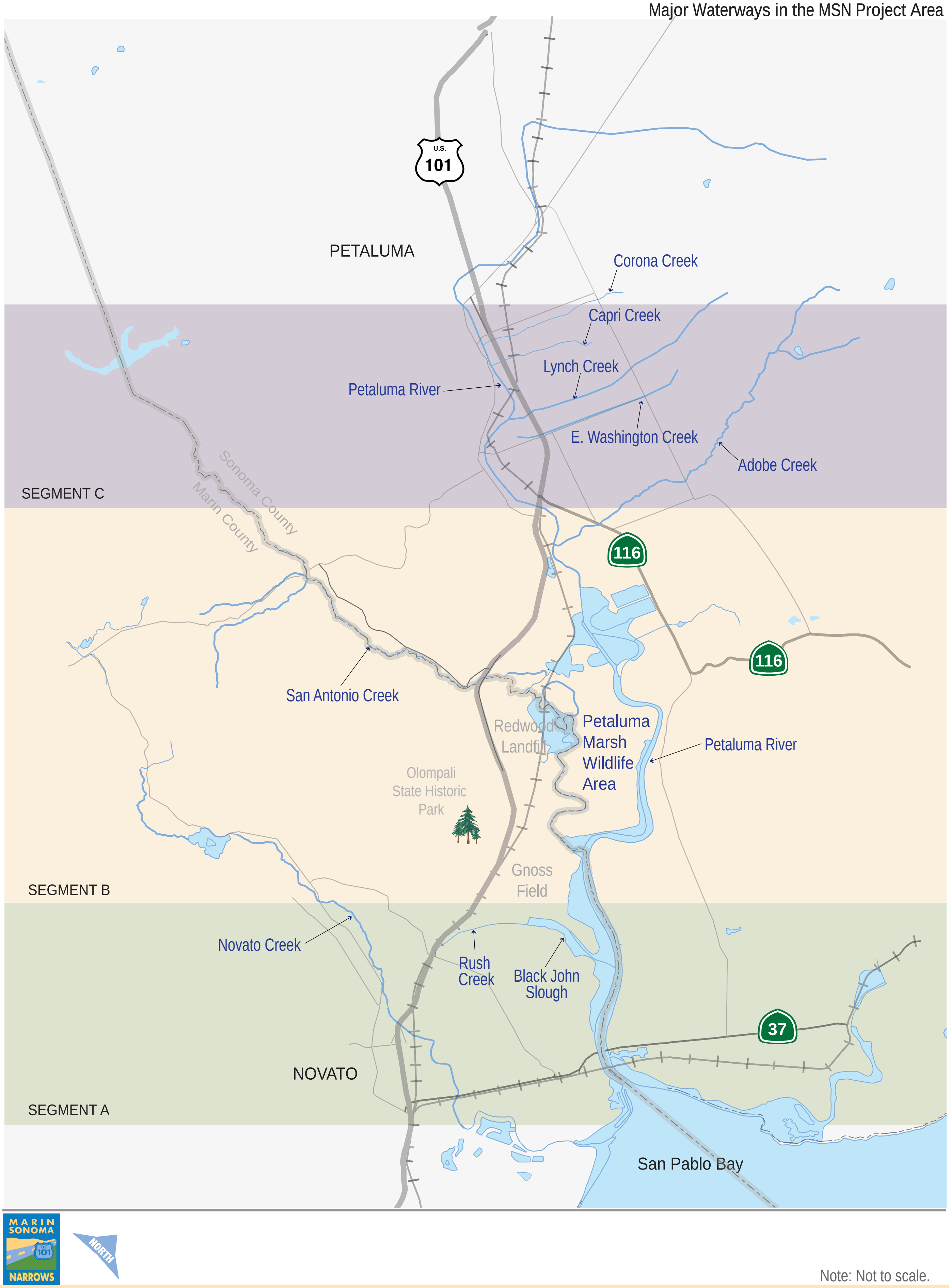
Surface Water Resources

The MSN Project is located in northern Marin County and continues through the southern section of Sonoma County. Segment A (the Southern Segment) of the MSN Project is located within Marin County, Segment C (the Northern Segment) is located within Sonoma County, and Segment B (the Central Segment) straddles both counties. The MSN Project area drains towards San Pablo Bay which is located to the southeast of the MSN Project. Figure 3.2-1 shows the surface waters in the project area and Figures 3.2-2a-d focus on those waterways within the project boundaries and the related 100-year floodplain.

The MSN Project is located in the San Pablo Unit of the San Francisco Bay Basin, and specifically within the San Pablo Bay Watershed. This watershed falls within the jurisdiction of the San Francisco Bay RWQCB.

- **Segment A (Southern Segment).** This segment is within Novato Hydrologic Sub-Area (HSA) 206.20. The primary receiving water bodies are Arroyo Avichi/Novato Creek and Arroyo San Jose. Arroyo San Jose is tributary to Novato Creek. Novato Creek drains to San Pablo Bay.

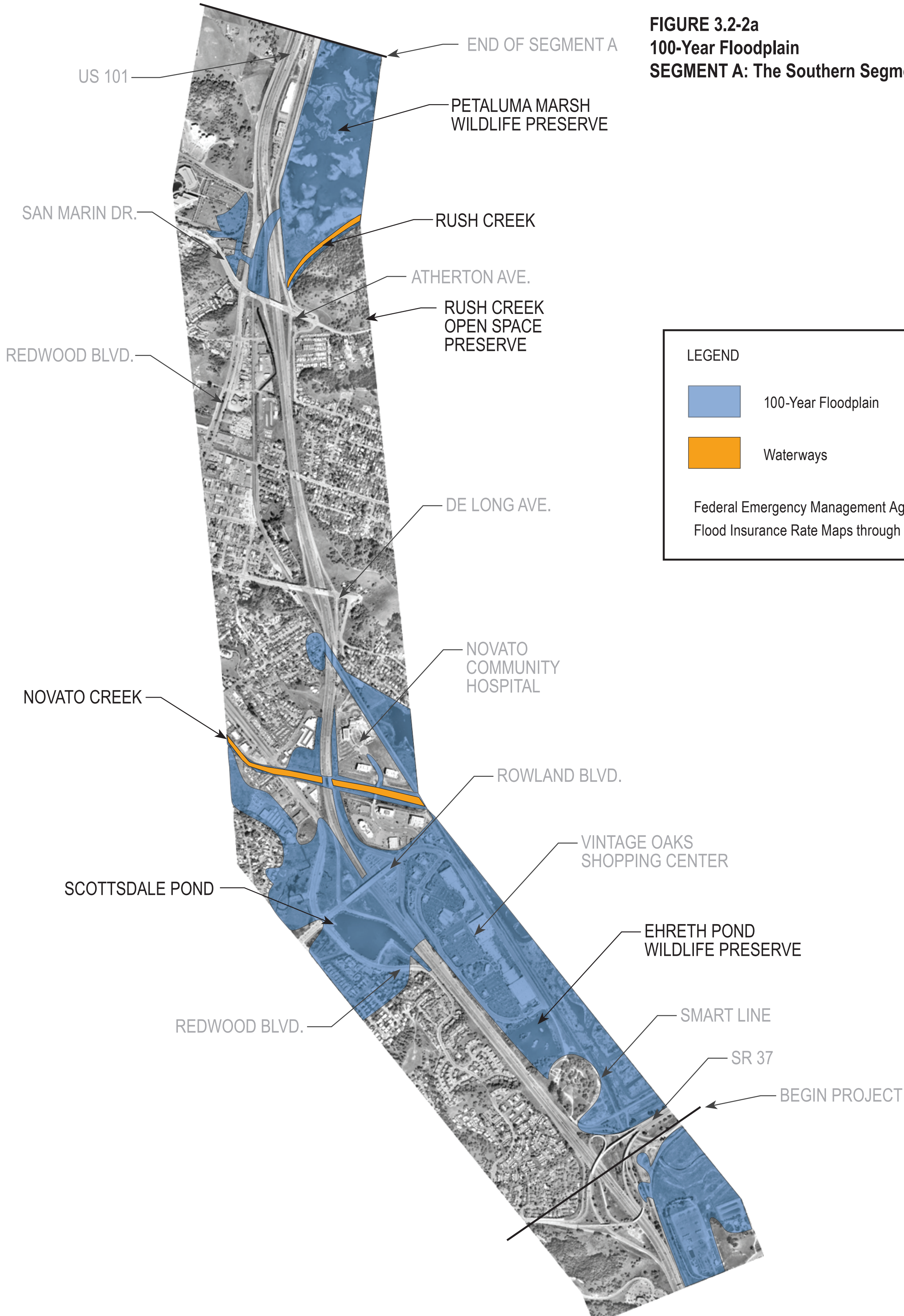
FIGURE 3.2-1
Major Waterways in the MSN Project Area



TB042006002BAO fig3_2_1_waterways.ai

Note: Not to scale.

FIGURE 3.2-2a
100-Year Floodplain
SEGMENT A: The Southern Segment



LEGEND

(blue)	100-Year Floodplain
(orange)	Waterways

Federal Emergency Management Agency, Flood Insurance Rate Maps through 1996

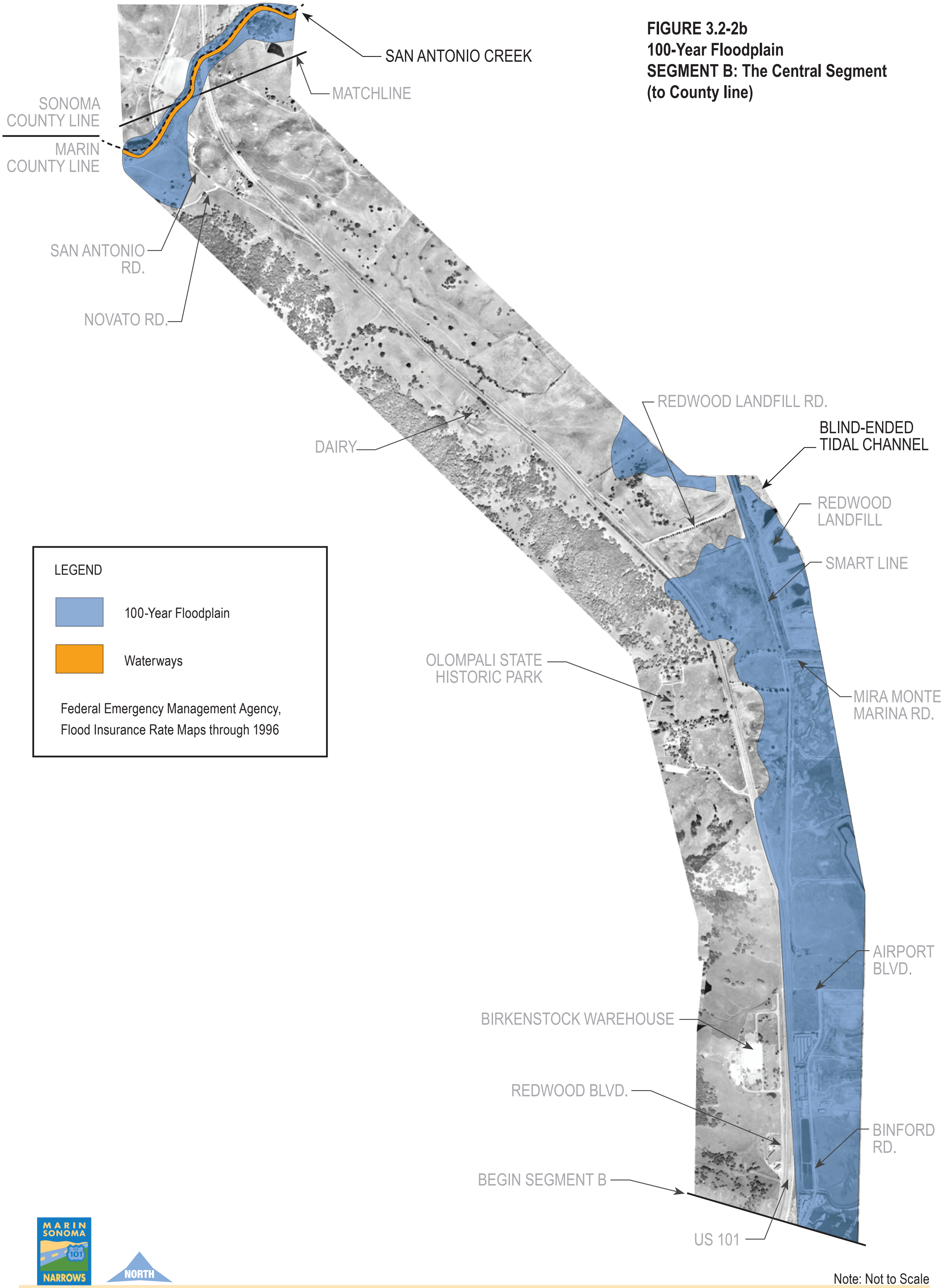
TB042006002BAO_Fig3.2-2_100yrFloodplain.indd 10-11-07

MARIN SONOMA NARROWS

NORTH

Note: Not to Scale

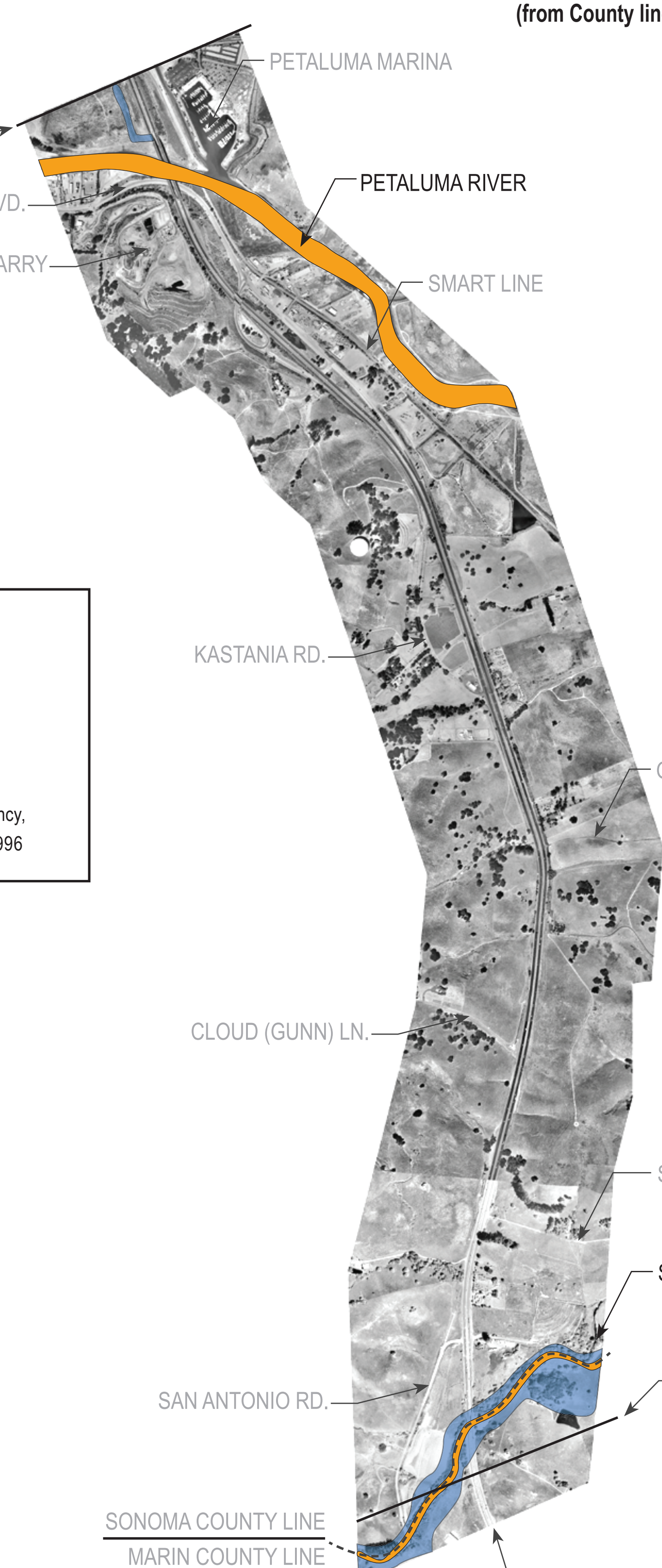
FIGURE 3.2-2b
100-Year Floodplain
SEGMENT B: The Central Segment
(to County line)



Note: Not to Scale

TB04200602BAO_Fig3.2-2_100yrFloodplain.indd 10-11-07

FIGURE 3.2-2c
100-Year Floodplain
SEGMENT B: The Central Segment
(from County line)



LEGEND

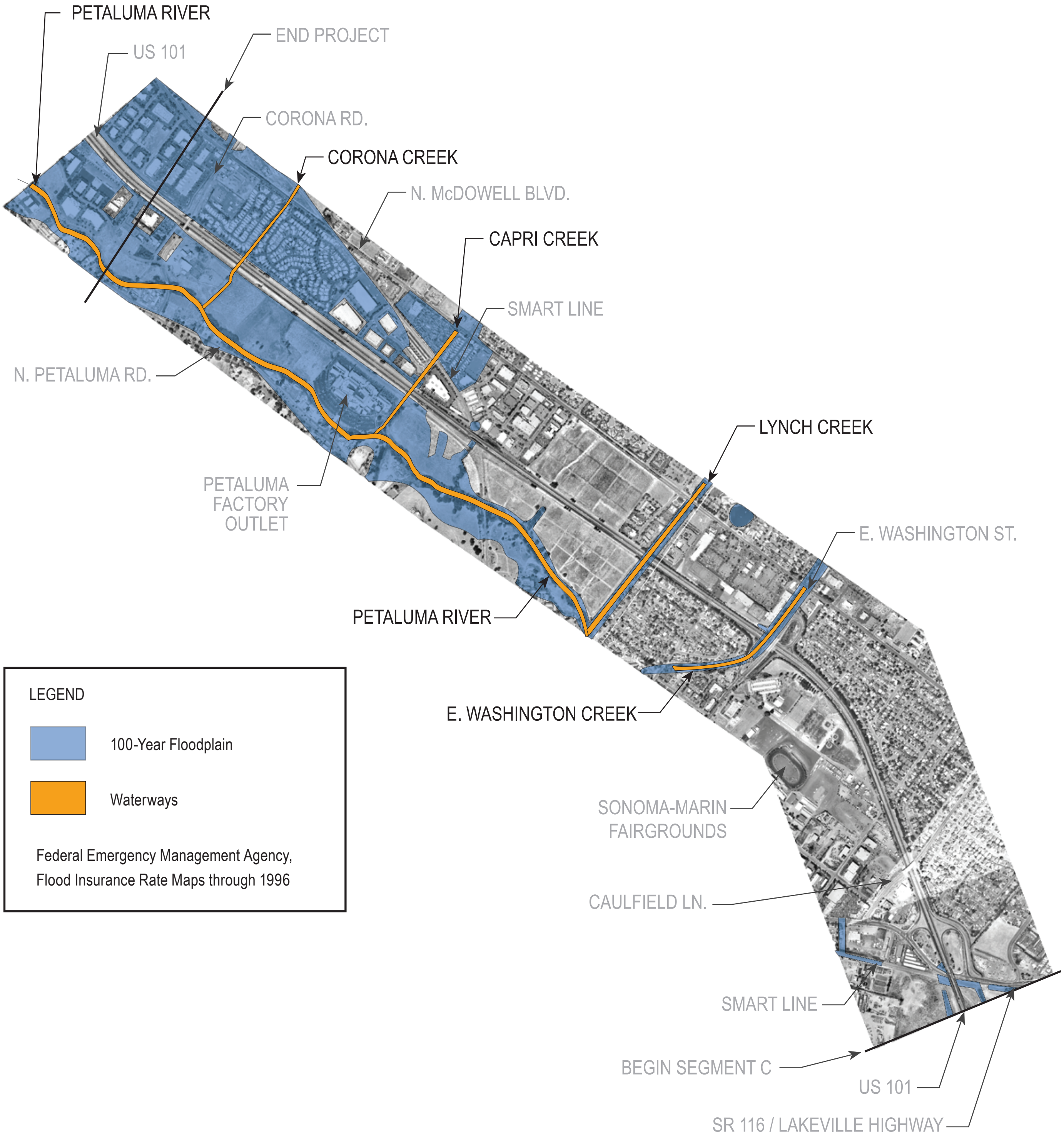
(blue)	100-Year Floodplain
(orange)	Waterways

Federal Emergency Management Agency, Flood Insurance Rate Maps through 1996

Note: Not to Scale

TB042006002BAO_Fig3.2-2_100yrFloodplain.indd 10-11-07

FIGURE 3.2-2d
100-Year Floodplain
SEGMENT C: The Northern Segment



Note: Not to Scale

TB042006002BAO_Fig3.2-2_100yrFloodplain.indd 10-11-07

- **Segment B (Central Segment).** This segment is within the Petaluma River HSA 206.30 and the Novato HSA 206.20. The primary receiving water bodies are Petaluma River, Adobe Creek, Ellis Creek, San Antonio Creek, an unnamed creek, Olompali Creek, Basalt Creek, and Rush Creek. The unnamed creek and Olompali Creek are tributary to San Antonio Creek. Adobe Creek, Ellis Creek, and San Antonio Creek are tributary to Petaluma River. Basalt Creek and Rush Creek flow east through Black John Slough before draining to Petaluma River which continues southeast and empties into San Pablo Bay. Petaluma Marsh is approximately 1.5 km east of the MSN Project.

- **Segment C (Northern Segment).** This segment is within the Petaluma River HSA 206.30. The primary receiving water bodies are Willow Brook, Corona Creek, Capri Creek, Lynch Creek, East Washington Creek, and Petaluma River. Willow Brook, Corona Creek, Capri Creek, and Lynch Creek flow southwest and are tributaries to Petaluma River. Petaluma River continues southeast and empties into San Pablo Bay.

Flooding within the Project Area

Historical records indicate that, in general, the existing culverts and drainage systems adequately transport on-site and off-site flows to receiving waters without localized flooding. Exceptions to this are in the regions of PM 23.9 (KP 38.5) in Marin County near the Birkenstock complex, PM 0.15 (KP 0.25) in Sonoma County near the San Antonio Creek and PM 3.34 (KP 5.36) of the Petaluma Urban Area, as described below.

Birkenstock Area. Near PM 23.9 in Marin County, commercial development on the western side of US 101 over the past 40 to 50 years has resulted in substantial increased runoff. Attempts to remedy this condition include redirecting some of the natural channels in the area, which has caused occasional flooding along US 101 at several locations where existing culverts are unable to accommodate the increased flows.

San Antonio Creek Area. Flooding occurs on US 101 just north of the Marin/Sonoma county line, which follows San Antonio Creek in the vicinity of the MSN Project. This condition can be caused either by infrequent, large-volume flows in San Antonio Creek or by more frequent, but less intense, storm events that cause local runoff to concentrate at the northerly intersection of Old San Antonio Road and US 101.

In general, the flooding that occurs at the northern intersection of old San Antonio Road is not the result of high flow in San Antonio Creek, but as a result of inadequate highway drainage facilities. A grated drainage inlet in the median about 500 ft north of the San Antonio intersection was found to be poorly maintained, resulting in overflow storm water being passed onto the intersection area. Additionally, there exists a system of small diameter (12”) culverts that are poorly maintained and filled with roadside debris. Even with proper maintenance, it is unlikely that the drainage system at San Antonio intersection is capable of handling more than a five-year rainfall event.

Petaluma Urban Area. Localized flooding has historically been a problem in the City of Petaluma, especially in the region from US 101 westward to the Petaluma River. Much of this area lies in the Petaluma River floodplain, and in those of several smaller creeks that flow to the river. Corona Creek, Lynch Creek, and Washington Creek drain watershed areas to the east of the city and flow westward under the freeway to the Petaluma River. Most of the on-site drainage from the freeway discharges to these small creeks and finds its way to the river.

In the East Washington Interchange area, Caltrans maintenance personnel have reported backyard flooding in at least some of the residences located in the southeast quadrant of the interchange. A field review of this area indicates a depressed area to the south and east of the northbound off ramp where highway runoff may be trapped by the adjacent residential development.

3.2.2.3 Impacts

Ground Water

Fixed HOV Lane Alternative. The proposed grading required for the MSN Project may have localized impacts to the flow of ground water, particularly in the locations that are water saturated: near the intersection of US 101 and Lakeview Road; north of Oak Shade Lane near Black John Slough and Rush Creek, at the Arroyo Creek crossing of US 101, and near the Frosty Lane crossing of US 101. However, because the affected ground water basins are so large, the localized impacts of permanently installed footings, retaining walls, or bridge supports would have minimal effect on the overall direction or rate of ground water flow towards San Pablo Bay.

The additional impervious surfaces from the widened freeway, interchange, and Access Options would reduce the areas that serve to recharge the underlying ground waters. In Segment A (the Southern Segment) and in Segment C (the Northern Segment), the reduction in ground water recharge areas would be minimal because the additional acres of impervious surface for the HOV lanes is small, especially when compared to the recharge areas of the Novato Valley Basin and the Wilson Grove Formation Highlands Basin, respectively. In addition, the affected areas of Segments A and C are in urbanized areas, where ground water recharge is already limited. In Segment B (the Central Segment), the extent of new impervious surfaces (64 ha, or 157 ac) is considerably greater than in Segments A and C (20 ha, or 49 ac, combined). While the reduction in ground water recharge area would therefore be greater in Segment B than in Segments A and C, the impact would still be minimal because the Petaluma Valley Ground Water Basin which underlies this portion of the project corridor is vast and largely undeveloped. Therefore, the risks of proposed project are not significant, do not constitute a significant floodplain encroachment, and there is no increase in the base floodplain elevation.

Reversible HOV Lane Alternative. Under this alternative, the amount of new impervious area, bridgework, and installation of support columns and footings would be the same as identified for the Fixed HOV Lane Alternative. As a result, the Reversible HOV Lane Alternative would be expected to have minimal ground water impacts.

Access Options. Table 3.2-1 indicates the amount of additional impervious surface area under each Access Option. Access Option 4b would require the least amount of additional impervious surface, 11.5 ha (28.3 ac), while Access Option 12b would require the greatest amount of additional impervious surface, 14.0 ha (34.6 ac). Impacts to ground water from loss of ground water recharge areas would be minimal under each of the four Access Options since the amount of additional impervious surface area reported in Table 3.2-1 would be negligible compared to the large recharge areas for the underlying ground water basins.

Table 3.2-1 Additional Impervious Surface by Access Option

Access Option	Hectares	Acres
4b	11.5	28.3
12b	14.0	34.6
14b	13.6	33.6
14d	13.4	33.1

No Build Alternative. The No Build Alternative would not have an impact on ground water within the project boundaries, since this alternative involves only routine maintenance and upkeep of existing facilities.

Drainage

Fixed HOV Lane Alternative. Most of the existing drainage facilities in the urban areas of the Southern and Northern Segments continue to be used with only minor modifications, while most culverts in the rural areas of the Central Segment must be replaced or upgraded to meet design standards, and address corrosion damage or inadequate capacity. The Fixed HOV Lane Alternative would increase the paved surface of the area of the freeway corridor (83 ha, or 205 ac) and thereby could permanently increase storm water runoff to the regions historically affected by flooding. Many of the existing rural culverts (Segment B) are metal and have been in place up to 70 years. These culverts typically have exceeded their service life and are severely corroded. As part of the MSN Project, many of the existing culverts would be replaced to meet the current minimum standard of 600 mm. Consequently, the MSN Project would not adversely alter drainage patterns but improve existing conditions, particularly areas currently susceptible to flooding.

Birkenstock Area. The project would upgrade the undersized culverts to handle storm water quantities calculated for the watershed as they exist today and correct the roadway overtopping problems that are periodically being experienced.

San Antonio Creek Area. The MSN Project would replace the single 24” cross culvert with two 36” cross culverts and raise the roadbed in some stretches to eliminate flooding problems.

Petaluma Urban Area. In order to maintain on-site highway drainage at or below current levels, detention facilities are planned, where necessary, throughout the Petaluma urban area. Several methods of detaining storm water runoff are being considered: (1) ponds, (2) open swales and/or ditches, and (3) underground storage. Detention ditches with metering devices could be strategically placed within the right-of-way to discharge any existing drainage channels.

Widening for the Fixed HOV Lane Alternative would take place in the existing highway median. This would likely take place after construction of the East Washington Interchange Project; therefore, the MSN Project would conform to the drainage system installed as part of that interchange project.

Reversible HOV Lane Alternative. Under this alternative, drainage impacts would be the same as for the Fixed HOV Lane Alternative. While there would be some incremental increase in storm water runoff due to the increased impervious areas (83 ha, or 205 ac), the Reversible HOV Lane Alternative would upgrade drainage facilities that are currently undersized. As a result, changes to drainage would be addressed, as described above for the Fixed HOV Lane Alternative.

Access Options. All the Access Options involve additional paving in Segment B. The additional pavement that is indicated in Table 3.2-1 would increase runoff in this segment and contribute to historic flooding hazards in the Birkenstock area and around San Antonio Creek. While the amount of impervious surface differs by Access Option, the improvements proposed in the vicinity of Birkenstock and San Antonio Creek are common to all of the Access Options. Thus, the impacts on drainage in the areas where drainage issues are greatest would be similar for all Access Options. To reduce the effect of the additional impervious surfaces and the resultant runoff and to correct existing drainage deficiencies, each of the Access Options would include new drainage facilities and improvements to the existing undersized facilities.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of existing facilities. Since no additional impervious surface areas are proposed by this alternative, changes to drainage patterns would not be expected.

100-Year Flood Hazard

Fixed HOV Lane Alternative. As described below, the Fixed HOV Lane Alternative would not significantly increase flood hazards or impact the FEMA mapped 100-year floodplain.

In the Segment A, there is a 100-year flood zone (Zone “AE”) around the Rowland Boulevard Interchange. The lowest elevation of US 101 in this stretch is about 11.0 ft, which is above the base flood elevation (9.0 ft on the west side and 7.0 ft on the east side). Construction of the Fixed HOV Lane Alternative in this stretch would involve widening the median to accommodate HOV lanes. This increase in impervious surface would not be enough to substantial raise the base flood water surface elevation. Therefore, although US 101 is mapped within a FEMA Special Flood Hazard Area (SFHA), the additional runoff generated by the Fixed HOV Lane Alternative would not significantly impact the floodplain.

In the Segment B, US 101 traverses another SFHA area in the vicinity of San Antonio Creek along the Marin-Sonoma County line. This area is designated Zone “A,” and the 100-year flood covers an expansive area and results in flood waters flowing over US 101. To protect the road and motorists, the Fixed HOV Lane Alternative would re-align US 101 approximately 70 m to the west and raise the road 1.5 m. As a result, this build alternative would avoid the periodic overtopping that currently creates hazardous driving conditions and higher maintenance costs. In addition, to ensure that water elevations upstream would not increase as a result of the proposed improvements, Caltrans proposes to upgrade an existing 600 mm culvert to a 900 mm culvert, as well as provide an additional 900 mm culvert outlet. These improvements would enable the upstream area to drain more effectively. As a result of these modifications to the road alignment and to the drainage facilities, it is expected that the 100-year base flood elevation would not be increased and that existing hazards would be reduced or diminished. In addition, flood hazards to adjacent land uses would not be increased due to the MSN Project (preliminary Drainage Report, Caltrans 2006).

In the Segment C, extensive areas of Petaluma are subject to flooding, particularly areas along the Petaluma River and along the tributaries to the Petaluma River. At the northern end of the project corridor, where Capri and Corona Creeks feed into the Petaluma River, much of the land on either side of US 101 is designated as a FEMA 100-year floodplain. In this stretch, the Fixed HOV Lane Alternative would involve widening the median to accommodate one HOV lane in each direction. The project would not be widening the overall freeway right-of-way or further encroaching into the floodplain to an extent that would diminish the storage capacity of the 100-year floodplain. Since this build alternative would be adding new impervious surfaces that could increase storm water runoff, detention facilities would be placed strategically to not significantly impact adjacent properties and to discharge into existing natural drainage channels.

Reversible HOV Lane Alternative. Under the Reversible HOV Lane Alternative, impacts to the 100-year floodplain would be the same as the Fixed HOV Lane Alternative, because both Build Alternatives would have the same cross sections and would propose the same upgrades to existing undersized drainage facilities. In addition, the realignment of the mainline would be identical under both alternatives.

Access Options. As noted above for the discussion of the Build Alternatives, in Segment B, where the Access Options are proposed, US 101 traverses an SFHA area in the vicinity of San Antonio Creek along the Marin-Sonoma County line. The 100-year floodplain in this area covers an expansive area and results in flood waters flowing over US 101. In this vicinity, Access Options 4b, 14b, and 14d all propose the same improvements: new and modified crossings of the San Antonio Creek, an access road along the west side of US 101, an access road on the east side of US 101, and a bicycle/pedestrian path connecting the east and west sides of US 101. These Access Options would have similar impacts in terms of impervious area and contribution to flood hazards. However, both Build Alternatives would include modifications to the road alignment and to the drainage facilities, so that the 100-year base flood elevation would not be increased and that existing hazards would be reduced or diminished.

Access Option 12b would be similar to the other Access Options but would not include the frontage road along the east side of US 101. Consequently, this Access Option would result in slightly less impervious surface area than the other Access Options in this portion of Segment B, with a corresponding reduction in its contribution to flood hazards, although as explained above, the improvements associated with the Build Alternatives would result in all Access Options Being protected from the SFHA.

No Build Alternative. The No Build Alternative would not contribute to or exacerbate 100-year flood hazards. Areas that are prone to flooding currently would continue to be subject to overtapping and hazardous conditions.

Surface Water Hydrology

Fixed HOV Lane Alternative. New replacement bridges across the Petaluma River and San Antonio Creek would not further constrict the channels, and therefore would not increase flow velocity through the bridges. Caltrans does not anticipate that rock slope protection would be required around the new structures.

Reversible HOV Lane Alternative. Under this alternative, impacts to the surface water hydrology would be the same as the Fixed HOV Lane Alternative, because the design and replacement of the Petaluma River Bridge and the work around San Antonio Creek would be identical under both alternatives.

Access Options. The major waterway in Segment B, where the Access Options are proposed, is San Antonio Creek. The proposed bridgework at this creek would be the same under each of the Access Options. Thus, the same impacts would be expected for each Access Option. As described above for the Build Alternatives, the design of the bridgework would maintain stream flow and velocity and would not be expected to adversely affect the waterway.

No Build Alternative. The No Build Alternative would not involve bridge widenings or replacement of the Petaluma River Bridge. Accordingly, this alternative would have no effect on surface water flows.

3.2.2.4 Avoidance, Minimization, and/or Mitigation Measures

The following measures would apply to both Build Alternatives.

Culvert Sizes. There are numerous locations where recommendations have been made to upgrade the existing culvert sizes to 24”. Depending on the specific location, these recommendations are the result of inadequate capacity issues and/or the result of minimum design criteria for cross culverts. During the design phase of the project, it may become apparent that greater headwater elevations can be allowed at specific locations, thereby reducing the recommended culvert size.

Subsurface Drainage. Preliminary recommendations for sub-surface drainage and geotechnical considerations include:

- Install top of cut diversion ditches above all significant cut faces. Significant cuts are considered to be those greater than 3 m in height.
- Install perforated underdrain pipes at the toe of all significant cut slopes and in other locations where existing installations of perforated pipe drains suggest that seepage water may be a problem.
- Install horizontal pipe drains in cut faces where slope instability has been observed. This condition has been noted in the vicinity of PM 27.5 in the vicinity of Atherton Avenue in Marin County and PM 2.85 near Kastania Road in Sonoma County.
- Construction is proposed in channels/ditches at specific locations recommended in the Preliminary Drainage Report.

Detention Facilities. In the Petaluma urban area, detention facilities will be needed. Various options are under consideration and include ponds, open swales, and or ditches. The detention facilities will be identified during the design phase. Regardless of the method selected to detain runoff, the facility must be designed with a capacity to detain the increased storm water runoff generated and be located strategically to discharge into natural drainage channels that ultimately flow to the Petaluma River. Metering devices (e.g., overflow weirs) could be considered to limit the rate of discharge.

Underground Storage. Caltrans will consider underground storage, which could be designed and constructed for future widening without modification of the existing storage facilities or acquisition of additional right-of-way. In evaluating this option to detention ditches, Caltrans will weigh right-of-way needs, on-going maintenance, costs, and storm water quality benefits.

3.2.3 Water Quality and Storm Water Runoff

The Water Quality section of the environmental document relies heavily on input from Environmental Engineering staff. This section describes storm water regulations affecting the project, receiving water bodies listed in Section 303(d) of the Clean Water Act and their beneficial uses, existing water quality, project-related storm water discharges and quality, and potential storm water impacts to water quality of receiving waters. The information presented in this section is based upon Caltrans Draft Water Quality Study Report, March 2007, and the Draft Storm Water Data Report, February 2007.

3.2.3.1 Regulatory Setting

The primary law regulating water quality is the federal Clean Water Act (CWA). The USEPA delegated its authority to oversee the implementation of the CWA in California to the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB). The RWQCB prepares and adopts the Water Quality Control Plan (Basin Plan), a master policy document for managing surface and groundwater quality in the region. The SWRCB and RWQCB issue permits, which implement the standards included in the Basin Plan as well as other requirements of the State Water Code and the CWA.

Section 401 of the CWA requires a water quality certification from the State Board or Regional Board when a project would require a federal license or permit and result in a discharge to waters of the United States.

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) system to regulate storm water discharges, including discharges from highways, which are defined as point source discharges. To ensure CWA compliance and to facilitate processing of routine projects, the SWRCB has issued Caltrans a statewide NPDES Storm Water Permit to regulate discharges from Caltrans facilities (Order No. 99-06-DWQ, CAS000003).

In addition, the SWRCB has issued a statewide Construction General Permit for construction activities (Order No. 98-08-DWQ, CAS000002) that applies to all storm water discharges from land where clearing, grading, and excavation result in disturbances of at least 0.4 ha (1 ac) or more. All projects that are subject to the construction general permit require a Storm Water Pollution Prevention Plan (SWPPP).

3.2.3.2 Affected Environment

Beneficial Uses

Table 3.2-2 identifies each of the principal water bodies in the project boundaries and their beneficial uses as identified in the San Francisco Bay Region Basin Plan. For each beneficial use, there are water quality standards that have been established by the RWCQB to protect those uses.

Water bodies that do not meet water quality standards are identified on the state's List of Water Quality Limited Segments pursuant to CWA Section 303(d). Action plans must be developed for these water bodies to improve water quality.

Novato Creek, Petaluma River, San Antonio Creek, and San Pablo Bay are Section 303(d) "impaired" water bodies. Urban runoff and discharges from storm sewers are the principal contributors to water quality problems in Novato and San Antonio Creeks. The Petaluma River and San Pablo Bay are degraded by a wide variety of sources, including urban runoff and storm sewer discharges, agricultural activities, and construction and land development.

Table 3.2-2 Beneficial Uses for Water Bodies in the MSN Project Area

	Cold freshwater habitat	Estuarine habitat	Fish migration	Preservation of rare and endangered species	Fish spawning	Warm freshwater habitat	Wildlife habitat	Water contact recreation	Noncontact water recreation	Navigation	Shellfish harvesting	Municipal and domestic supply	Industrial service supply	Ocean, commercial, sport fishing
Novato Creek (Segment A)	□		□	■	□	□	■	□	□			■		
San Antonio Creek (Segment B)	■		■		□	■	■	□	□					
Petaluma River (Segments B and C)	■	■	■	■	■	■	■	■	■	■				
San Pablo Bay (all segments)		■	■	■	■		■	■	■	■	■		■	■

Source: San Francisco RWQCB, San Francisco Basin Plan
Notes:
■ = Existing beneficial use
□ = Potential beneficial use

Areas Susceptible to Erosion

Areas that are characterized by moderate to high erosion potential, when combined with areas that are relatively steep and have rapid runoff characteristics, pose possible water quality concerns because ground disturbance in these areas can cause the soils to erode and be transported to nearby surface water bodies. Los Osos Clay Loam, Goulding Cobbly Clay Loam soils, and Los Osos-Bonnydoon Complex are classified as having a high potential of erosion hazard.

According to the Geotechnical Report (2005), Los Osos soils are in Segments A and B (Southern and Central Segments, respectively), and Goulding Cobbly Clay Loam soils are in Segment B only. There are no soils with high erosion hazards in Segment C (the Northern Segment).

3.2.3.3 Impacts

The primary potential for water quality impact from the MSN Project is soil erosion or suspended solids being introduced into the waterways due to construction activities or from additional runoff from added impervious areas. Water quality would also be affected by temporary and permanent encroachment into existing wetlands and Waters of the U.S. and the State. This section of the DEIR/S focuses on impacts due to construction and storm water runoff; Section 3.3.2 addresses impacts to wetlands and Waters of the U.S.

Temporary Impacts

Fixed HOV Lane Alternative. Construction-related activities that may affect water quality include excavation and grading activities, stockpiling of soils; loading, unloading and transport of excavated and fill materials; and working near various creek crossings in the MSN Project area. During construction, there is a potential for temporary impacts to occur due to increased erosion. In Segment A (the Southern Segment), the maximum disturbed soil area estimated by Caltrans would be approximately 13 ha (32 ac); in Segment B (the Central Segment), 190 ha (470 ac); and in Segment C (the Northern Segment), 13.4 ha (33 ac).

This potential for construction-period erosion is accentuated where the soils have moderate to high erosion potential and the ground-disturbing activities are near surface water bodies. In these locations, sediments could eventually be transported into nearby creeks and storm drains with storm runoff.

The MSN Project includes bridge widening or replacement over creeks or removal or extension of culvert creek crossings. Some of these creeks are perennial and may need dewatering operations or temporary creek diversions during construction. Perennial waterways crossed by the MSN Project include Petaluma River, San Antonio Creek, Basalt Creek, Rush Creek, and Novato Creek. Construction is anticipated within the creek channels at the bridges across Petaluma River and San Antonio Creek. Temporary creek diversions or dewatering operations may cause temporary impacts to wetlands or Waters of the U.S. and may temporarily degrade water quality. Dewatering for retaining wall footings or pilings may also be necessary for deep excavations. Over 70 sites were identified in the Caltrans' *Preliminary Site Investigation Report*, Volume 1 (January 30, 2006) as being known or potential areas of contamination. Ground disturbance or dewatering in these areas could release contaminants into near surface water bodies or into the underlying ground water basins, resulting in lower water quality.

Fueling or maintenance of construction vehicles would occur in the MSN Project area during construction, so there would be a risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials may pose a threat to water quality if contaminants enter storm drains, natural creeks, and other waterways. The magnitude of the impact from an accidental release would depend on the amount and type of material spilled.

A spill on the roadway would trigger immediate response actions to report, contain, and mitigate the incident. The California Office of Emergency Services has developed a Hazardous Materials Incident Contingency Plan, which provides a program for response to spills involving hazardous materials. The plan designates a chain of command for notification, evacuation, response, and cleanup of spills resulting from the transport of hazardous material. Caltrans also has spill contingency procedures and response crews.

Increased sediment load, construction activities in the waterways, and accidental spills would all trigger temporary water quality deterioration and, in the short term, compromise maintenance of the water quality objectives that are established to protect the beneficial water uses of the water bodies in the MSN Project area. Such impacts would be adverse, especially in Segment A (the Southern Segment) where the MSN Project crosses Novato Creek, in Segment B (the Central Segment) where the MSN Project crosses San Antonio Creek and Petaluma River, and in Segment C (the Northern Segment) where the MSN Project crosses Lynch, Capri, and Corona Creeks, each of which drain into the Petaluma River. While short-term impacts could be experienced in many of the MSN Project area waterways, these particular locations are highlighted because the receiving water bodies are on the Section 303(d) list of waterways failing to meet water quality standards.

Reversible HOV Lane Alternative. Under this alternative, soil disturbance would be the same as the Fixed HOV Lane Alternative, because the footprints of the two alternatives would be the same. Impacts to water quality and the waterbodies within the project limits would therefore be similar to those of the Fixed HOV Lane Alternative.

Access Options. The amount of disturbed soils under the Access Options is generally included in the estimates for the Build Alternatives. The differences to water quality impacts among the four Access Options would be negligible, considering Caltrans' adherence to the various water quality regulations such as those under its NPDES permit.

No Build Alternative. The No Build Alternative would not impact water quality within the project boundaries, since this alternative involves only routine maintenance and upkeep of existing facilities. Any interference or disruption related to mainline or ramp repairs or maintenance would be limited in duration and scope. Construction activity associated with the routine maintenance and upkeep of existing facilities would adhere to the various water quality regulations such as those for the NPDES permit. These measures would require construction activity to avoid potential water quality impacts from storm water runoff.

Permanent Impacts

Fixed HOV Lane Alternative. After construction, permanent water quality impacts could result from the additional stormwater pollution that washes off new impervious surface area resulting from the Fixed HOV Lane Alternative. This alternative would create approximately 83 ha (205 ac) of new impervious areas, of which approximately 10 ha (25 ac) would occur in Segment A, 64 ha (157 ac) in Segment B, and 10 ha (25 ac) in Segment C.

Caltrans has performed studies to monitor and characterize highway storm water runoff throughout the State. Commonly found pollutants in storm water runoff are Total Suspended Solids (TSS), nitrate nitrogen, Total Kjeldahl Nitrogen (TKN), phosphorous, Ortho-phosphate, Copper, Lead and Zinc. Some sources of these pollutants are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, and the wearing of break pads (Caltrans, November 2003). Runoff from the 83 ha (205 ac) of new impervious surface area under the Fixed HOV Lane Alternative would introduce more of these pollutants into the nearby receiving waters; however, as described in Section 3.2.2.4, Caltrans under the provisions of its NPDES permit, must monitor and regulate runoff from its facilities. Compliance with the NPDES permit is expected to avoid potential water quality impacts from storm water runoff.

Reversible HOV Lane Alternative. Under this alternative, the new impervious area would be the same as the Fixed HOV Lane Alternative since the cross-sectional width of the roadway would be identical, 34.2 m (114 ft). Impacts to water quality and the waterbodies within the project limits from increased storm water runoff from the additional impervious surface area would thus be the same as those of the Fixed HOV Lane Alternative.

Access Options. All the Access Options involve additional paving in Segment B. Of the 64 ha (157 ac) reported for Segment B under the Fixed and Reversible HOV Lane Alternatives, approximately 11.5-14.0 ha (28.3-34.6 ac) of additional impervious surface area would be added under the Access Options, which would increase runoff and contribute to storm water runoff and pollutant loading. Table 3.2-1 in Section 3.2.1.3 identifies the amount of additional impervious surface area under each Access Option. Access Option 4b would require the least amount of additional impervious surface, 11.5 ha (28.3 ac), while Access Option 12b would require the greatest amount, 14.0 ha (34.6 ac).

No Build Alternative. The No Build Alternative would not have permanent water quality impacts within the project boundaries, since this alternative involves only routine maintenance and upkeep of existing facilities. This alternative would not alter the existing amount of impervious surface area and thus would not increase storm water runoff.

3.2.3.4 Avoidance, Minimization, and/or Mitigation Measures

In developing the MSN Project, a number of alternatives have been identified and an alternative evaluation process was followed to avoid or minimize environmental impacts while maintaining the project’s need and purpose. While this process has avoided or minimized many water resource and water quality impacts that could otherwise occur, additional mitigation measures are still needed to reduce impacts.

Avoidance and/or Minimization Measures

Avoidance measures for the MSN Project were developed in consultations with locals and regulatory agencies. Roadway realignments, project footprint, and waterway crossings have been planned to avoid as much as possible wetlands, Waters of the U.S. and the State, and other Environmentally Sensitive Areas (ESA) that could have water quality impacts if disturbed, such as floodplains, areas with highly erodible soils, and steep slopes. Where such avoidance was not possible, such as waterway crossings, measures to minimize impacts were identified through consultation with regulatory partners and then subsequently incorporated as design modifications. In order to ensure that the MSN Project would maximize avoidance of ESAs that exist within or are adjacent to the MSN Project boundaries, these areas will be delineated, field verified, and included on all MSN Project contract plans.

In addition, proposed construction work in jurisdictional wetland areas will be restricted to regulatory windows defined in accordance with the USACE404 permit that will be needed for the MSN Project.

Mitigation Measures

As explained earlier in the description of the regulatory framework governing the protection of water resources, Caltrans adheres to a number of standard practices and BMPs, as identified in its Storm Water Management Plan (SWMP), NPDES permit, and Construction General Permit. The Caltrans Statewide SWMP identifies temporary and permanent BMPs that have been approved for statewide application to address the quality of discharges from Caltrans' facilities. The BMPs fall into four categories: Construction Site BMPs, Design Pollution Prevention BMPs, Treatment BMPs, and Maintenance BMPs. The BMPs that must be considered during the planning and design of all construction projects within Caltrans right-of-way include Construction Site, Design Pollution Prevention, and Treatment BMPs. Construction Site BMPs are implemented during construction activities to reduce pollutants in storm water discharges throughout construction. Design Pollution Prevention BMPs are permanent measures to improve storm water quality by reducing erosion, stabilizing disturbed soil areas, and maximizing vegetated surfaces. Treatment BMPs are permanent devices and facilities that treat storm water runoff. Because the area disturbed by the MSN Project would be greater than 0.4 ha (1 ac), the BMPs must include the use of Best Conventional Technology (BCT) and Best Available Technology (BAT). Finally, Caltrans drainage facilities are considered a municipal separate storm sewer system under the Caltrans permit and, therefore, must reduce the discharge of pollutants to the Maximum Extent Practicable.

Temporary Water Quality Control Measures/Construction Site BMPs. The MSN Project shall be regulated under the NPDES Permit for Construction Activities (Order No. 99-08-DWQ, NPDES No. CAS000002), which is also referenced in the Caltrans NPDES Permit (Order No. 99-06-DWQ, NPDES No. CAS000003). Reducing possible construction activity pollutants to the BAT/BCT can be achieved by following the procedures in the *Statewide Storm Water Management Plan* (Caltrans 2003) and the *Storm Water Quality Handbook*, *Project Planning and Design Guide* (Caltrans 2002). To comply with the conditions of the Caltrans NPDES Permit, and to address the temporary water quality impacts resulting from the construction activities of the project, Standard Special Provision (SSP) 07-345 will be included in the specifications for the MSN Project. This SSP will address water pollution control work and the implementation of a SWPPP during construction.

Ultimately, the temporary erosion control and water pollution control measures will be defined in detail on the Erosion Control and Water Pollution Control design sheets prepared for the MSN Project and in the Project Specifications of the Contract Documents prepared for the MSN Project.

Construction activities near active waterways shall provide all necessary soil stabilization and sediment control practices to minimize the potential for impacts to the watershed. Preliminary temporary BMPs include linear sediment barriers, such as silt fences and fiber rolls, which serve to prevent sediment-laden sheet flow during construction of a project. Riparian areas adjacent to wetlands or environmentally sensitive areas will be designated and protected as ESAs with high visibility silt fences. To protect water quality where construction within creek channels is anticipated, temporary stream crossings and clear water diversions will be required. Other types of temporary BMPs that will be utilized during construction activities include tracking controls to prevent off-site tracking of sediments. These controls may include stabilized construction entrances, street sweeping, and vacuuming. Concrete wastes may be managed through the use of concrete washout facilities. Dewatering discharges is anticipated and a dewatering permit will be required for the project.

There is the potential to discharge non-visible pollutants with storm water discharges from the construction site and/or the contractor's yard. A Sampling and Analysis Plan (SAP) for Non-Visible Pollutants will be prepared to describe the sampling and analysis strategy and schedule for monitoring non-visible pollutants in storm water discharges from the MSN Project site and the contractor's yard in accordance with the requirements of Section B of the General Permit and applicable requirements of the Caltrans Guidance Manual: *Storm Water Monitoring Protocols* (July 2000).

Compliance with the Caltrans statewide NPDES permit, including preparation and adherence to the SWPPP, should reduce or avoid substantial construction-related impacts. Table 3.2-3 lists temporary water quality control measures that may be required for the project.

Other temporary water quality or construction site BMPs are listed in the Caltrans SWMP and each should be considered for inclusion into the MSN Project as the design progresses.

Table 3.2-3 Temporary Water Quality Control Measures

Category	Minimum Requirement(s)
Soil Stabilization Practices	SS-1 Scheduling SS-2 Preservation of Existing Vegetation SS-6 Straw Mulch SS-7 Erosion Control Blankets SS-10 Outlet Protection/ Velocity Dissipation Devices
Sediment Control Practices	SC-1 Silt Fence SC-5 Fiber Rolls SC-7 Street Sweeping and Vacuuming SC-10 Storm Drain Inlet Protection
Wind Erosion Control	WE-1 Wind Erosion Control
Non-Storm Water Control	NS-6 Illicit Connection/Illegal Discharge Detection and Reporting NS-8 Vehicle and Equipment Cleaning NS-9 Vehicle and Equipment Fueling NS-10 Vehicle and Equipment Maintenance
Waste Management & Materials Pollution Control	WM-1 Material Delivery and Storage WM-2 Material Use WM-3 Stockpile Management WM-4 Spill Prevention and Control WM-5 Solid Waste Management WM-8 Concrete Waste Management WM-9 Sanitary/Septic Waste Management
Temporary Construction Practice	TC-1 Stabilized Construction Entrance/Exit

Design Pollution Prevention BMPs. The design of drainage and landscape elements can effectively also function as pollution prevention BMPs. Concurrence with the following BMPs shall be obtained from the Caltrans Hydraulic and Landscape Architecture units as required under Section 4.3 of the SWMP:

- **Consideration of downstream effects related to potentially increased flow:** To reduce effects of discharge to unlined channels, erosion control measures will be applied to restrict water velocity to less than 1.2 m/s during a 25 year storm. Sediment loading is considered minimal given the flattened slopes and the revegetation included as a permanent BMP.
- **Preservation of existing vegetation:** At all locations, existing vegetation will be preserved as much as possible.
- **Concentrated flow conveyance systems:** The MSN Project will have the potential to: (a) cause gullying, (b) create or modify existing slopes, and (c) require the concentration of surface runoff. To mitigate for these conditions, drainage facilities will be properly designed to handle concentrated flows. Concentrated flow conveyance systems, such as asphalt concrete (AC) dikes and oversize drains will be used to convey water from the impervious area to the vegetated ditches, swales, or trenches along the highway. AC dikes will be used for areas with side slopes steeper than 1:4. The proposed dike locations are specified in the MSN Project separate Storm Water Data Report. Though there would be an increase in impervious surface, with a relative increase in the pollutants washed off the pavement, roadside treatments will be available to treat the pollutant runoff. Rock energy dissipaters will be used at culvert inlets and outlets, channel lining and scour control will be used where appropriate.
- **Slope/surface protection systems:** The MSN Project would create or modify existing slopes, requiring that all new slopes be revegetated per the Project Erosion Control Plan (approved by the District Landscape Architect). Erosion control will be used to stabilize exposed slopes, and smooth transitions will be constructed between outlets, headwalls, wingwalls, and the natural channel.

Treatment BMPs. The MSN Project is considering treatment BMPs because this project involves soil disturbance that is greater than 1.2 ha and because the MSN Project is within Marin and Sonoma Counties, which are Municipal Separate Storm Sewer System (MS4) areas. As described in the Caltrans Project Planning and Design Guide (2002), during all phases, the Project Engineer should initiate discussion with the Office of Environmental Engineering and all other responsible functional groups (NPDES Coordinator, Landscape Architecture, Maintenance, Hydraulics, Construction and Environmental Units) to consider Treatment BMPs for this project.

In compliance with Caltrans' NPDES requirements, water quality BMP drainage facilities will be included where practicable, and may include shallow roadside infiltration trenches, biofiltration strips or swales, and detention devices. Treatment BMPs for the Petaluma River and San Antonio Creek watersheds, which are impaired by Caltrans design constituents, nutrients, and sediment, are considered in the following order: infiltration devices, media filters, detention devices, biofiltration strips, and biofiltration swales. Novato Creek will follow General Purpose Pollutant Removal which will consider treatment BMPs in the following order: biofiltration strips, biofiltration swales, media filters, and detention devices. These BMPs are further detailed in the MSN Project Storm Water Data Report.

3.2.4 Geology/Soils/Seismic/Topography

The following discussion is based upon the Caltrans Preliminary Geotechnical Study (August 2005). In addition, Caltrans conducted a review of all the structures in the MSN Project study area. Referred to as an Advanced Planning Study, these reviews were done between January 2004 and September 2005. Preliminary design is based in part on the results of this review.

3.2.4.1 Regulatory Setting

This section discusses geology, soils, and seismic concerns as they relate to the public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. The Caltrans Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. The current policy is to use the anticipated Maximum Credible Earthquake (MCE) from young faults in and near California. The MCE is defined as the largest earthquake that can be expected to occur on a fault over a particular period of time.

3.2.4.2 Affected Environment

The MSN Project area is in the California Coast Ranges geomorphic province, a series of long, northwest-trending mountain ranges separated by parallel river valleys. The oldest known basement rock is the Franciscan Formation, an assemblage of sedimentary and volcanic rocks of Jurassic and Cretaceous age. Overlying the Franciscan Formation are Pliocene-age, marine sediments of Wilson Grove Formation and Pliocene-age Volcanic of the Sonoma Group.

The project area is in a region well known for seismic activity. There are three active faults located in the project area. The Rodgers Creek Fault and the Hayward Fault are located 6 km and 12 km (0.6 mi and 7.5 mi) from the project area, respectively. The San Andreas Fault is 19 km (11.6 mi) from the project area. Table 3.2-4 provides the predicted MCE based upon historical data of seismic activity near the project area.

Table 3.2-4 Predicted Maximum Credible Earthquake and Acceleration for Faults near the MSN Project Area

Fault	Distance from Project Km (mi)	Maximum Credible Earthquake	Peak Acceleration
Rodgers Creek	6.0 km	7.0	.46 g
San Andreas	19.0	8.0	.41 g
Hayward	12.0	7.5	.40 g
Source: California Department of Transportation Preliminary Geological Report, August 2005.			

The Burdell Mountain Fault zone extends from the vicinity of Santa Rosa southeastward 40-48 km (25-30 mi) to the northern margin of the San Pablo Bay. This fault intersects the expressway portion of the project, and is considered potentially active, as defined by showing evidence of surface displacement during Quaternary time (the last 1.6 million years).

Liquefaction potential in the project area varies from very low to very high. Liquefaction refers to a type of ground failure that results when cohesionless, granular materials, such as fine-grained sands, are changed into a fluid-like state as a result of seismic ground shaking events. In this “liquefied” state, soils lose their ability to support foundations and structures. The highest potential exists in the area of the SR 37 Interchange. There is also high liquefaction potential from Rowland Boulevard to Atherton Avenue and from the area around San Antonio Creek to the southern Kastania Road intersection. Moderate potential exists in the area just north of the SR 116/Lakeville Highway Separation and Overhead.

3.2.4.3 Impacts

Fixed HOV Lane Alternative. This alternative would involve the widening of several bridges, ramps and overcrossings. Table 3.2-5 lists the proposed structural work under the Fixed HOV Lane Alternative. In the northern and southern segments of the project, where the primary improvement involves widening the median to accommodate the HOV lanes, risk of fault rupture under the Fixed HOV Lane Alternative would not increase over existing conditions.

In addition, the Fixed HOV Lane Alternative proposes the construction of several new structures, such as interchanges and a San Antonio Creek Bridge just west of the existing bridge in the Central Segment. New structures would be constructed following Caltrans' seismic design considerations and compliance with these seismic design standards would minimize ground shaking impacts from earthquakes up to the MCE.

Table 3.2-5 Proposed Structure Work

Bridge No.	Bridge Name	KP	Type of Work
27 0086K	South Novato Blvd. OC	30.5	Earthquake retrofit of columns and footings.
27 0089L/R	Novato Creek	R33.0	Widen in median, replace outside rails.
27 0090L/R	Franklin Ave. OH	R33.7	Widen in median, and outsides, soundwall both sides.
27 0092L/R	Olive Ave. UC	R34.5	Widen in median, add soundwalls on both sides. Build on raised falsework due to poor clearance.
27 0094L/R	North Novato OH	35.9	Widen in median, replace outside rails.
27 0115	Redwood Landfill OC	40.8	Widen on left (north) side with Options 4b and 12b.
TBD	San Antonio OC	42.6	New Overcrossing with Options 4b, 14b and 14d.
TBD	S. San Antonio Creek	N/A	New Bridge for frontage road
20 0019L/R	San Antonio Creek	44.5/0	Remove left Bridge, replace joint seals on right Bridge.
TBD	San Antonio Creek	44.5/0	New Bridge for US 101 on new alignment.
TBD	Petaluma Blvd. S. OC	5.1	New OC with all Access Options.
20 0156L/R	South Petaluma UC	5.6	Remove
20 0154L/R	Petaluma River	5.3	Replace on new vertical alignment.
20 0155L/R	US 101/SR 116 SOH	5.8	Widen left Bridge, replace right Bridge.
20 0163L/R	Washington Creek	7.7	Widen in median and on left and right sides.
20 0162L/R	Lynch Creek	8.3	Widen in median and on left and right sides.
20 0158L/R	North Petaluma OH	9.3	Replace OH on new vertical alignment.

Caltrans also evaluates structures for seismic retrofit. Any structure work as part of the Fixed HOV Lane Alternative would include an analysis of the seismic and scour deficiencies. Project plans would include seismic retrofit, as necessary. Table 3.2-2 indicates the South Novato Boulevard Overcrossing would undergo a seismic retrofit of columns and footings. Seismic work can be identified as part of the Advanced Planning Study, or would be identified as part of the General Plan development in final design.

Secondary seismic events could result in the MSN Project corridor, depending on the soil response to ground shaking or acceleration. Any of the active faults listed in Table 3.2-4 could cause the project corridor to undergo varying intensities of ground shaking during an earthquake. The shaking may cause lurch cracks in silty and clayey soils with a greater potential of cracking during rainy periods when the soil is saturated. Lateral spreading could also occur due to the shaking. Lateral spreading involves large masses of saturated alluvium flowing toward open slopes. Neither of these phenomena is considered to be a high risk hazard in the MSN Project corridor.

Other potential impacts related to soil and geologic conditions in the project area from construction of the Fixed HOV Lane Alternative are listed below.

- Erosion could occur in the Central and Southern Segments of the project due to the presence of erodible soils.
- Soils in portions of the Central Segment are classified as having high shrink-swell potential, meaning the soils are prone to expansion during wet conditions and to contraction during dry conditions.
- While slope stability in the Northern and Southern Segments would not cause concern, there is a history of slope instability in the Central Segment. This geologic hazard would be of particular concern where cuts are proposed.
- There is a soft clay layer of bay mud at the Rowland Avenue Overcrossing in the City of Novato, where widening is proposed. Similarly, bay mud may be encountered on the northern Petaluma River bank during bridge replacement work.

Reversible HOV Lane Alternative. Because the footprint, improvements, and scope of work for the Reversible HOV Lane Alternative would be the same as for the Fixed HOV Lane Alternative, the geoseismic and soil hazards would be the same as under the Fixed HOV Lane Alternatives. Key seismic, geotechnical, and soil effects under the Reversible HOV Lane Alternative would be erosion, slope stability, and the presence of shrink-swell soils and bay mud.

Access Options. The number of overcrossings, ramps, and interchanges differs by Access Option; however, the potential effects from ground shaking would be similar since Caltrans would comply with seismic design standards that would minimize ground shaking impacts from earthquakes up to the MCE.

Access Option 12b involves a deeper cut to accommodate a proposed access road on the west side of US 101. This feature suggests that this option may encounter greater slope stability impacts than the other Access Options.

In the Central Segment, where the Access Options are proposed, the maximum amount of disturbed soils is estimated at 190 ha (470 ac) for both mainline improvements and the various Access Options. While the extent of areas subject to high erosion or shrink-swell soils would vary among the four Access Options, the differences in long-term impact would be negligible, because they would be addressed by Caltrans' engineering and design standards for soils, foundations, and structures and by standard practices described below in the section on mitigation measures.

No Build Alternative. Under the No Build Alternative, work in the MSN Project corridor would involve only routine maintenance and upkeep of the existing facilities. No new structures or substantial construction is proposed. Accordingly, geoseismic and soil impacts would not be expected, although grading, excavation, and other ground-disturbing activities could cause erosion, particularly in the Northern and Southern Segments.

3.2.4.4 Avoidance, Minimization and Mitigation Measures

Erosion Controls. There should be no significant increase in soil erosion as a consequence of this project. Erosion will be mitigated using various erosion controls depending on the topography. Section 3.2.3.4 identifies a number of water quality measures to control runoff and erosion. Materials used for embankment or foundation construction will conform to standard specifications to ensure proper soil settlement occurs.

Soil Settlement Control Measures. Soil settlement problems caused by the consolidation of cohesive soils are commonly mitigated by the removal of soft soils, soil mixing, wick drains, lightweight fill, grouting, or stone columns.

Expansive Soil Control Measures. Expansive soils will be mitigated by removing the soils or by mixing with other materials such as lime. Where imported fill is required for site drainage, use of non-expansive import will mitigate expansive soil effects.

Retaining Walls to Stabilize Embankments. Embankments will be stabilized and retained with retaining walls along the project. The cut/embankment slope ratios and benches will be analyzed and identified during the design phase of the project.

Dewatering Procedures to Reduce Groundwater. Groundwater will be dealt with by dewatering procedures, which may be required where large cuts are proposed.

Structures Built to Withstand Earthquakes. Structures will be built to withstand a 7.0 magnitude earthquake, the largest magnitude earthquake the active Rodgers Creek Fault is capable of producing (California Building Standards Code, 2001 and 2003). Maximum expected bedrock acceleration for Roger Creek Fault was estimated according to “Mualchine, 1996” (Caltrans – California Seismic Hazard Map, 1996).

Liquefaction Reduction. The liquefaction potential can be reduced by use of vibro or dynamic compaction methods on less cohesive soils. All liquefaction values will be confirmed by subsurface exploration and laboratory tests. In addition, specifically designed foundations for structures or ground improvement methods such as stone columns, dynamic compaction, or removing liquefiable materials are among the possible mitigation measures.

3.2.5 Hazardous Waste/Materials

3.2.5.1 Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for “cradle to grave” regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety & Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, EO 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in California is regulated primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning.

As used in this section, the term hazardous substance includes both construction materials and wastes that may be harmful to humans or the environment.

3.2.5.2 Affected Environment

The affected environment, with regards to hazardous materials, is generally considered to be the proposed project footprint. Caltrans conducted a Preliminary Site Investigation (PSI) of the properties within and adjacent to the proposed project footprint in an attempt to identify naturally occurring hazards and anthropogenic hazards that could adversely impact the delivery of the MSN Project. A summary of the existing conditions identified in the PSI are discussed in this section. The PSI included the following activities:

- A site reconnaissance including a visual "drive-by" inspection of the project and interviews with county environmental officials;
- A public record review using Environmental Data Resources' (EDR) DataMap Environmental Atlas;
- A file review of public information from the following sources: Caltrans District 4, RWQCB on-line Geotracker Database, Marin County Department of Environmental Management (MCDEH), Sonoma County Department of Environmental Management (SCDEH); and
- A review of geologic maps, topographic maps, and aerial photographs.

The PSI report, which was completed in January 2006, was performed in general accordance with the American Society of Testing Material Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process (ASTM E1527-00); however, the PSI did not include all the elements required by the standard. It is typically preferable to perform the full Phase 1 assessment during the final design due to right-of-way changes and the relatively short timeframe in which Phase 1 studies remain valid. A summary of the existing conditions identified in the PSI is presented in this section.

Sites of Potential Environmental Concern

A public record review to identify sites of potential environmental concern was performed using EDR DataMap Environmental Atlas. For this project, a 1-mile radius was used for the search corridor. The sites identified within the search corridor were screened to identify the sites located within the project footprint, or close enough to the footprint to potentially impact the project. In addition, Caltrans and regulatory file reviews were performed to obtain additional information related to potentially contaminated sites. Information from the file review was used to assess the potential that contamination from these sites could impact the proposed MSN Project.

Based on the EDR, agency file, and aerial photograph reviews, as many as 71 known or suspected areas of contamination are located within or adjacent to the project footprint. The sites of potential concern that were identified in this evaluation include:

- UST/HIST UST/CA FID/AST: These sites are included on various databases of active or historic above ground and underground storage tanks.
- LUST: These are sites with reported incidences of leaking underground storage tanks (LUSTs).
- CORTESE: These sites are associated with identified groundwater and/or subsurface contamination identified by the California Environmental Protection Agency (Cal EPA). These sites include reported releases from underground storage tanks (USTs) and solid waste disposal facilities with reported migration of contaminants.
- CA SLIC: These sites are part of the California Spills, Leaks, Investigations and Cleanups (CA SLIC) statewide program. They are identified as having subsurface contamination by non-fuel constituents.
- VCP: These sites “low threat” properties with either confirmed or unconfirmed releases for which California Department of Toxic Substances Control (DTSC) has been asked to oversee either investigation or cleanup.
- DEED: These sites have recorded land use restrictions to protect the public from unsafe exposure to hazardous substances or wastes.
- EMI: These sites have toxics and criteria pollutant emissions data that have been collected by the California Air Resources Board or local air pollution agencies.
- CERCLIS - NFRAP: These sites have been removed from the federal list of priority sites for remedial action (the National Priorities List - NPL) and are designated “No Further Action Planned.” These sites may include sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require NPL consideration.
- WMUDS/SWAT: These sites are waste management sites.
- CA NFA: These sites include properties at which the DTSC has made a clear determination that the property does not pose a problem to the environment or public health.

- RCRIS (LQG/SQG): These sites are included in the Resource Conservation and Recovery system which includes selective information on sites which generate, transport, store, treat, and/or dispose of hazardous waste as defined by RCRA. Sites included are both large quantity generators and small quantity generators.
- P65: These records include facility notifications of releases that could impact drinking water.
- CUPA: These sites are included in a Certified Unified Program Agency Database (CUPA). CUPAs are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.
- HAZNET: These sites have submitted hazardous waste manifests to DTSC.
- Aerial Photo: These sites were not identified in the EDR or agency file reviews, but were noted during a review of aerial photographs.
- CA WDS: These sites are identified by the California Water Resources Control Board as having waste discharge systems.
- MINES: These sites are included in the Mines Master Index File, which is based on data from the Department of Labor, Mine Safety, and Health Administration.

Historic or active underground storage tanks (UST) or above ground storage tanks (AST) were recorded in one or more databases or noted in aerial photographs for 54 of the 71 sites with known or suspected contamination; documentation of spills or leaks were noted at 28 sites. Eight sites were listed based solely on records pertaining to hazardous waste generation, transport, disposal, or management. The remaining nine sites include a quarry, two farms and/or airstrips, two possible junkyards, one Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) “No Further Action Planned” site, one Cortese site, one CA SLIC site, and one DTSC “No Further Action” site.

Table 3.2-6 provides an overview of the findings of the EDR, agency file, and aerial photograph review.

Table 3.2-6 Overview of Sites of Potential Environmental Concern

Property Owner Name	Map_ID	UST/HIST UST/ CA FID/AST	LUST Report	Cortese	CA SLIC	VCP/ DEED	CNFRALP	SWF/LF	CA NFA	RCRIS (LQG/SQG)	P65	CUPA	EMI	HAZNET	Aerial Photo	CA WDS	MINES
Marin Products	1	X	X														
PG&E Ignacio Substation	2						X										
Novato Reclamation Facilities	3	X															
Costco Wholesale	4									X							
Sephora Store	5									X							
Shell/Matt & Jeff's Hand Carwash	6	X															
Chevron Station No. 92071	7	X															
Pacific Pulmonary Services	8											X					
Cloudburst Car Wash	9	X	X	X													
Ciampi Distributing Company	10	X	X														
Novato Ford	11	X	X	X						X				X			
Midas Muffler	12	X															
Novato Fire Protection District	13	X	X	X										X			
Golden Gate Business Park/Hospital?	14								X								
H. Pinl & Co Mill Site	15	X															
Golden Gate Bridge & Transit District	16	X								X	X			X			
North Marin Water District (NMWD)	17	X															
Harding Lawson Associates	18	X	X	X										X			
Fireman's Fund Insurance	19	X								X				X			
Service Station Site?	20	X													X		
Buck Institute for Research in Aging	21	X															
Novato Hotel	22	X													X		
Pacific Gas & Electric Co	23	X													X		
Suspected Service Station Site	24	X													X		
Black John Slough Rancho Del Pantano	25				X												
"Novato Storage Park"	26	X		X					X								
Aero Fuel	27	X															
Marin Air Services	28	X	X	X												X	
Redwood Landfill Inc	29													X			
Turrini's Auto Salvage	30	X						X		X			X	X		X	
Silveira A & L 2002 Trust/Dairy Ranch	31	X															
Silveira A & L 2002 Trust/Dairy Ranch Junkyard	32	X													X		
Arturus Veterinary Clinic	33													X			

Table 3.2-6 Overview of Sites of Potential Environmental Concern

Property Owner Name	Map_ID	UST/HIST UST/ CA FID/AST	LUST Report	Cortese	CA SLIC	VCP/ DEED	CNFRALP	SWF/LF	CA NFA	RCRIS (LQG/SQG)	P65	CUPA	EMI	HAZNET	Aerial Photo	CA WDS	MINES
Ray & Pamela Majauskas Property	34														X farm		
Walter or Joseph C Tognalda Former Airstrip	35														X farm/ airstrip		
Corda & Sons Ranch	36	X															
Theodoros Papageorgacopoulos	37	X	X														
G. Morrison Site	38	X															
Domenic Vachini	39	X															
Martinovich Former Junkyard	40														X junkyard		
Sonoma Gateway Properties	41														X junkyard?		
Gas N Shop	42	X	X	X										X			
Ellen D. Brians	43	X															
Novato Disposal Service	44	X	X	X				X									
Henris Investments	45	X	X	X													
Rinehart Distributing Inc	46	X															
Haynie Diesel Service	47	X															
John F. & Roase Mary Cunha	48	X								X			X				
Dutra Inc Quarry	49																X
Royal Petroleum Co	50									X			X	X			
Frank Hiebakos & Sons Trucking	51	X	X	X						X							
Caltrans Maintenance Station	52	X	X	X													
Hertz/ Big 4 Rents?	53	X															
G&C Autobody Site	54	X	X		X									X			
Don's Plumbing	55	X	X	X													
McPhail's Distribution Center	56	X	X			X											
Courtesy Auto & Truck Repair	57	X	X														
Lakeville Shell	58	X	X	X										X			
Ingerson Trucking	59	X	X	X						X				X			
Petaluma School Bus Yard	60	X															
Chevron Station No. 94081	61	X	X	X						X							
7-11 Store No. 18878	62	X	X	X													
Arco Station No. 2150	63	X	X	X													
KMART	64	X	X							X				X			
Mike Hudson Distributing	65	X	X	X													
Spurgeon Painting Inc	66									X				X			

Table 3.2-6 Overview of Sites of Potential Environmental Concern

Property Owner Name	Map_ID	UST/HIST UST/ CA FID/AST	LUST Report	Cortese	CA SLIC	VCP/ DEED	CNFRALP	SWF/LF	CA NFA	RCRIS (LQG/SQG)	P65	CUPA	EMI	HAZNET	Aerial Photo	CA WDS	MINES
Optoelectronics	67									X							
Advanced Devices Inc	68									X				X			
PG&E/Petaluma Service Station	69	X	X	X													
J&D Automotive	70	X	X	X										X			
Maltby Electrical Supply	71	X	X	X													

Notes:

UST/HIST UST/CA FID/AST	Active or historic underground storage tanks (UST) or above ground storage tanks (AST) from the following sources: Underground Storage Tank Database, Facility Inventory Database, Historic UST Registered Database, Above Ground Storage Tank Database, Aerial Photographs, or LUST sites.
LUST Report	Geotracker's Leaking Underground Fuel Tank Report
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CA SLIC	Statewide Spill, Leak, Investigation, and Cleanup Cases
VCP	Voluntary Cleanup Program
DEED	Deed Restriction Program
EMI	Emissions Inventory Data
CNFRALP	Comprehensive Environmental Response, Compensation and Liability Information System - No Further Remedial Action Planned
SWF/LF	Solid Waste Facilities/Landfill Sites
CA NFA	California No Further Action
RCRIS (LQG/SQG)	Resource Conservation and Recovery Information System (Large Quantity Generators/Small Quantity Generators)
P65	RWQCB's Proposition 65 Database
CUPA	Certified Unified Program Agency Database
HAZNET	Data Extracted from Hazardous Waste Manifests
Aerial Photo	Aerial photograph review
CA WDS	California Water Resources Control Board - Waste Discharge System
MINES	Mines Master Index File

Naturally Occurring Asbestos (NOA)

The term naturally occurring asbestos (NOA) refers to a variety of six fibrous materials. Chrysotile, the most common material of this type found in California, is part of the serpentine mineral group. Serpentine and NOA are frequently encountered in areas known as ultramafic rock units. NOA is not known to be present in the project's footprint; however, deposits do exist approximately two miles west of US 101 between Novato Creek and San Antonio Creek. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a toxic air contaminant by the California Air Resources Board (CARB) in 1986. Asbestos may cause lung disease and cancer.

If undisturbed, NOA is not hazardous. However, when asbestos-containing material is disturbed, asbestos fibers could become airborne thereby creating an inhalation hazard. There is a possibility that sediment in San Antonio Creek and Novato Creek, which flow under US 101, could contain NOA, as portions of the watersheds for these streams include some ultramafic rock formations.

Man-made Asbestos

Man-made asbestos is commonly found in many products such as the shims used under aluminum bridge barrier rails and even concrete.

Mine Tailings

The EDR report revealed the presence of an inactive, abandoned mercury mine, the Gambonini Mine, located southwest of Petaluma off Marshall-Petaluma Road, west of Wilson Hill Road in Sonoma County. It is unlikely that there would be any direct impact from mine tailings because the Gambonini Mine is in a separate watershed from the project. However, mine tailings have washed into Walker Creek and into Tomales Bay, and similar geologic formations exist within the project footprint at two locations: US 101 just north of Novato Creek, and US 101 just south of San Antonio Creek. It is also conceivable that mine tailings from other mines in the area may have been used as fill material to construct the original US 101 embankments and that these tailings contain the mineral cinnabar (mercury sulfide) which is often bright scarlet or cinnamon red in color.

Aerially Deposited Lead (ADL)

Aerially Deposited Lead (ADL) is known to exist in surface soils adjacent to the edge of pavement within the US 101 corridor due to the historic use of leaded gasoline. A 1977 study by Getz, and others, indicates that the higher the historical traffic volume, the higher the soil lead content. This study also noted that soil concentrations were inversely proportional to the distance from the roadway. That is, lead concentrations decreased the further a sample was collected from the roadway. Soil lead concentrations are also inversely proportional to the depth of the sample below the original ground level. Typically, if the soil has not been disturbed, the highest lead concentrations are found at the ground surface and gradually decrease to naturally occurring levels at depths of approximately 2 to 3 ft below ground surface. The gradual buildup of ADL has resulted in lead concentrations in surface soils that sometimes exceed the total threshold limit concentration 5.0 milligrams per liter (mg/l), listed in Title 22 of the California Code of Regulations (22 CCR). Waste materials that exceed these levels are characterized as a California hazardous waste and must typically be disposed of at special landfills.

Yellow Traffic Striping

Yellow traffic striping and/or pavement markings containing lead and other potentially toxic substances are present on US 101 within the project boundaries. The lead concentrations in yellow painted traffic striping and in yellow thermoplastic traffic striping can occasionally exceed the aforementioned thresholds.

3.2.5.3 Impacts

This section describes potential impacts associated with hazardous materials known or suspected to exist within the project vicinity. These impacts are directly related to the location of land and other features that would be disturbed. The exact location of land to be acquired, construction staging areas, and other related details would be refined during the project design phase. As a result, the exact location and magnitude of environmental impacts are not known at this time. Only a general discussion of situations that may be encountered and prescriptive corrective actions are described.

Potentially Contaminated Sites

Fixed HOV Build Lane Alternative. Contaminated soil and/or groundwater may be encountered during construction of the Fixed HOV Lane Alternative. If these materials are removed from their present location, they may be reclassified as a hazardous material if chemical concentrations exceed state and federal limits for characterizing materials as hazardous substances. In addition, contaminated soil and groundwater can pose a potential impact to human health if not properly managed.

The PSI rated each of the 71 sites with known or suspected contamination by both hazardous materials risk and by the probability that contamination would impact the MSN Project. The site rankings are as follows:

- Six sites were rated as low risk for both hazardous materials and probability that contamination at the site would impact the MSN Project.
- Thirty-eight sites were rated as having a medium risk for hazardous materials, but a low probability that contamination would impact the MSN Project.
- Twenty-two sites were rated as medium risk for both hazardous materials and probability that contamination at the site would impact the MSN Project.
- Three sites, including the Golden Gate Business Park/Novato Hospital, Black John Slough/Rancho Del Pantano, and Redwood Landfill were rated as high risk for hazardous materials, but low to medium risk for contamination impacting the MSN Project.
- Two sites, including Gas N Shop and Novato Disposal Service, were rated as medium risk for hazardous materials, but high risk for contamination impacting the MSN Project.

Table 3.2-7 summarizes information for each site. Sites rated as high risk for either hazardous materials or probability that contamination would impact the MSN Project, are summarized below. A dairy site that has been identified as medium risk and medium probability is also described.

Golden Gate Business Park/Novato Hospital. The Golden Gate Business Park site is located at Franklin Avenue next to the NW Pacific Railroad tracks in the City of Novato. This site is situated at or near 165 Rowland Way just north of Novato Creek. This site was on DTSC's list of sites for which no further action is required (NFA). This site is listed because the RWQCB received correspondence from the City of Novato that the area was a former dumping site; however, no documents were ever found by DTSC to confirm that this site was the site of a former landfill. No changes to the mainline alignment or right-of-way are proposed near this site as part of the Fixed HOV Lane Alternative. This site is rated potentially high risk with a low-probability of impacting construction operations. Figure 3.2-3 presents the site location.

Table 3.2-7 Sites of Known or Suspected Contamination

Line No.	County	Assessor Parcel Number[1] (APN)	ROW Type	Impact Area[2] (M^2)	Owner/Property/Site Name	Project Footprint Sheet No.	Alignment	Station (Meters)	East/West Side	Current Land Use	Hazmat Risk Rating Due to Site History	Probability that Contamination Will Impact Proposed MSN Project	Case Status	Site Address	EDR Site Number
1	Marin	157-33-19	HM		Marin Products (Geotracker Site)	A-1	101 A	290.00	East	Industrial	Medium	Low	Unknown	55 Frosty Lane Novato, CA	N/A
2	Marin	157-40-18 157-40-17	HM		PG&E Ignatio Substation	A-1	101 A	300.00	East	Industrial	Medium	Low	Unknown	NW Corner of Hamilton and Bell Marin Keys Novato, CA	145-27
3	Marin	155-220-019? 153-22-19	HM		Novato Reclamation Facilities	A-1 & A-2	101 A	309.00	East	Dump? Hist UST	Medium	Medium	Unknown	Hanna Ranch Road? Novato California	143-27
4	Marin	153-34-04	HM		Costco Wholesale at Vintage Oaks Shopping Center	A-2	101 A	316.00	East	Industrial	Medium	Low	Unknown	300 Vintage Way Novato, CA 94945	140-26
5	Marin	153-34-28?	HM		Sephora Store at Vintage Oaks Shopping Center	A-2	101 A	321.00	East	Industrial	Low	Low	Small Generator No Violations	208 Vintage Way Novato, CA 94945	139-26
6	Marin	153-34-21?	HM		Matt and Steve's Hand Car Wash Vintage Oaks Shopping Center	A-2	101 A	322.80	East	Industrial UST Site	Medium	Medium	UST Site	125 Vintage Way Novato, CA 94945	142-27 137-26
7	Marin	153-32-02?	HM		Chevron No. 92071	A-3	101 A	325.00	East	Industrial	Medium	Low	Active	22 Rowland Way Novato, CA 94945	136-26
8	Marin	152-32-04?	HM		Pacific Pulmonary Services	A-3	101 A	327.00	East	Industrial	Medium UST Site	Low	Unknown	88 Rowland Ave Novato, CA 94945	136-26
9	Marin	152-05-02?	HM		Cloudburst Car Wash (RWQCB Case No. 21-0037)	A-3	101 A	329.60	West	Industrial	Medium LUST Site	Medium	Case Closed	6981 Redwood Blvd Novato, CA 94947	131-26
10	Marin	152-05-19?	HM		Ciampi Distributing Co	A-3	101 A	330.00	West	Industrial	Medium	Low	UST Site	90 Hill Road Novato, CA 94947	132-26 133-26
11	Marin	152-05-22	HM		Novato Ford	A-3	101 A	330.35	West	Industrial	Medium	Low	LUST Site	6995 Redwood Blvd Novato, CA 94947	131-26
12	Marin	153-17-59?	HM		Midas Muffler	A-3	101 A	331.80	West	Industrial	Medium	Low	UST Site	7000 Redwood Blvd Novato, CA 94947	131-26
13	Marin	140-22-43?	HM		Novato Fire Protection District	A-3	101 A	331.80	West	Industrial	Medium	Low	LUST Site	7025 Redwood Novato, CA 94947	130-26
14	Marin	153-017-060?	TCE	2,059.1	Golden Gate Business Park/Hospital Former Dump Site	A-3	101 A	333.00	East	Hospital	High	Low	DTSC - No Further Action	Franklin Avenue next to NW Pacific Railroad - Former Dump Site Novato, CA 94945	129-26
15	Marin	153-057-001	HM		H. Pinl & Co Mill Site Robin Morton [Pinl Mill]	A-4	101 A	341.00	West	Industrial	Medium Hist UST Site	Low	Unknown	730 Scott Ct Novato, CA 94947	126-24
16	Marin	143-022-001 143-073-001	HM		Golden Gate Transit	A-4	101 A	348.40	West	Industrial	Medium	Medium	Unknown	801 Golden Gate Place Novato, CA 94945	111-24
17	Marin	143-060-009	HM		North Marin Water District (RWQCB Case No. 21-0254)	A-4	101 A	352.00	West	Industrial	Medium	Low	Case Closed HIST UST	999 Rush Creek Road Novato, CA 94945	110-24
18	Marin	125-202-002	HM		Harding Lawson Associates	A-5	101 A	357.00	West	Industrial Small Generator	Low	Low	No Violations	7655 Redwood Blvd Novato, CA 94947	103-24

Table 3.2-7 Sites of Known or Suspected Contamination

Line No.	County	Assessor Parcel Number[1] (APN)	ROW Type	Impact Area[2] (M^2)	Owner/Property/Site Name	Project Footprint Sheet No.	Alignment	Station (Meters)	East/West Side	Current Land Use	Hazmat Risk Rating Due to Site History	Probability that Contamination Will Impact Proposed MSN Project	Case Status	Site Address	EDR Site Number
19	Marin	125-202-003	HM		Fireman's Fund Insurance	A-5	101 A	357.00	West	Business Park	Medium LUST Site	Medium	Closed	777 San Marin Drive Novato, CA 94947	104-24
20	Marin	125-540-001	HM		Service Station?	B-1	101 B	1369.00	East	Industrial	Medium	Low	Unknown	## Binford Road Novato, CA 94945	N/A
21	Marin	Old 125-18-068? New 125-58-10? New 125-58-07? New 125-58-05?	HM		Buck Institute for Research in Aging (Has their own UST on site?)	B-1	101 B	1370.20	West	Industrial	Medium UST Site	Medium	Active	8001 Redwood Highway Novato, CA 94945	101-21 102-21
22	Marin	Old 125-18-34 New 125-18-80 New 125-18-81	HM		Novato Motel (Hist. UST in southern corner of site - could be Buck Institute's UST)	B-1	101 B	1370.40	West	Motel	Medium Hist UST Site	Medium	Unknown	8141 Redwood Blvd Novato, CA 94945	N/A
23	Marin	125-180-049	HM		Pacific Gas & Electric Co Former Service Station? (Shown on 1970 Aerial Photo just north of Novato Motel)	B-1	101 B	1372.80	West	Agricultural	Medium LUST Site	Medium	Unknown	8161 Redwood Blvd Novato, CA 94945	102-21?
24	Marin	125-190-061	HM		Service Station?	B-1	101 B	1373.60	East	Industrial	Medium	Low	Unknown	## Binford Road Novato, CA 94945	N/A
25	Marin	125-190-019 125-190-020 125-190-021 125-190-065 125-190-066	HM		Edward Goliti, Larissa Goliti, Rudy Tulipani and Lindberg Landing LLP Rancho Del Pantano/ Black John Slough	B-1	101 B	1375.00	East	Tire/Auto Landfill Boat Repair/Junkyard	High	Low	Unknown SLIC	8190 Binford Road Novato, CA 94945	105-24 100-21?
26	Marin	125-190-056 125-190-064	HM		Vacant Parcel Novato Storage Park	B-1	101 B	1377.00	East	Industrial	Low	Low	NFA-DTSC	Airport and Binford Roads Novato, CA 94945	100-21
27	Marin	125-190-54? or 125-190-41?	HM		Aero Fuel Northern Lights Aviation EMC Petroleum Allana Corp	B-1	101 B	1380.00	East	Industrial	Medium	Low	Unknown	351 Airport Road Novato, CA 94945	97-21 98-21
28	Marin	125-190-024?	HM		Marin Air Services Vindar Aviation Marin Co Airport/Gnoss Field	B-1	101 N	1380.10	East	Industrial	Medium	Low	Unknown	451 Airport Road Novato, CA 94945	97-21
29	Marin	125-160-013	HM		Redwood Landfill Inc a.k.a Novato Dump	B-3	101 B	1405.50	East	Landfill	High	Low		8950 Redwood Highway Novato, CA 94945	96-18
30	Marin	125-160-016	PRW	51,801.5	Turrini's Auto Salvage, Inc?	B-3	101 B	1408.00	West	Industrial	Medium	Medium	Unknown	8950 Redwood Highway Novato, CA 94948	96-19
31	Marin	125-160-015 125-160-016	PRW	2,888.0	Silveira A & L 2002 Trust	B-3 & B-4	101 B	1417.00	West	Dairy Farm	MediumHist UST Site	Medium	Unknown	9501 101 Highway Novato, CA 94947	91-17
32	Marin	125-130-024	PRW	10,250.0	Silveira A & L 2002 Trust Junkyard? (See Caltrans Aerial Photo dated 7-31-87)	B-4 & B-5	101 B	1425.10	West	Agricultural	Medium	Low	Unknown		N/A

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Line No.	County	Assessor Parcel Number[1] (APN)	ROW Type	Impact Area[2] (M^2)	Owner/Property/Site Name	Project Footprint Sheet No.	Alignment	Station (Meters)	East/West Side	Current Land Use	Hazmat Risk Rating Due to Site History	Probability that Contamination Will Impact Proposed MSN Project	Case Status	Site Address	EDR Site Number
33	Marin	125-130-013	PRW	831.4	James H / Ann Steere [Arturus Veterinary Clinic]	B-5	101 B	1434.00	West	Industrial	Low	Low	Small Generator	2 San Antonio Road Petaluma, CA 94947	89-14
34	Marin	125-130-014	PRW	13,090.8	Ray & Pamela Majauskas Farm - Possible UST Site	B-5	101 B	1437.40	West	Residential	Medium	Low			N/A
35	Sonoma	019-280-003	PRW	3,518.4	Walter or Joseph C Tognalda Former Airstrip and Farm (Shown on 1970 Aerial Photo)	B-5 & B-6	101 B	2001.00	West	Agricultural	Medium	Medium	Unknown	155 or 460 San Antonio Road Petaluma, CA 94952	N/A
36	Sonoma	019-280-005	HM		Jerome R Klima Jr. Corda & Sons Ranch US 101 at San Antonio Road	B-6	101 B	2004.00	East	Industrial	Medium	Low	Unknown	5493/5495 Redwood Highway South Petaluma, CA 94952	87-14
37	Sonoma	019-280-008	HM		Theodoros (Ted) Papageorgacopoulos US 101 just south of Gunn Road	B-6	101 B	2006.20	East	Residential	Medium	Medium	Unknown	5381 Old Redwood Highway Petaluma, CA 94952	85-14
38	Sonoma	019-290-001	PRW	25,565.4	Ann & Fred Klatte/ G. Morrison UST Site?	B-6	101 B	2007.00	West	Agricultural	Medium HIST AST	Low	Unknown	5498 Redwood Highway Petaluma, CA 94947	87-14
39	Sonoma	019-280-011	HM		Simon & Anastasia Sjoen 5303 Redwood Hwy South a.k.a. Domenic Vachini Farm?	B-6	101 B	2009.20	East	Agricultural	Medium Hist UST	Low	Unknown	5301 or 5303 Redwood Hwy - South Petaluma, CA 94952	84-14
40	Sonoma	019-330-012	PRW	140.8	Debra Martinovich Former Junkyard located east of structures in 1970 aerial photo	B-7	101 B	2024.80	East	Residential	Medium	Medium	Unknown	4747 Redwood Hwy - South Petaluma, CA 94952 North of Gambini Road and south of Kastania Road	N/A
41	Sonoma	019-330-011	PRW	385.0	Sonoma Gateway Properties LLC Salvage/Junkyard?	B-7	101 B	2029.50	East	Salvage Yard	Medium	Medium	Unknown	4555 Redwood Hwy - South Petaluma, CA 94952	N/A
42	Sonoma	019-330-006	HM		Andy & Zaida Saberi a.k.a. Gas N Shop a.k.a. Petaluma Texaco a.k.a. Sabek Inc.	B-7	101 B	2030.20	West	Gas Station	Medium	High		4550 Redwood Highway US 101 at Kastania Road Petaluma, CA	81-14 82-14
43	Sonoma	019-310-019	HM		Ellen D. Brians	B-7	101 B	2031.50	West	Residential	Medium HIST UST	Medium		4418 Redwood Highway So. Petaluma, CA 94952-9508	80-14
44	Sonoma	019-220-038	PRW	127.3	Novato Disposal Service a.k.a. Timber Cove Recycling a.k.a. Novato Recycling	B-8	101 B	2045.00	East	Industrial LUST Site	Medium LUST Site	High		2543 Petaluma Blvd. South Petaluma, CA 94952	77-11
45	Sonoma	019-220-004 019-220-036	HM		Henris Investments 2581 Petaluma Blvd S Henris Supply Warehouse (RWQCB Case No. 49-0071)	B-8	101 B	2046.60	East	Industrial	Medium	Low	Case Closed	172 Landing Road Petaluma, CA 94952	79-11
46	Sonoma	019-220-006	HM		Rinehart Distributing Inc. Rinehart Truck Stop, Petaluma Blvd at Landing	B-8	101 B	2047.00	East	Truck Stop	Medium	Low		2645 Petaluma Blvd. South Petaluma, CA 94952-5527	77-11
47	Sonoma	019-220-011	HM		Patricia & Ed Souza a.k.a. Haynie Diesel Service?	B-9	101 B	2048.60	East	Industrial	Medium	Low	Unknown	2141 Petaluma Blvd. South Petaluma, CA 94952	76-11

Table 3.2-7 Sites of Known or Suspected Contamination

Line No.	County	Assessor Parcel Number[1] (APN)	ROW Type	Impact Area[2] (M^2)	Owner/Property/Site Name	Project Footprint Sheet No.	Alignment	Station (Meters)	East/West Side	Current Land Use	Hazmat Risk Rating Due to Site History	Probability that Contamination Will Impact Proposed MSN Project	Case Status	Site Address	EDR Site Number
48	Sonoma	019-220-009	HM		John F. & Roase Mary Cunha	B-9	101 B	2050.00	East	Industrial	Medium HIST UST	Low	Unknown	2551 Petaluma Blvd. South Petaluma, CA 94952	77-11
49	Sonoma	019-220-012	HM		Dutra Inc. Quarry a.k.a. Kaiser Sand & Gravel?	B-9	101 B	2052.00	West	Industrial	Medium AST Site	Low	Unknown	1600 Petaluma Blvd. South Petaluma, CA	78-11?
50	Sonoma	019-220-026?	HM		Royal Petroleum Co.	B-9	101 B	2054.00	West	Industrial	Medium	Low	Unknown	1501 Petaluma Blvd. South Petaluma, CA 94952	75-11
51	Sonoma	019-210-010?	HM		Frank Hiebakos & Sons Trucking	B-9	101 B	2054.40	West	Industrial	Low	Low	Case Closed	1473 Petaluma Blvd. South Petaluma, CA 94952	75-11
52	Sonoma	019-210-009?	HM		Caltrans Maintenance Station	B-9	101 B	2054.50	West	Industrial	Low	Low	Unknown	1485 Petaluma Blvd. South Petaluma, CA 94952	75-11
53	Sonoma	005-060-036	HM		Rental Center Properties 1721 Lakeville Highway a.k.a. Big 4 Rents? (RWQCB Case No. 49-0014)	C-1	101 C	2059.00	East	Industrial	Medium	Low	Unknown	1731 Lakeville Hwy Petaluma, CA 94952	N/A
54	Sonoma	005-020-027?	HM		BVM Investments? C&G Autobody Site (Cyanides/Salts)	C-1	101 C	2062.75	West	Industrial	Medium LUST Site	Low	Unknown	896 Lakeville Street Petaluma, CA 94952	65-8
55	Sonoma	005-060-021?	HM		Don's Plumbing a.k.a. Milton L. Foreman	C-1	101 C	2062.75	West	Industrial	Medium HIST UST	Medium	Unknown	1004 Lakeville Street Petaluma, CA 94952	65-8
56	Sonoma	005-060-015 005-060-021 005-060-031 005-060-038	HM		McPhail's Distribution Center 1000-1010 Lakeville Street Petaluma, CA 94952	C-1	101 C	2063.00	West	Industrial	Medium HIST UST	Low	DTSC Certified O&M Plan	1000 Lakeville Street Petaluma, CA 94952	65-8 & 67-8
57	Sonoma	005-020-066	HM		Charles A Slifer Courtesy Auto & Truck Repair	C-1	101 C	2063.00	West	Industrial	Medium LUST Site	Medium	Unknown	1051 Lakeville Highway Petaluma, CA 94952	71-8
58	Sonoma	005-020-068	HM		Equilon Enterprises LLC Shell Station (RWQCB Case No. 49-0150)	C-1	101 C	2063.50	West	Industrial	Medium LUST Site	Medium	Unknown	1001 Lakeville Street Petaluma, CA 94952	65-8 & 67-8
59	Sonoma	005-010-026	HM		Jack & Mary Ingerson/ Robert Uichum - Manager? Ingerson Trucking Site (RWQCB Case No. 49-0077)	C-1	101 C	2067.00	West	Industrial	Medium LUST Site	Low	Case Closed	979 Lindberg Lane Petaluma, CA 94952	60-8
60	Sonoma	007-473-001	HM		Petaluma School Bus Yard At end of Lindberg Lane	C-1	101 C	2068.20	West	Industrial	Medium	Low	Active	993 Lindberg Lane Petaluma, CA 94952	57-8
61	Sonoma	Unknown	HM		Lutz Chevron Station	C-2	101 C	2077.50	East	Industrial	MediumLUST Site	Low	Unknown	1440 Washington St EPetaluma, CA 94952	50-8
62	Sonoma	Unknown	HM		7-11 Store No. 18878	C-2	101 C	2077.50	East	Industrial	Medium LUST Site	Low	Unknown	201 McDowell Store Petaluma, CA 94952	47-8
63	Sonoma	007-340-007	PRW	5,338.1	Arco Station No. 2150 (RWQCB Case No. 49-0021)	C-2	101 C	2078.00	East	Industrial	Medium	Low	Unknown	101 McDowell Blvd N Petaluma, CA 94952	42-8

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Line No.	County	Assessor Parcel Number[1] (APN)	ROW Type	Impact Area[2] (M^2)	Owner/Property/Site Name	Project Footprint Sheet No.	Alignment	Station (Meters)	East/West Side	Current Land Use	Hazmat Risk Rating Due to Site History	Probability that Contamination Will Impact Proposed MSN Project	Case Status	Site Address	EDR Site Number
64	Sonoma	007-350-008	PRW	3,467.7	Syers Properties Shopping Center/ KMART (RWQCB Case No. 49-0085)	C-2	101 C	2081.80	East	Industrial	Medium LUST Site	Medium	Case Closed	261 McDowell Blvd N Petaluma, CA 94952	38-8
65	Sonoma	007-630-Unknown	HM		Mike Hudson Distributing	C-3	101 C	2095.00	East	Industrial LUST Site	Medium	Low	Case Closed	1297 Dynamic Street Petaluma, CA 94952	34-5
66	Sonoma	007-630-Unknown	HM		Spurgeon Painting Inc	C-3	101 C	2095.00	East	Industrial	Medium	Medium	Small Quantity Generator No Violations	1308 Dynamic Street Petaluma, CA 94952	34-5
67	Sonoma	007-501-014? or 007-630-009?	HM		Optoelectronics Div Avco CP	C-3	101 C	2095.00	East	Industrial	Medium	Low	Small Quantity Generator No Violations	1309 Dynamic Street Petaluma, CA 94952	34-5
68	Sonoma	007-630-005	HM		Elde V. & Diane L. Toly a.k.a. Petaluma Imagesetting Inc. a.k.a. Advanced Devices Inc.	C-3	101 C	2095.00	East	Industrial	Medium	Low	Small Quantity Generator No Violations	1340 Commerce Street Petaluma, CA 94952	35-5
69	Sonoma	007-401-?	HM		PG&E Service Center/ Petaluma Service Station	C-4	101 C	2110.60	East	Industrial LUST Site	Medium	Medium	Unknown	210 Corona Road Petaluma, CA 94952	25-4
70	Sonoma	007-401-?	HM		J&D Auto	C-4	101 C	2110.80	East	Industrial LUST Site	Medium	Medium	Unknown	278 Corona Road Petaluma, CA 94952	19-4
71	Sonoma	137-110-015?	HM		Maltby Electrical Supply Holm Road at Clegg St.	C-4	101 C	2115.80	East	Industrial	Medium LUST Site	Low	Closed	1200 Holm Road Petaluma, CA 94954	20-4

Notes:

[1] An underlined parcel number indicates that the parcel is not within the project footprint but is listed here because subsurface contamination could have migrated from the site into the proposed project footprint.

[2] Right-of-way (ROW) type and impact area obtained from Yolanda Rivas spreadsheet dated REV. 07/28/2005.

Key:

ENC Right-of-way encroachment
PRW Partial right-of-way take
TEC Temporary construction easement
HM Known or potential hazardous materials release site within or adjacent to the project footprint
AST Above ground storage tank
UST Underground storage tank
LUST Leaking underground storage tank

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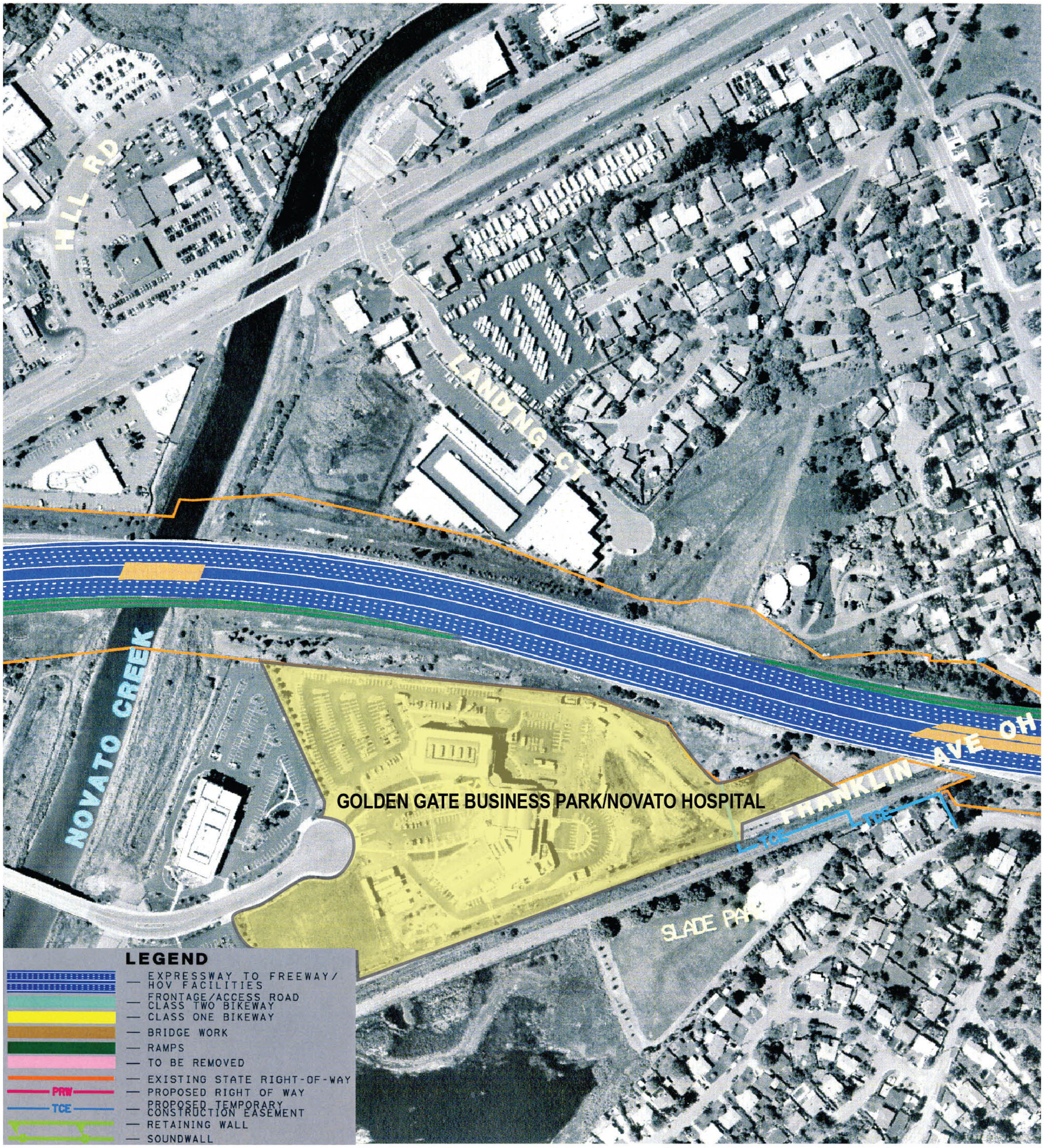
FIGURE 3.2-3
Golden Gate Business Park/Novato Hospital Sites with High Risk or High Probability to Impact Project



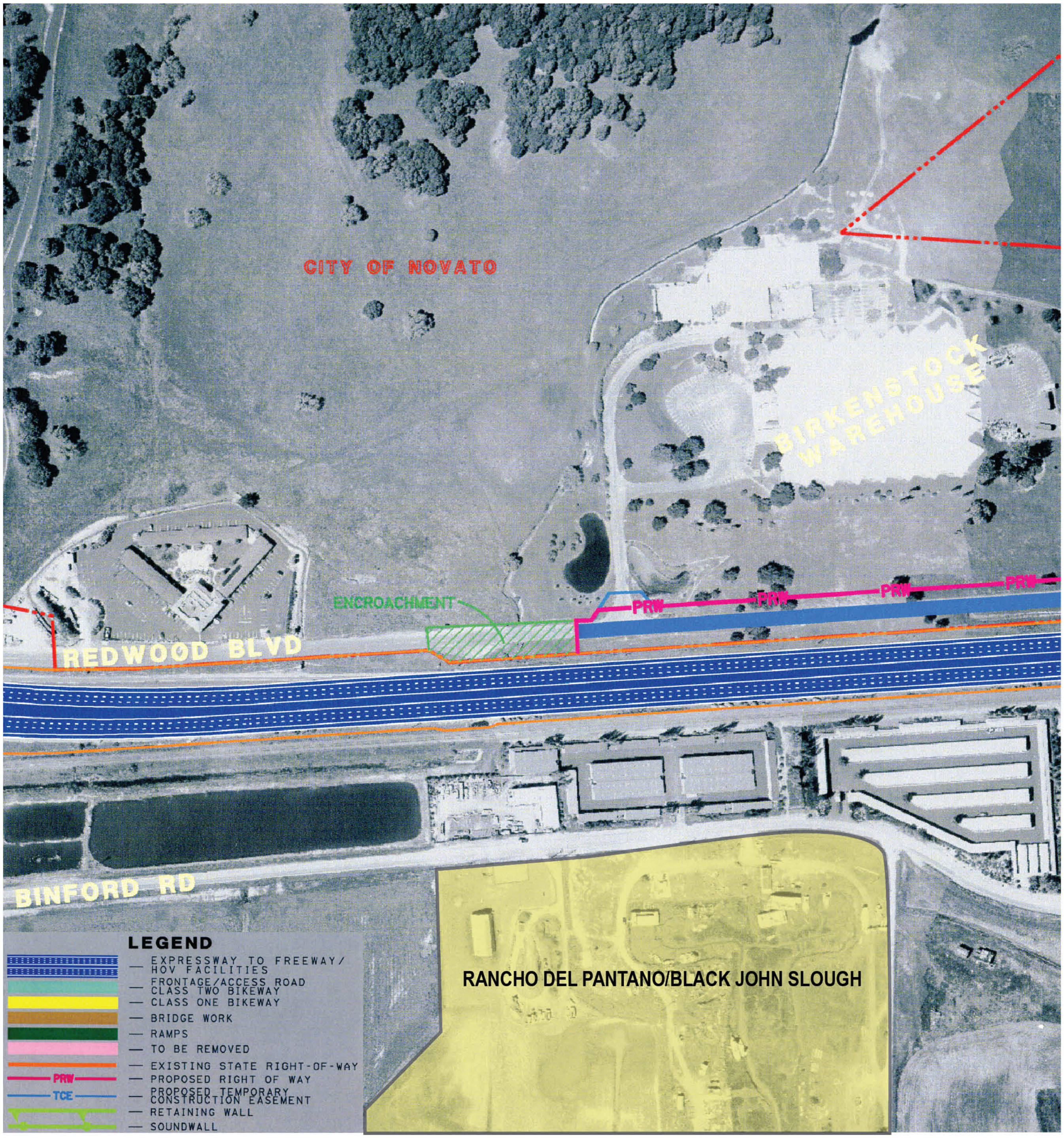
NORTH

Black John Slough/Ranch Del Pantano. The Rancho Del Pantano Site is located at 8190 Binford Road at the western end of Black John Slough in the City of Novato. This site is also possibly called Edward Goliti, Larissa Goliti, Rudy Tulipani and Lindberg Landing LLP. Past uses for this site include tire/auto disposal, boat repair, and junkyard. This site was on the California RWQCB's spills, leaks, investigation and cleanup (CA SLIC) database of sites that impacts or has the potential to impact groundwater. The site is not directly adjacent to the existing US 101 right-of-way; it is separated by a parcel that has not been identified as a site with known or suspected contamination. No changes to the mainline alignment are proposed near this site as part of the Fixed HOV Lane Alternative; however right-of-way acquisition is proposed along the west side of US 101 (the site is located east of US 101). This site is rated high-risk/low-probability. Figure 3.2-4 presents the site location.

Redwood Landfill. The Redwood Landfill site is located at 8950 Redwood Highway (US 101) in the City of Novato. Redwood Landfill is an active Class 3 solid waste landfill. The HAZNET database lists the following waste categories: unspecified oil containing waste, oxygenated solvents, oil/water separation sludge. This site is listed as an active industrial facility which is considered to be a minor threat to water quality. The AST database indicates that an 11,250-gallon aboveground storage tank facility is located at this site. The RCRIS-SQG listing indicates that no violations were found with regard to their database. Leachate from this landfill has the potential to contaminate groundwater underneath the adjacent parcels of land. The site is not directly adjacent to the existing US 101 right-of-way; it is separated by a parcel that has not been identified as a site with known or suspected contamination. However, right-of-way acquisition associated with the reconfiguration or adaptation of the Redwood Landfill Road Overcrossing is proposed for the parcel adjacent to the landfill. The Redwood Landfill site is considered to be a high-risk/medium-probability site in the PSI; however, the relocation of a proposed access road away from the landfill has reduced the probability to impact the MSN Project from medium to low. Figure 3.2-5 presents the site location.

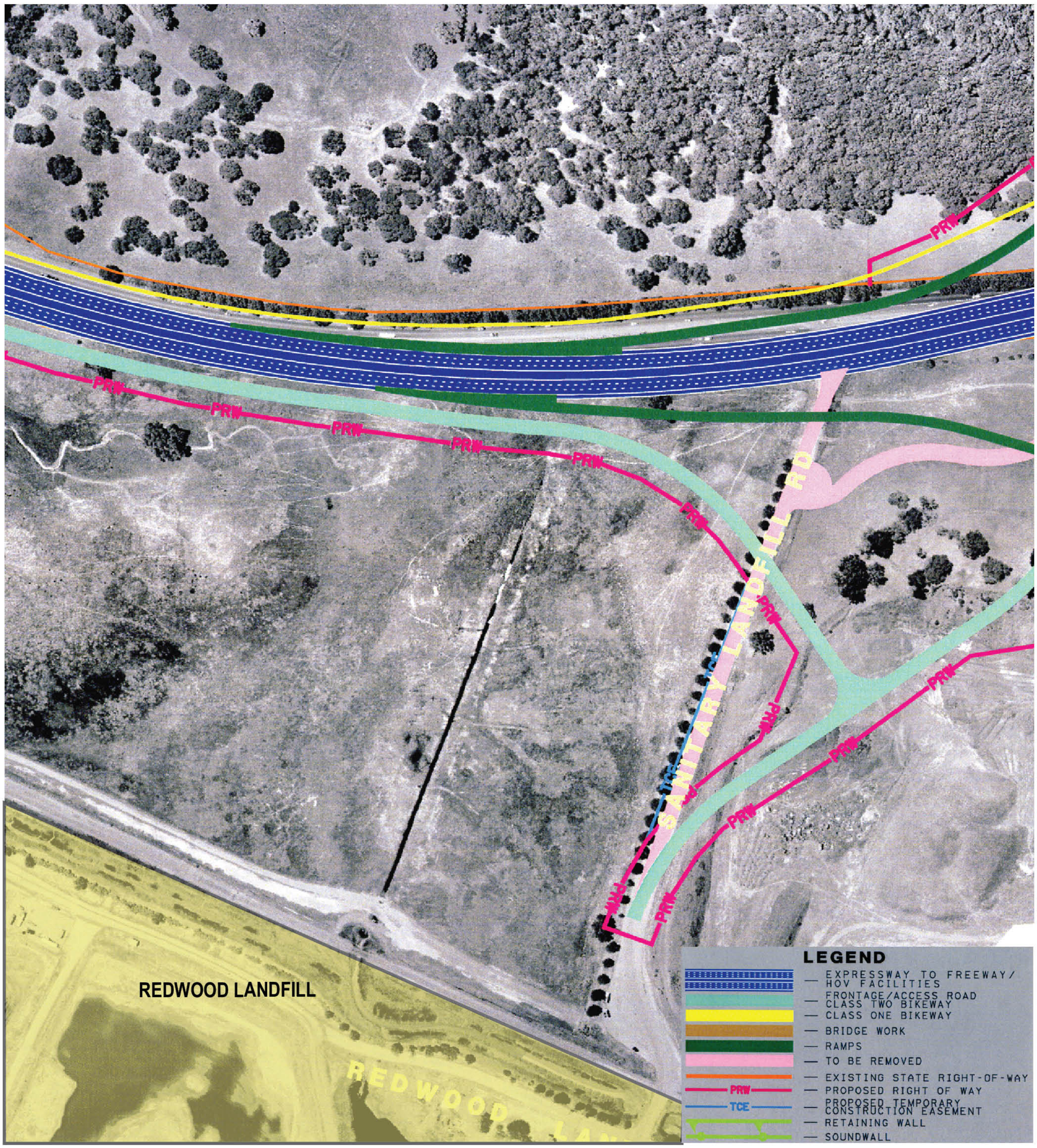
Silveira A & L Trust/Dairy Ranch. The Silveira Dairy Ranch is located at 9501 Redwood Highway – South in the City of Novato. Based on available information, USTs were used to store leaded gasoline, unleaded gasoline and diesel at the site. The status of the three recorded USTs at the site is not known; however, no leaks have been reported. In addition to the USTs, potential sources

FIGURE 3.2-4
Rancho Del Pantano/Black John Slough
Sites with High Risk or
High Probability to Impact Project



MARIN SONOMA 101 NARROWS

FIGURE 3.2-5
Redwood Landfill
Sites with High Risk or
High Probability to Impact Project



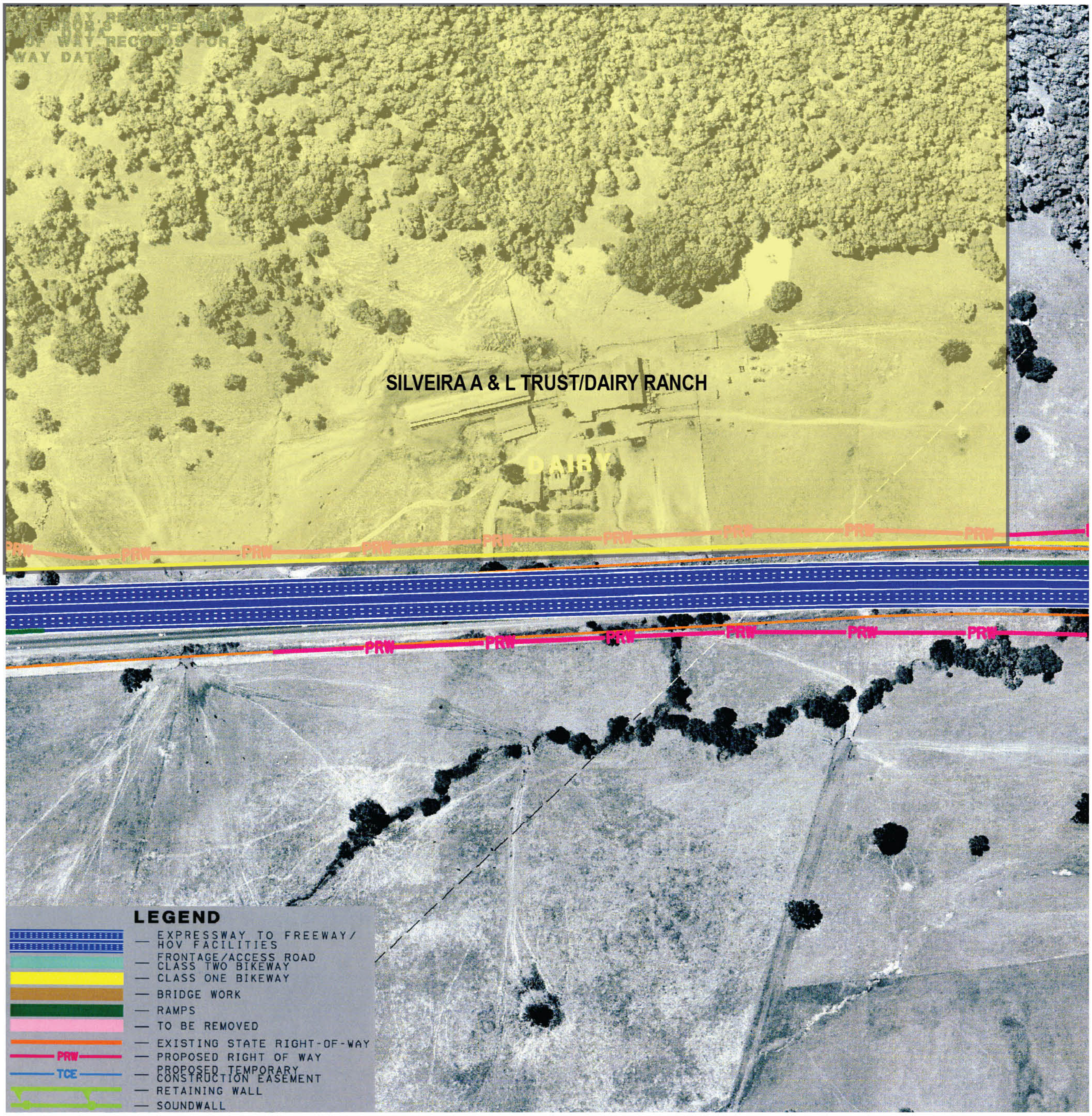
NORTH

of contamination at the site include dairy operations. Confined animal operations can be sources of contamination in groundwater, particularly nitrates and salts. Construction near the Silveira Dairy Ranch site under the Fixed HOV Lane Alternative would include realignment of US 101 requiring the purchase of new right of way at the Dairy property in a location down gradient of the dairy facility. Contaminated groundwater is unlikely to be encountered during construction of the proposed improvements; however, contamination from the site, if present, could impact the property to be acquired. This site was identified as a medium risk/medium probability site in the PSI; however, it was identified for further discussion in this document due to the emphasis that the RWQCB is currently placing on confined animal units. Figure 3.2-6 presents the site location.

Gas N Shop. The Gas N Shop site is located at 4418 Redwood Highway – South, at the intersection of US 101 and Kastania Road, in the City of Petaluma. Based on available information, four USTs are located on this site. Three of these tanks are used to store gasoline and one of them is designated for diesel fuel. Records indicate that the aquifer beneath the site has been contaminated with MTBE. A review of site investigation reports available for this site indicate that the groundwater level is approximately 8 ft below the existing ground surface. This groundwater flows eastward underneath US 101. The groundwater beneath this site, and beneath US 101, is contaminated with benzene and MTBE. Benzene and MTBE concentrations in groundwater were reported to be as high as 5,430 μg/l and 1,000 μg/l, respectively, in samples collected on May 6, 2004. Construction near the Gas N Shop site would include realignment of US 101 within the existing right of way and improvements to the frontage/access road. Under the Fixed HOV Lane Alternative, the US 101 freeway facilities adjacent to the Gas N Shop property would be placed on fill. The only planned excavation in the area is associated with a retaining wall on the northbound shoulder of US 101. The excavation is not expected to reach the groundwater table; therefore, contaminated groundwater is unlikely to be encountered during construction of the proposed improvements.

The site is located adjacent to the western US 101 right-of-way. Right-of-way acquisition is not proposed along US 101 adjacent to the site; however, right-of-way and encroachment acquisition is proposed on and adjacent to Kastania Road which runs along the southwestern property boundary of the site. The property that would be acquired is generally upgradient or cross gradient to the general groundwater flow direction; however, contamination from the site may impact the

FIGURE 3.2-6
Silveira A & L Trust/Dairy Ranch
Sites with High Risk or
High Probability to Impact Project



MARIN SONOMA NARROWS

NORTH

TB042006002BAO_Fig3-2_ImpactProjectSites.indd property. This site is considered to be a medium-risk/high-probability site. Figure 3.2-7 presents the site location.

Novato Disposal Service. The Novato Disposal Service site is located at 2543 Petaluma Boulevard – South, in the City of Petaluma. Records indicate that this facility accepts passenger car and truck tires, and is an active LUST site. Documents indicate that the parcel is being recommended for closure by the SCDEH and the RWQCB. However, at the time the PSI was prepared, the case was officially still open.

The construction of the proposed South Petaluma Boulevard Interchange as part of the Fixed HOV Lane Alternative would require the acquisition of a small section of right-of-way at the southwest corner of the Novato Disposal Service property. The proposed project includes acquisition of encroachment along the existing South Petaluma Boulevard, which runs adjacent to the western property boundary of the site. In addition, acquisition of a small portion of the southwest corner of the site property is proposed. This site is considered to be a medium-risk/high-probability site. Figure 3.2-8 presents the site location.

Reversible HOV Lane Alternative. The overall footprint of the Reversible HOV Lane Alternative is the same as the Fixed HOV Lane Alternative; therefore, potential impacts related to potentially contaminated sites would be the same as those identified above for the Fixed HOV Lane Alternative.

Access Options. The proposed improvements under the four Access Options would have a similar potential to disturb the high risk and/or high probability and dairy sites described above, with two notable exceptions. The potential exposure to contaminated site would be substantially different for the Redwood Landfill and the Silveira A & L Trust/Dairy Ranch.

At Redwood Landfill, the frontage/access road under Access Options 4b, 12b, and 14d would be closer to the landfill property than under Access Option 14b. Contaminated groundwater is the highest risk associated with Redwood Landfill. Because the proposed improvements would be located generally upgradient of the landfill, the probability of impact under any of the Access Options would be low.

Adjacent to the Silveira A & L Trust/Dairy Ranch property, the alignments of the frontage/access roads and bicycle/pedestrian paths are different under each Access Option and, as a result, the right-of-way to be purchased under each

FIGURE 3.2-7
Gas N Shop
Sites with High Risk or
High Probability to Impact Project

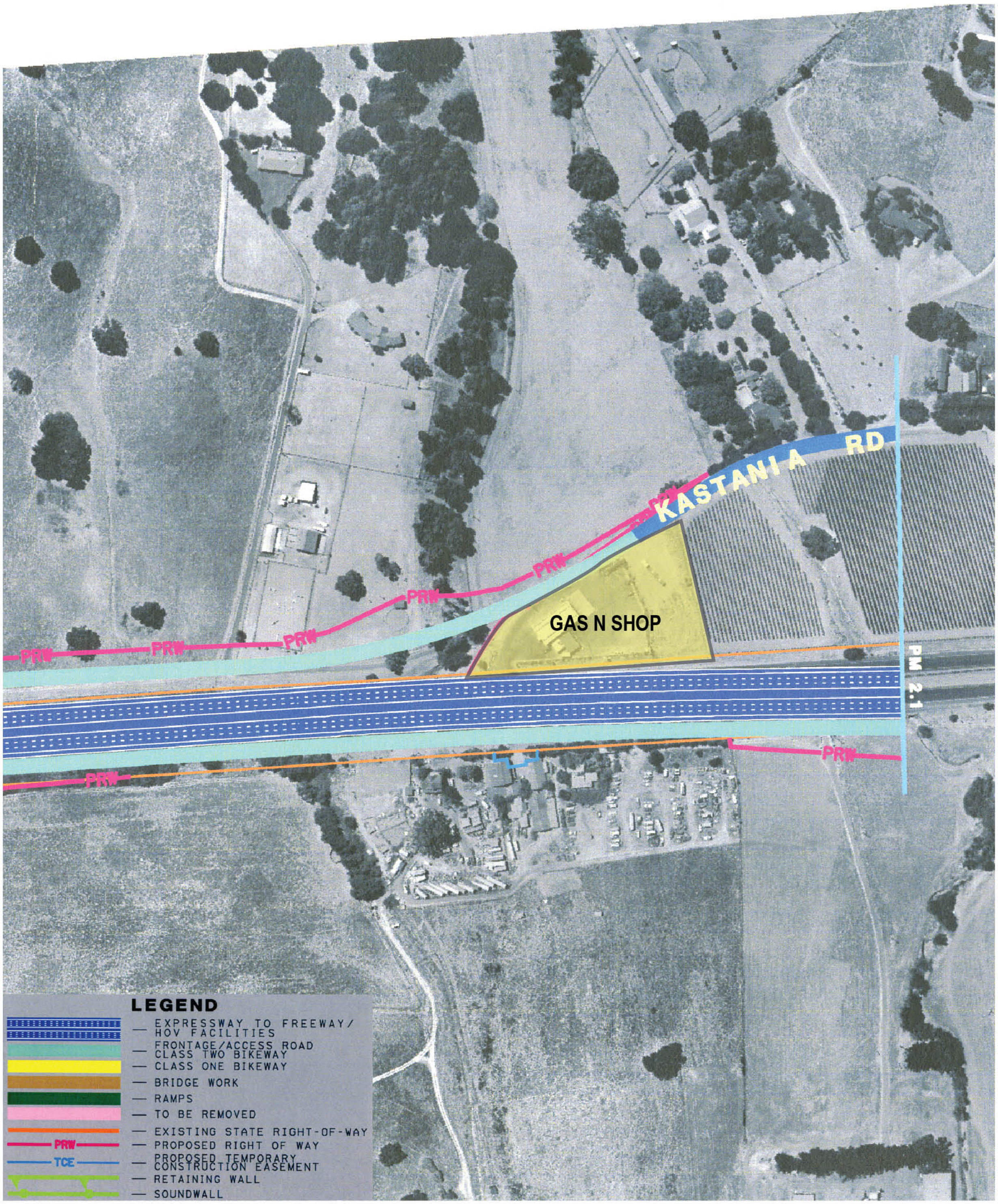


FIGURE 3.2-8
Novato Disposal Service
Sites with High Risk or
High Probability to Impact Project

Access Option would be different. Access Option 12 b would require the largest right of way acquisition adjacent to the dairy property; Access Option 4b would require the smallest right of way acquisition. Contaminated groundwater is unlikely to be encountered during construction of the proposed improvements. Nevertheless, because the right of way property is down gradient of the dairy facility, contamination from the site, if present, could impact the property to be acquired.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. Because this alternative would not involve land acquisition or extensive construction/excavation, the likelihood of encountering contaminated soil or groundwater from the high risk and/or high probability sites would be low.

NOA

Fixed HOV Build Lane Alternative. NOA may have migrated into streams and other waterways as a result of weathering and erosion of ultramafic rocks in the watershed. Impacted areas may be adjacent to or coincide with bridgework areas designated for the Petaluma River Bridge replacement, the new San Antonio Creek Bridge construction, and others. If undisturbed, NOA is generally not considered to be hazardous. However, excavation and other construction activities that cause ground disturbance may cause the asbestos fibers to become airborne, which can result in air quality and human health hazards.

Reversible HOV Lane Alternative. For the Reversible HOV Lane Alternative, the bridgework areas at the Petaluma River and San Antonio Creek would be substantially similar to the Fixed HOV Lane Alternative; therefore, potential impacts related to NOA would not be distinguishable from those identified above for the Fixed HOV Lane Alternative.

Access Options. The bridgework areas at the Petaluma River and San Antonio Creek would be common to all Access Options. Therefore, potential impacts related to NOA would the same for all Access Options.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. Because this alternative would not involve bridgework or major construction at the waterway crossings, potential effects from exposure to NOA would not be expected.

Man-made Asbestos

Fixed HOV Build Lane Alternative. Demolition or modification of structures including the Petaluma River Bridge, Novato Creek Bridge, Lynch Creek Bridge, and SR 116/Lakeville Highway Overhead may disturb man-made asbestos materials in concrete or other bridge parts. Disturbance of asbestos-containing materials may cause the asbestos fibers to become airborne, which can result in air quality and human health hazards.

Reversible HOV Lane Alternative. The demolition or modification of structures for the Reversible HOV Lane Alternative would be substantially the same as the Fixed HOV Lane Alternative; therefore, potential impacts related to man-made asbestos would not be distinguishable from those identified above for the Fixed HOV Lane Alternative.

Access Options. The structures to be demolished or modified are consistent for all Access Options. Therefore, potential impacts related to man-made asbestos would the substantially the same for all Access Options.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. Because this alternative would not involve demolition or modification of structures, impacts from exposure to man-made asbestos materials would not be expected.

Mercury Mine Tailings

Fixed HOV Build Lane Alternative. Mine tailings, which could potentially be encountered in fill materials or in rock formations in localized areas along the alignment, may contain hazardous levels of mercury. If encountered during construction of the Fixed HOV Lane Alternative, mine tailings may require special handling and disposal procedures.

Reversible HOV Lane Alternative. The overall footprint of the Reversible HOV Lane Alternative would be the same as the Fixed HOV Lane Alternative; therefore, potential impacts related to exposure to mercury mine tailings would not be distinguishable from those identified above for the Fixed HOV Lane Alternative.

Access Options. The PSI noted that geologic formations similar to those at the Gambonini Mine exist along US 101 just south of San Antonio Creek. There are some variations in the proposed bikeways/access roads in this area; however, potential impacts related to mercury mine tailings would not likely to be substantially different for each of the Access Options, since all involve some construction/improvements in this vicinity.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. Because this alternative would not involve extensive construction outside the existing right-of-way, potential impacts from exposure to mine tailings would not be expected.

Yellow Traffic Striping and ADL

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would involve the transport and disposal of lead-contaminated materials including yellow traffic striping and surface soil adjacent to the pavement that has been impacted by ADL. This lead-contaminated material, if not managed properly, could become airborne and then inhaled or disposed of in an uncontrolled area that would then present a new exposure pathway.

Reversible HOV Lane Alternative. The overall footprint of the Reversible HOV Lane Alternative is the same as the Fixed HOV Lane Alternative; therefore, potential impacts related to lead would not be distinguishable from those identified above for the Fixed HOV Lane Alternative.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. These relatively minor rehabilitation activities could involve the transport and disposal of lead-contaminated materials, and result in the same effects as described above for the Build Alternatives but to a less extensive degree.

3.2.5.4 Avoidance, Minimization and Mitigation Measures

It is Caltrans' policy to avoid acquisition of contaminated sites; however, if an area of contamination cannot be avoided, then engineering controls would be developed to minimize and mitigate potential impacts to human health and the environment. Because the footprints for the Fixed HOV Lane Alternative and for the Reversible HOV Lane Alternative would be identical opportunities for avoidance of potentially contaminated sites are minimal. In contrast, there may be some opportunities for avoidance with the various Access Options.

Phase 1 and Phase 2 Environmental Site Assessments (ESA). As part of the design process, site specific Phase 1 ESA will be conducted for each parcel that requires a partial or full right-of-way take. The Phase 1 ESA will be conducted in accordance with the requirements of the Final Rule for All Appropriate Inquiries promulgated as an amendment to CERCLA. Based on the findings of the Phase 1 ESA, areas potentially impacted with contaminants will be investigated and sampled, the constituents of concern identified, and any impacts delineated in a Phase 2 ESA. Caltrans will make every effort to have the property owner, or responsible party, investigate and clean-up the contamination prior to Caltrans acquisition.

Safety Plans. As appropriate, the MSN construction contract will require the development and implementations of various plans to safeguard human health and the environment during construction. These plans will include a Waste Management and Disposal Plan, a Health and Safety Plan, and a Storm Water Pollution Prevention Plan (SWPPP). The Waste Management and Disposal Plan will outline procedures for the handling, storage, and disposal of contaminated materials. The Health and Safety Plan will be prepared in accordance with the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard 29 of the Code of Federal Regulations (CFR). The Health and Safety Plan will outline measures to protect site workers and neighbors during construction. The SWPPP will outline BMPs for construction and the handling of hazardous materials. Preparation of a SWPPP is required by the RWQCB in compliance with the NPDES under the federal CWA. The abovementioned plans will cover all potential hazardous materials, including contaminated soil and groundwater, NOA, man-made asbestos, mine tailings, and lead-containing materials. Specific requirements for material handling and disposal of hazardous materials will also be included in the special provisions.

Utility Design to Prevent Migration of Contamination. If new storm drain facilities, or other underground utilities must be installed at or near the groundwater table at petroleum-impacted sites, the design of these facilities will include minimization and mitigation measures to reduce the potential for contamination to migrate off the current area of contamination. Such measures may include the use of watertight pipe connections and the use of impermeable material for backfill around these drainage pipes.

NOA Testing and Control Measures. If sediments within the Novato Creek or the San Antonio Creek would be impacted by either Build Alternative, sediments will be sampled and tested for NOA as part of the Phase 2 ESA. If asbestos is detected, then nonstandard special provisions will be prepared to direct the safe removal and disposal of waste sediments. These special provisions will be developed in compliance with the requirements of Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations as promulgated and enforced by the California Air Resources Board (CARB). Measures that have been developed by CARB to reduce emissions during construction include dust suppression by wetting, rinsing vehicles in contact with NOA, and covering and/or wetting stockpiles and excavated materials during transport.

Asbestos-Containing Materials Testing and Control Measures. An asbestos survey will be undertaken for all structures that would be demolished as part of either Build Alternative. If asbestos-containing material is discovered, standard special provisions will be prepared to address the safe removal and disposal of this material prior to any demolition activities. These specific provisions will ensure compliance with the National Emissions Standards for Hazardous Air Pollutants, under Title 40 of the CFR Part 61, and are enforced by the Bay Area Air Quality Management District (BAAQMD) and the CARB.

Mercury Mine Tailings Testing and Control Measures. If further investigation indicates that mine tailings may be encountered during construction of either Build Alternative, suspected mine tailings will be sampled and tested for mercury as part of the Phase 2 ESA. If mercury is detected, Caltrans will implement special handling and disposal requirements in accordance with Title 22 of the California Code of Regulations (CCR) and the California Health and Safety Code.

ADL Testing and Control Measures. As part of the Phase 2 ESA, surface soil along the project corridor will be sampled and tested for lead and, possibly, for mercury if the soil is observed to be reddish in color. If concentrations exceed the soluble or total threshold limits specified in Section 66261.24 of Title 22 of the California Code of Regulations (22 CCR), lead-contaminated soil will be managed in accordance with the Variance No. 00-H-VAR-01 (Variance) issued by the California Department of Toxic Substances Control (DTSC). In these cases, the Variance specifies that lead-contaminated “waste” soils that are generated during construction can be safely encapsulated within new embankments, thereby prevent the runoff of lead-contaminated soil into the environment. Caltrans will implement the appropriate health and safety provisions during construction to protect construction employees and the public. It is anticipated that this project would be eligible to reuse lead-contaminated soil under the provisions of the Variance. If, for some reason, Caltrans were not able to implement the Variance provisions or if mercury was detected, soil with metal concentrations in excess of the aforementioned thresholds will be disposed of as hazardous waste in accordance with 22 CCR or Section 25157.8 of the California Health and Safety Code.

Yellow Traffic Striping Testing and Control Measures. Yellow traffic striping is frequently removed during traffic staging and construction activities. Standard special provisions are available that typically specify that a high efficiency particulate air (HEPA) filter-equipment vacuum device be used concurrently when removing this material. This method of stripe removal will ensure that this waste is properly captured during the removal process. These special provisions also provide for sampling, testing and disposal of this waste.

3.2.6 Air Quality

The air quality discussion is based upon the Air Quality Impact Report (revised August 2007) for the MSN Project. Portions of the Preliminary Site Investigation (January 2006) are also discussed here as it pertains to Naturally Occurring Asbestos and asbestos-containing materials.

3.2.6.1 Regulatory Setting (Nationally Ambient Air Quality Standards and Regional Conformity)

The Clean Air Act (CAA) as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act (CCAA) of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns; the criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter, lead (Pb), and sulfur dioxide (SO_2). The federal and state ambient air quality standards are shown in Table 3.2-8.

Table 3.2-8 Ambient Air Quality Standards and Bay Area Attainment Status

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Ozone	8 Hour	0.070ppm(137μg/m^3)	N[9]	0.08 ppm	N[4]
	1 Hour	0.09ppm(180 μg/m^3)	N		[5]
Carbon Monoxide	8 Hour	9.0ppm(10 mg/m^3)	A	9ppm (10 mg/m^3)	A[6]
	1 Hour	20ppm(23 mg/m^3)	A	35ppm (40 mg/m^3)	A
Nitrogen Dioxide	Annual Average			0.053ppm (100 μg/m^3)	A
	1 Hour	0.25ppm(470 μg/m^3)	A		
Sulfur Dioxide	Annual Average				
	24 Hour	0.04ppm(105 μg/m^3)	A	0.14ppm(365 μg/m^3)	A
	1 Hour	0.25ppm(655 μg/m^3)	A		
Particulate Matter	Annual Arithmetic Mean	20 μg/m^3	N[7]		
(PM_{10})	24 Hour	50 μg/m^3	N	150 μg/m^3	U
Particulate Matter	Annual Arithmetic Mean	12 μg/m^3	N[7]	15 μg/m^3	A
($PM_{2.5}$)	24 Hour			35 μg/m^3 (see Footnote 10)	U
Sulfates	24 Hour	25 μg/m^3	A		
Lead	Calendar Quarter			1.5 μg/m^3	A
	30 Day Average	1.5 μg/m^3	A		
Hydrogen Sulfide	1 Hour	0.03ppm(42 μg/m^3)	U		
Vinyl Chloride (chloroethene)	24 Hour	0.010ppm(26 μg/m^3)			
Visibility Reducing Particles	8 Hour(1000 to 1800PST)	See Footnote 8	U		

A=Attainment N=Nonattainment U=Unclassified
mg/m^3=milligrams per cubic meter
μg/m^3=micrograms per cubic meter
ppm=parts per million
Source: BAAQMD internet site, 1/4/2007

Notes:

[1] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that ARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two thirds the state standard.

[2]National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 μg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 65 μg/m^3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every

Table 3.2-8 Ambient Air Quality Standards and Bay Area Attainment Status

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard. [3] National air quality standards are set at levels determined to be protective of public health with an adequate margin of safety. Each state must attain these standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency. [4] In June 2004, the Bay Area was designated as being in marginal attainment of the national 8-hour ozone standard. [5] The national 1-hour ozone standard was revoked by USEPA on June 15, 2005. [6] The Bay Area is maintenance for CO, and is subject to conformity requirements. [7] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}. [8] Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range. [9] This standard was approved by the Air Resources Board on April 28, 2005 and became effective on May 17, 2006. [10] USEPA lowered the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ in 2006. In March 2007, USEPA issued rules requiring 39 metropolitan areas in the country to develop plans to achieve attainment of the $PM_{2.5}$ standard by 2015. The San Francisco Bay Area is not among the designated 39 metropolitan areas. [11] Data is based upon a long range projection. While year to year variations are to be expected and are sometimes large, they shouldn't affect long-term projections.					

Under the 1990 Clean Air Act Amendments, the DOT cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the State Implementation Plan (SIP) for achieving the goals of the Clean Air Act requirements. Conformity with the Clean Air Act takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

Regional level conformity in California is concerned with how well the region is meeting the standards set for CO, NO_2, O_3, and particulate matter. California is in attainment for the other criteria pollutants. At the regional level, a regional transportation plan (RTP) is developed that includes all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements for CO, NO_2, O_3 and particulate matter of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Metropolitan Transportation Commission (MTC) and the FHWA, make the determination the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. If the design and scope of the proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements of project-level analysis. The MSN Project is listed in the MTC 2035 RTP. Specific discussion regarding the project's conformity with the SIP occurs later in this section.

Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, USEPA also regulates a list of air toxics (64 Federal Register [FR] 38706). Air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), air sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics identified by the USEPA. MSATs are emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as by-products. Metal air toxics result from engine wear or from impurities in oil or gasoline.

The USEPA is the lead Federal Agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The USEPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act. FHWA has issued Interim Guidance on Air Toxic Analysis in NEPA Documents (February 3, 2006).

In its rule, USEPA also examined the impacts of existing and newly formulated mobile source control programs, including its reformulated gasoline program, its national low emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulphur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulphur control requirements. FHWA projects that between 2000 and 2020, nationwide VMT will increase by 64 percent. Despite this increase, FHWA projects these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 to 65 percent, and will reduce on-highway diesel particulate matter emissions by 87 percent.

As a result, the USEPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of Clean Air Act Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

This FEIR/S includes a basic analysis of the likely MSAT emission impacts of the MSN Project. However, available technical tools do not enable a prediction of the project-specific health impacts of the emission changes associated with the proposed project. Evaluating the environmental and health impacts from MSATs on a proposed highway project involves several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps requires a number of assumptions that, when compounded together, make the results imprecise and speculative for a determination of the MSAT health impacts of this project.

In 1998, California identified diesel particulate matter (diesel PM) as a toxic air contaminant based on its potential to cause cancer and other adverse health impacts. In addition, to diesel PM, emissions from diesel-fueled engines include over 40 other cancer causing substances. In September 2000, the California Air Resources Board (CARB) approved a comprehensive Diesel Risk Reduction Plan (Plan) to reduce diesel PM emissions and the associated health risk by 75 percent in 2010 and 85 percent or more by 2020.

Asbestos

Asbestos refers to a family of naturally-occurring fibrous minerals that are frequently encountered in areas known as ultramafic rock units. Chrysotile (white asbestos), the most common material of this type found in California, is part of the serpentine mineral group and the one most commonly used in structural applications. When the asbestos-containing material is disturbed, the fibers break off and become airborne, creating a health risk if inhaled. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a toxic air contaminant by CARB in 1986.

In accordance with Section 112 of the Clean Air Act, USEPA established National Emissions Standards for Hazardous Air Pollutants (NESHAP) to protect the public. On March 31, 1971, USEPA identified asbestos as a hazardous pollutant, and on April 6, 1973, USEPA first promulgated the Asbestos NESHAP in 40 CFR Part 61. The Asbestos NESHAP was established to protect public health during activities involving the processing, handling, and disposal of asbestos-containing material by minimizing the release of asbestos when facilities that contain asbestos-containing materials are demolished or renovated. In addition, the regulations require notification to applicable State and local agencies and/or USEPA Regional Offices before all demolitions, or before renovations of buildings that contain a certain threshold amount of asbestos. The CAA allows USEPA to delegate enforcement of NESHAP to State and local agencies.

Asbestos Airborne Toxic Control Measures (ATCMs) adopted by CARB regulate (1) the use of serpentine and asbestos-bearing ultramafic rock materials used for surfacing applications, and (2) the application of best-management practices for fugitive dust from construction, grading and quarrying operations in areas that have NOA.

In 2000, CARB amended the ATCM for Surfacing Applications to apply to any person who sells, supplies, offers for sale or supply, transports, or applies "restricted material – defined as ultramafic rock and serpentine rock; any material extracted from a region defined on geologic maps a an ultramafic rock unit, and any material that has been tested and found to have an asbestos content of 0.25% or greater." The ATCM outlines notification and record-keeping requirements, prohibits the sale or use of material with an asbestos content greater than 0.25 percent for unpaved surfacing, and requires any person who transports restricted material to maintain all receipts and records with the material at all times during transit.

In addition, in 2001 CARB also approved an ATCM for Construction, Grading, Quarrying, and Surface Mining Operations in areas likely to have NOA. Road construction and maintenance operations must use dust control measures for a specified set of emission sources and prevent visible emissions from crossing the project boundaries. For construction and grading projects that will disturb one acre or less, the regulation requires several specific actions to minimize emissions of dust that are available on CARB's website. Construction projects that will disturb more than one acre must prepare and obtain district approval for an Asbestos Dust Mitigation Plan. The ATCM also outlines notification, record-keeping and off-site transport requirements, Following the classification standard given in California Code of Regulations, section 66261.24, the California Department of Toxic Substances Control (DTSC) classifies asbestos-containing material as hazardous waste if it is friable and contains one percent (1.0 percent) or more asbestos as hazardous waste. DTSC regulates the packaging, onsite accumulation, transportation, and disposal of asbestos when it is a hazardous waste. To determine if it is hazardous, asbestos waste must be tested (California Code of Regulations, Title 22, Section (66262.11(b)(2)) by a laboratory certified by the California Department of Health Services. Asbestos removal and abatement contractors must be certified by the Contractors State License Board under Business and Professions Code Section 7058.5 and must register with California's Division of Occupational Safety and Health (Cal-OSHA) under Labor Code Section 6501.5.

Bay Area Air Quality Management District's (BAAQMD) Regulation 11-2-401.3 requires the completion of an application and notification to the BAAQMD at least ten (10) working days prior to commencement of demolition activities or renovation activities involving the removal of 100 sq. ft./lin. ft. or greater of Regulated Asbestos Containing Material (RACM). Regulation 11-2-303.8 requires a survey by a Cal-OSHA certified person that has passed a USEPA approved building course be performed prior to demolition to determine the presence of RACM. The ATCM for Construction, Grading, Quarrying, and Surface Mining Operations became effective in the BAAQMD in 2002 and requires submittal of an application and Asbestos Dust Mitigation Plan that employs the best available dust mitigation measures in order to reduce and control dust emissions. The BAAQMD must be notified in writing at least fourteen (14) days prior to the initiation of any road construction or maintenance activity.

3.2.6.2 Affected Environment

Climate

The Bay Area is characterized by cool, dry summers and mild, wet winters. Temperature in the project area and its vicinity averages approximately 58 degrees Fahrenheit annually, with an average maximum summer temperature of approximately 82 degrees Fahrenheit and an average minimum winter temperature of approximately 38 degrees Fahrenheit. The Eastern Pacific High, which is a strong persistent anticyclone, is the major influence on the climate in the area. The area experiences little precipitation during the summer months, when a high-pressure cell prevents storms from affecting the California coast.

During the winter, the high-pressure cell weakens and shifts southward. Storms occur more frequently and winds are usually moderate.

Existing Air Quality

Low wind speeds and temperature inversions contribute to the build-up of air pollution. Low wind speed contributes to the build-up or air pollution because it allows more pollutants to accumulate in the air within a period of time. The highest air pollutant concentrations in the Bay Area generally occur during inversions, when temperature increases as altitude increases, thereby preventing air close to the ground from mixing with the air above it. As a result, air pollutants are trapped near the ground. Under the California Clean Air Act, the Sonoma and Marin County portion of the Bay Area Air Basin is designated as a non-attainment area for O_3, PM_{10}, and $PM_{2.5}$. Under the Clean Air Act, the Sonoma and Marin County portion of the Bay Area Air Basin is designated as a non-attainment area for O_3 (as shown in Table 3.2-8).

Carbon Monoxide. CO is almost exclusively emitted by motor vehicles. This pollutant binds the oxygen-carrying protein in blood to hemoglobin, reducing the amount of oxygen reaching the heart and brain. Exposure to CO, even at low levels can endanger people with coronary artery disease. It can also cause headaches, fatigue, and slow reflexes, even among healthy people. Typical symptoms experienced by some people where levels of CO substantially exceed State and Federal Air quality standards are headaches and dizziness.

Violations of the CO standards usually occur in the winter, during periods of ground-based weather inversions (i.e., when warm air above traps a layer of cold air beneath, near ground level) with very low wind speed.

The BAAQMD monitoring data from the Santa Rosa station, the nearest station to the project site, shows no violations of the federal and state CO standards in the three years from 2006 to 2008, based upon available data, as shown in Table 3.2-9.

Table 3.2-9 2006-2008 Criteria Pollutant Violations: Santa Rosa - 5th Street Monitoring Station

Pollutant	Standard Exceedance	2006	2007	2008
Ozone (1 hour)	Maximum 1-hr concentration (ppm)	0.077	0.710	0.076
	Days > 0.12 ppm (Federal 1-hr standard)	0	0	0
	Days > 0.09 ppm (State 1-hr standard)	0	0	0

Table 3.2-9 2006-2008 Criteria Pollutant Violations: Santa Rosa - 5th Street Monitoring Station

Pollutant	Standard Exceedance	2006	2007	2008
Ozone (8 hour)	Maximum 8-hr concentration (ppm)	0.058	0.059	0.064
	Days > 0.08 ppm (Federal 8-hr standard)	0	0	0
Carbon Monoxide	Maximum 8-hr concentration (ppm)	1.70	1.71	1.49
	Days > 9 ppm (Federal 8-hr standard)	0	0	0
	Days > 9.0 ppm (State 8-hr standard)	0	0	0
Nitrogen Dioxide	Maximum 1-hr concentration (ppm)	0.044	0.046	0.049
	Days > 0.25 ppm (State 1-hr standard)	0	0	0
$PM_{2.5}$	Maximum 24-hr concentration (µg/m^3)	59.0	32.0	30.8
	Days >65 µg/m^3 (Federal 24-hr standard)	1	0	0
PM_{10}	Maximum 24-hr concentration (µg/m^3)	89.5	37.2	49.9
	Estimated days > 150µg/m^3 (Federal 24-hr standard)	0.0	0.0	*
	Estimated days > 50µg/m (State 24-hr standard)	11.8	0.0	*

Source: California Air Resources Board. Date: 6/8/09
* BAAQMD data not available for these pollutants from 2006-2008.

Table 3.2-10 presents the BAAQMD monitoring data from the San Rafael station, which is the Marin County station closest to the project site. Based upon available data, there were also no violations of the federal and state CO standards in the three years from 2006 to 2008.

Table 3.2-10 2006-2008 Criteria Pollutant Violations: San Rafael Monitoring Station

Pollutant	Standard Exceedance	2006	2007	2008
Ozone (1 hour)	Maximum 1-hr concentration (ppm)	0.089	0.072	0.085
	Days > 0.12 ppm (Federal 1-hr standard)	0	0	0
	Days > 0.09 ppm (State 1-hr standard)	0	0	0
Ozone (8 hour)	Maximum 8-hr concentration (ppm)	0.058	0.058	0.070
	Days > 0.08 ppm (Federal 8-hr standard)	0	0	0
Carbon Monoxide	Maximum 8-hr concentration (ppm)	1.49	1.34	1.10
	Days > 9 ppm (Federal 8-hr standard)	0	0	0
	Days > 9.0 ppm (State 8-hr standard)	0	0	0
Nitrogen Dioxide	Maximum 1-hr concentration (ppm)	0.054	0.057	0.056
	Days > 0.25 ppm (State 1-hr standard)	0	0	0
$PM_{2.5}$	Maximum 24-hr concentration (µg/m3)	*	*	*
	Days > 65 µg/m3 (Federal 24-hr standard)	*	*	*
PM_{10}	Maximum 24-hr concentration (µg/m3)	39.0	52.0	41.0
	Estimated days > 150µg/m3 (Federal 24-hr standard)	0	0	0
	Estimated days > 50µg/m3 (State 24-hr standard)	0	1	0

Source: California Air Resources Board. Date: 6/8/09
* BAAQMD data not available for these pollutants from 2006-2008.

Ozone. O_3 is the primary constituent of photochemical smog. It is not emitted directly into the atmosphere, but is produced through a complex series of chemical reactions involving hydrocarbons (HC) and oxides of nitrogen (NO_x), in the present of sunlight. Vehicle exhaust emissions contribute about half of the pollutants that form ozone. High ozone levels occur primarily in the summer and early fall. High ozone levels aggravate asthma, bronchitis, and other respiratory ailments, as well as cardiovascular disease. High concentrations of ozone may also cause dizziness, headaches, burning of eyes and throat, and nausea.

The general structure of oxidant or ozone problems is the emissions of HC and NO_x. In the morning, these pollutants react in the presence of sunlight to produce a peak oxidant concentration layer. As these reactions occur, the air mass is normally transported by the wind. Consequently, the peak oxidant concentrations in the Bay Area tend to occur downwind of the areas where the emissions were released, settling in areas like San Jose and Livermore. Photochemical oxidants cannot therefore be said to be cause by a specific source, nor do peak concentrations invariably occur in the vicinity of emission sources. Thus, photochemical oxidants are an area-wide pollution problem and require a regional analysis such as that done by MTC.

The data monitored at the BAAQMD station in Santa Rosa show no violations of the federal standards and only one violation of the state ozone standards in three years from 2003 to 2005, as shown in Table 3.2-9.

Oxides of Nitrogen (NO_x). Nitrogen oxides are produced by motor vehicles (particularly heavy duty vehicles) and high temperature industrial operations. They have not posed a separate, serious health problem in the Bay Area in the past several years but help to create the ozone problem.

Sulfur Dioxide (SO_2). Sulfur dioxide (SO_2) is produced primarily by petroleum refineries and by the combustion of sulfur-containing coal and oil in power plants. Only 20 percent is produced by burning diesel oil and other fuels in motor vehicles. While SO_2 can be a serious health hazard, no exceedance of either state or federal standards has been recorded since 1976. The Bay Area Air Quality Management District shows data up to 2007; however we have no reason to believe that there have been any new exceedances since then or that there will be any new ones in the foreseeable future.

Fine Particulate Matter (PM_{10} and $PM_{2.5}$). Fine particulate matter (PM_{10}, or particulate matter less than 10 microns in diameter) includes a wide range of solid or liquid particles, dust, smoke, aerosols and metallic oxides. $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter. When inhaled, PM_{10} and $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract. There are many sources of PM_{10} emission, including, industrial processes, grading and construction, wood burning stove and fireplaces, and motor vehicles. Of the PM_{10} emissions associated with motor vehicle use, some are tailpipe and tire-wear emissions, but greater quantities are generated by re-suspended road dust. $PM_{2.5}$ results from fuel combustion (from motor vehicle, power generation, industrial facilities), residential fireplaces, and wood stoves. The data monitored at the BAAQMD station in Santa Rosa, as shown in Table 3.2-9, indicate no violations of the federal and state standards in the three years from 2003 to 2005.

Lead. Lead is a metal that was used to increase the octane rating in auto fuel, a practice that is no longer allowed. The Bay Area is in attainment of the state ambient standards of this pollutant.

Asbestos. NOA is not known to be present within the project footprint; however, deposits do exist approximately two miles west of US 101 between Novato Creek and San Antonio Creek. There is a possibility that sediment in San Antonio Creek and Novato Creek, which flow under US 101, could contain NOA, as portions of the watersheds for these streams include some ultramafic rock formations and NOA may have migrated into the streams as a result of weathering and erosion of these rocks.

Man-made asbestos is commonly found in many products such as the shims used under aluminum bridge barrier rails and even concrete.

3.2.6.3 Impacts

Carbon Monoxide

This air quality analysis utilizes the "Transportation Project-Level Carbon Monoxide Protocol," dated December 1997, prepared by the Institute of Transportation Studies, University of California at Davis. This protocol was approved by MTC in Resolution No. 3075 on June 24, 1998. Use of this protocol was recommended by the Bay Area Interagency Conformity Task Force, which is the interagency consultation group established pursuant to USEPA's conformity regulation and the Bay Area's conformity with the State Implementation Plan (SIP).

Since the Bay Area was designated an attainment area for CO on June 1, 1998, the protocol indicates that an analysis by comparison to a similar freeway corridor is appropriate for this project. This involves a comparison of the proposed facility with existing facilities within the same air district. A list of the features to be compared is described on pages 4-6 to 4-7 of the protocol.

For mainline facilities, comparisons were made between the year 2010 Build conditions of US 101 and the existing conditions on I-880 in Alameda County from Route 92 to Route 84; for intersection comparisons, Caltrans used the Foothill/Mission Boulevard Intersection in that same area.

The Traffic Operational Analysis Report (February 2005) for future years of 2010 and 2030 indicates that traffic impacts at nearby intersections would be minimal. Most intersections would experience less than 5 percent differences in future predicted traffic volumes between the Build and No Build conditions. This difference is not significant given the accuracy of the prediction methodology.

The most critical intersection within the project area is at US 101 northbound ramps and Atherton Avenue Intersection. This intersection is considerably smaller than the intersection at Foothill and Mission Boulevard, which was used as a point of comparison. The northbound US 101 ramps are two-lane roads and Atherton Avenue is a four-lane road (two-lanes per direction). The Foothill/Mission Intersection represents the junction of two major state routes, plus a connector to downtown Hayward. This five-legged intersection consists of multiple lane approaches and experiences heavy congestion and delays. Receptor distances are comparable at both intersections 4.5 to 6 m (15 to 20 ft).[2] Traffic volumes, queues, delays and background CO are greater at Mission and Foothill. The facility and a list of the features to be compared are presented in Table 3.2-11.

[2] Receptor locations are chosen where the highest CO concentrations seem most likely to occur and where sensitive receptors are located. Sensitive receptors refer to residences, park, playgrounds, school, hospital and retirement homes, where children, the elderly, and the acutely ill are likely to reside or spend a substantial amount of time (BAAQMD 1999). The critical receptor for analysis that is the closest to the highway traffic is 15.3 m.

Table 3.2-11 Comparison of US 101 and I-880 for Air Quality Assessment

	Parameters	US 101 (Build)*	I-880 (Existing)
A	Receptor Distance	15.3 m (50')	7.62 m (25')
B	Roadway Geometry	6 lanes	8 lanes
C	Worse case Meteorology	Coastal Valley	Coastal Valley
D	Peak Hourly Volumes	12,800 vph	15,000 vph
E	Hot/Cold Starts	50/10 NB 50/10 SB	50/10 NB 50/10 SB
F	Percent HDG trucks	0.9-2.9%	7.6-8.3%
G	Background CO	2.3 ppm	3.2 ppm

Source: Air Quality Impact Report, Marin-Sonoma Narrows Project on US 101. Nov. 2005.

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would result in a facility that would be similar and less congested than comparable facilities within the same air district (I-880 and Foothill and Mission). Since the comparable facilities are in an area that meets air quality standards (maintenance area), this project would also be expected to meet microscale air quality requirements and would, therefore, have no significant impact on air quality or cause exceedances of state or federal carbon monoxide standards.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would be comparable to the Fixed HOV Lane Alternative. The annual average daily traffic, vehicle miles traveled, and the amount of vehicle hours of delay in 2030 have been predicted to be similar. As a result, like the Fixed HOV Lane Alternative, the Reversible HOV Lane Alternative would attain microscale air quality requirements and would not result in exceedances of state or federal carbon monoxide standards.

Access Options. The four Access Options would result in intersections much less congested than the comparable facilities within the same air district (Foothill and Mission). The Access Options would provide for new interchanges, overcrossings, and frontage roads that largely seek to replace at-grade connections to US 101 or access to local businesses, residences, and properties. As such, they are not serving major traffic movements like the comparable Foothill and Mission intersection, which serves two significant thoroughfares and provides access to a major East Bay community downtown. Since the comparable facility would involve much higher volumes, turning movements, and congestion, it is reasonable to expect that since that intersection operates without exceedances of state and federal carbon monoxide standards, that the interchanges and intersections associated with the four Access Options would also not exceed state and federal carbon monoxide standards.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. Since this alternative would not contribute any improvements and would not reduce congestion and delays, it would not be supportive of regional efforts to attain air quality standards.

Particulates (PM_{10} and $PM_{2.5}$)

Although the USEPA Transportation Conformity Regulations require a quantified microscale analysis for PM_{10}s, no approved methodologies are available to address the microscale impacts of PM_{10} or $PM_{2.5}$. The regulations state that "the USEPA will be releasing technical guidance on how to use existing modeling tools to perform PM_{10} hotspot analysis. The requirements will not take effect until the Federal Register has announced availability of this guidance." (40 CFR Parts 51 and 93, Prologue Section V.K.: Federal Register, August 15, 1997.) These technical guidelines have not yet been released. Accordingly, the following assessment offers a qualitative review of potential fine particulate matter effects.

Fixed HOV Lane Alternative. The federal PM_{10} standards have been met in the Bay Area Air Basin. Projects are subject to hot spot analysis for PM_{10} if they are located in a PM_{10} non-attainment or maintenance area (Federal standards), for purposes of transportation conformity. The state PM_{10} standard is extremely stringent, and thus no urbanized parts of California meet the standard of 50 $\mu g/m^3$ Maximum 24-hour PM_{10}. However, the Maximum 24-hour PM_{10} published by the CARB for the Santa Rosa PM_{10} monitoring station (the monitoring station closest to the project corridor) showed no violations over the past three years. Moreover, the Fixed HOV Lane Alternative would alleviate the vehicle hours of delay and the congestion that is particularly acute in the Novato Narrows without substantially increasing vehicle miles traveled. The project would also pave the 11.6-m (38 ft) unpaved median and outside shoulders, which is notable because one of the largest sources of particulate matter is from re-suspended road dust. Given the above factors, which indicate that there is local attainment of the state PM_{10} standard and that the sources for particulates would be reduced as a result of the Fixed HOV Lane Alternative, the proposed project would not be expected to have an adverse air quality impact with respect to particulates. In fact, the provision of HOV lanes is one of the recommended transportation control measures in the Bay Area Clean Air Plan to help achieve attainment of the ambient air quality standards.

Reversible HOV Lane Alternative. This alternative would be similar to the Fixed HOV Lane Alternative in that it would pave the median and outside shoulders in Segment B, reduce congestion and vehicle delays through the provision of an HOV lane, and accommodate the same annual average daily traffic and vehicle miles traveled. As a result, the Reversible HOV Lane Alternative would likewise not be expected to have an adverse air quality impact with respect to particulates.

Access Options. Particulate emissions associated with the Access Options would be a function of the amount of travel (e.g., average daily traffic and vehicle miles traveled), congestion (vehicle hours of delay), and disturbed soils. The amount of disturbed soils varies by Access Option and the effects on particulate emissions are described later under Construction Impacts. Traffic on the non-continuous frontage roads would either enter the US 101 mainline traffic flow or exit from that flow; therefore, traffic volumes are accounted for in the 2030 forecasts. Since the Access Options would not increase or alter annual average daily traffic, vehicle miles traveled or delays would not result in additional particulate emissions.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. Since this alternative would not contribute any improvements and would not reduce congestion and delays, it would not be supportive of regional efforts to attain air quality standards.

Mobile Source Air Toxics

Fixed HOV Lane Alternative. The FHWA's MSAT guidance considers projects like MSN to have low potential MSAT effects because it is intended to improve highway operations without adding substantial new capacity and without creating a facility that is likely to increase emissions [has an average annual daily traffic (AADT) less than 140,000]. From Caltrans' traffic forecast and traffic operational analysis, the maximum AADT in the section from the US 101/SR 37 Interchange to the Rowland Road Interchange, the segment within the project boundaries with the highest 24-hour volume, would be 128,300 for the No Build Alternative and 136,200 for the Fixed HOV Lane Alternative in the year 2030. The projected truck percentage of total vehicles would be 4.42 percent in 2030. Notably, according to the traffic operational analysis, the differences of AADT and truck percentages between the Fixed HOV Lane Alternative and the No Build Alternative are negligible.

The amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated in the project area for each alternative is summarized in Table 3.2-12.

Table 3.2-12 Projected Increase in Vehicle Miles Traveled in the Project Area (in thousands of miles), Year 2030*

Alternative	A.M. Peak	P.M. Peak
Build Alternatives		
Fixed HOV Lane	5,318	6,367
Reversible HOV Lane	5,318	6,367
No Build	5,312	6,358
Percent Increase	0.11%	0.14%
*Year-to-year variations can be expected, and they are sometimes large; however, they shouldn’t affect long-term projections.		

The VMT estimated for the Fixed HOV Lane Alternative would be slightly higher than that for the No Build Alternative, because the additional capacity associated with the project would increase the efficiency of the roadway and attract rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the Fixed HOV Lane Alternative along the highway corridor, but decrease emissions along the local parallel routes.

However, there is a difference between the MSAT emissions associated with the freeway versus the MSAT emissions associated with the local roads. According to USEPA’s Mobile6 emissions model, emissions of all priority MSATs except for diesel particulate matter decrease as speed increases. Consequently, the MSAT emissions from increased VMT on US 101 would be somewhat reduced by the higher speeds, compared to speeds on the local roads.

Given that AADT and VMT would not be appreciably different between the Fixed HOV Lane Alternative and the No Build Alternative, and that the percentage of truck trips of the overall fleet is not expected to change, it is reasonable to expect that MSAT emissions would not increase under the Fixed HOV Lane Alternative.

Reversible HOV Lane Alternative. As shown above in Table 3.2-12, the predicted AADT and VMT for the Reversible HOV Lane Alternative would be identical to those reported for the Fixed HOV Lane Alternative. As a result, the Reversible HOV Lane Alternative would have the same effect in terms of MSAT emissions as the Fixed HOV Lane Alternative. In summary, given that AADT and VMT would not be appreciably different between the Reversible HOV Lane Alternative and the No Build Alternative, and that the percentage of truck trips of the overall fleet is not expected to change, it is reasonable to expect that MSAT emissions would not increase under the Reversible HOV Lane Alternative.

Access Options. The impacts to MSAT emissions would not vary by Access Option, because the Access Options do not vary in the estimated VMT or AADT.

No Build Alternative. Under the No Build Alternative, there would be no increase in VMT or AADT, and there would be no change in travel speeds or the fleet vehicle mix. Therefore, MSAT emissions would not be affected.

Asbestos

Fixed HOV Lane Alternative. NOA may be adjacent to or coincide with bridgework construction areas for the Petaluma River Bridge replacement, the new San Antonio Creek Bridge, and creek crossings. If undisturbed, NOA is generally not considered to be hazardous. However, excavation and other construction activities that cause ground disturbance may cause the asbestos fibers to become airborne, which can result in air quality and human health hazards.

In addition to NOA, there may be asbestos in man-made structures that use materials from ultramafic and serpentine rock. Demolition or modification of structures as part of the Fixed HOV Lane Alternative, including the Petaluma River Bridge, Novato Creek Bridge, Lynch Creek Bridge, and SR 116/Lakeville Highway Overhead may disturb human-made asbestos materials in concrete or other bridge parts. Disturbance of asbestos-containing materials may cause the asbestos fibers to become airborne, which can result in air quality and human health hazards.

Reversible HOV Lane Alternative. This alternative would propose improvements and construction in the same waterways and to the same existing structures as the Fixed HOV Lane Alternative. Accordingly, the Reversible HOV Lane Alternative would have the same potentially adverse effects as the Fixed HOV Lane Alternative in terms of exposure to asbestos.

No Build Alternative. The No Build Alternative would not involve demolition of structures or major construction in waterways. Thus, the potential to disturb NOA or asbestos in man-made structures that could become airborne and pose a health hazard would be minimal. During rehabilitation, however, it may be necessary to make such modifications, so that there is still a potential for the No Build Alternative to release asbestos.

Conformity with State Implementation Plan

Build Alternatives. The MSN Project study area is located in a non-attainment area for federal and state ozone standards and in a non-attainment area for state PM_{10} standard, and includes Transportation Control Measures (TCMs) in the SIP. (Note: State and Federal attainment designations are based on region-wide data from all monitoring sites in the Bay Area air basin. Specific sites may show exceedances of some standards but these are still consistent with the attainment designations for the region when taken as a whole.) The most recent transportation plan in the project area is the Transportation 2035 Plan, adopted by MTC on April 22, 2009. The most recent Transportation Improvement Program (TIP) is the 2009 TIP. The FHWA made its conformity determination for the Transportation 2035 Plan and the 2009 TIP on May 29, 2009. The project is listed in the 2009 TIP (TIP ID nos. MRN050034 and SON070004) and the Transportation 2035 Plan (RTP reference no. 230702). The proposed MSN Project design and concept, as either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative, are substantially the same as the design scope and concept in the 2035 RTP and Regional Transportation Improvement Program (RTIP) listings, and all applicable Transportation Control Measures are included in the project. The project therefore meets the regional tests for conformity with the SIP.

No Build Alternative. This alternative would not be consistent with the SIP, the RTP, or the RTIP.

Construction Impacts

Fixed HOV Lane Alternative. Construction activity is a source of dust and exhaust emissions that can have substantial temporary impacts on local air quality. These emissions would result from earthmoving, use of heavy equipment, land clearing, ground excavation, embankments, and construction of roadways. Construction air emissions under the Fixed HOV Lane Alternative would be particularly substantial in the Central Segment, where US 101 would be widened to operate at freeway standards, new access roads and interchanges would be constructed, and new bicycle/pedestrian paths would be added. In addition, the erection of soundwalls in Novato and Petaluma would cause ground disturbance and the generation of dust emissions. Daily emissions can vary substantially, depending on the level of activity, specific operations, and prevailing weather. A major portion of dust emissions for the Fixed HOV Lane Alternative would likely be caused by construction traffic on temporary construction roads. The primary emissions of concern from construction activities would be PM_{10} and ozone precursors from diesel-fueled equipment.

The BAAQMD CEQA Guidelines provide some general rules of thumb by which to estimate the amount of dust and PM_{10} emissions (BAAQMD. 1999. BAAQMD CEQA Guidelines). The USEPA has estimated that construction-related emissions of total suspended particulates total 1.2 tons per acre per month of activity. Further, the CARB estimates that 64 percent of construction-related total suspended emissions are PM_{10}. Thus, an estimated 51 pounds per acre per day of PM_{10} are generated during construction. While the construction scenario for the Fixed HOV Lane Alternative has not yet been defined, there are estimates of the maximum acres of soil disturbed: 13.1 ha (32.4 ac) in the Southern Segment, 190.3 ha (470.2 ac) in the Central Segment, and 13.5 ha (33.4 ac) in the Northern Segment, for a total of 217 ha (536 ac). These numbers only serve to illustrate that the construction period would yield a considerable amount of suspended emissions and PM_{10}.

Construction-related emissions are generally short-term in duration but may still cause adverse air quality impacts. According to the BAAQMD CEQA Guidelines, emissions of carbon monoxide and ozone precursors (ROG and NO_x) from exhaust and other construction activities are included by the BAAQMD in the emission inventory that is the basis for regional air quality planning, and their generation is not expected to impede attainment or maintenance of the ozone or CO standards.[3] Consequently, construction impacts associated with these pollutants are not analyzed. For PM_{10}, the BAAQMD's approach to analyses of

[3] BAAQMD, BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, April 1996, revised December 1999, p. 13.

construction impacts is to emphasize implementation of effective and comprehensive control measures for PM_{10} rather than detailed quantification of emissions. The BAAQMD has developed feasible PM_{10} control measures for construction activities. The BAAQMD Guidelines state that a determination of significance for PM_{10} from construction activity should be based on a project's implementation of these control measures.[4] Consequently, construction emissions were not quantified in this analysis, but the Fixed HOV Lane Alternative's inclusion of PM_{10} control measures is discussed.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would have the same footprint, mainline improvements, and scope of work as the Fixed HOV Lane Alternative, except that the median would be constructed with a single HOV lane. Because of the similarities in the Build Alternatives, the construction-period impacts would also be similar. Thus, the Reversible HOV Lane Alternative would also result in substantial temporary impacts on local air quality from earthmoving, use of heavy equipment, as land clearing, ground excavation, cut-and-fill operations, and construction of roadways. The primary emissions of concern from construction activities would be PM_{10} and ozone precursors from diesel-fueled equipment.

Access Options. As noted above in the description of construction-related air quality impacts for the Build Alternatives, construction air emissions would be particularly substantial in the Central Segment, where US 101 would be widened to operate at freeway standards, new access roads and interchanges would be constructed, and new bicycle/pedestrian paths would be added. The various Access Options would result in different combinations of interchanges, overcrossings, frontage roads, and bicycle/pedestrian paths. Each would involve substantial ground disturbance and the generation of local dust and particulate emissions. While Access Option 12b, unlike the others, would propose fewer interchanges, it would result in the greatest amount of paving and the most significant tree removal. As such, it may result in the most substantial amount of earthmoving. More importantly, while the differences among the Access Options would not be substantial, the differences from the No Build Alternative would be substantial and cause temporary adverse air quality emissions.

[4] BAAQMD, BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, April 1996, revised December 1999, p. 12.

No Build Alternative. The No Build Alternative would involve only routine maintenance and upkeep of the existing US 101 facilities. As a result, this alternative would affect air quality during construction but it would not likely be adverse.

3.2.6.4 Avoidance, Minimization, and/or Mitigation Measures

The following mitigation measures apply to the Fixed HOV Lane and the Reversible HOV Lane Alternatives. The No Build Alternative would also be subject to asbestos measures, if structures were to be demolished, and to the construction-period measures.

Construction Air Quality Measures. As mentioned in the impact analysis, the BAAQMD requires implementation of control measures to reduce a project's construction impacts. Therefore, the following measures would be implemented as part of the Build and No Build Alternatives:

- Water exposed surfaces twice daily
- Cover all trucks hauling soil, sand, and other loose materials or maintain at least 2 ft of freeboard;
- Pave, apply water three times daily, or apply nontoxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites;
- Sweep daily with water sweepers all paved access roads, parking areas, and staging areas at construction sites;
- Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets;
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more);
- Enclose, cover, water twice daily, or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.);
- Limit traffic speeds on unpaved roads to 15 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways; and
- Replant vegetation in disturbed areas as quickly as possible.

Asbestos Testing and Control Measures. If sediments within the Novato Creek or the San Antonio Creek will be impacted by either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative, sediments will be sampled and tested for NOA. If asbestos is detected, then nonstandard special provisions will be prepared to direct the safe removal and disposal of waste sediments.

An asbestos survey will be completed for all structures that will be demolished as part of the Build and No Build Alternatives. If asbestos-containing material is discovered, standard special provisions will be prepared to address the safe removal and disposal of this material prior to any demolition activities.

The nonstandard and standard specific provisions will be developed in compliance with CARB's, DTSC's and the Districts requirements to ensure compliance with NESHAP, under Title 40 of the Code of Federal Regulations Part 61.

In addition, special provisions will be developed in compliance with the requirements of CARB's ATCM for Construction, Grading, Quarrying, and Surface Mining Operations, including preparation and submittal of an Asbestos Dust Mitigation Plan. An example of measures that have been developed by CARB to reduce emissions during construction include dust suppression by wetting, rinsing vehicles in contact with NOA, and covering and/or wetting stockpiles and excavated materials during transport.

3.2.7 Noise and Vibration

3.2.7.1 Regulatory Setting

NEPA and CEQA provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment.

State and Federal Policies and Procedures

The noise impact evaluation criteria for the MSN Project reflect the Noise Abatement Criteria (NAC) established by the FHWA in Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR Part 772 2006) and criteria adopted by Caltrans in Traffic Noise Analysis Protocol (August 2006). For residential land uses, parks, schools and hospitals, the FHWA outdoor noise criterion is 67 dBA, and the interior noise criterion is 52 dBA. Table 3.2-13, shows noise criteria for these and other land use categories.

Table 3.2-13 Activity Categories and Noise Abatement Criteria (23 CFR 772)

Activity Category	Leq (h)	L10 (h)	Description of Activity
A	57 exterior	60 exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 exterior	70 exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 exterior	75 exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	---	---	Undeveloped lands.
E	52 interior	55 interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

According to the Protocol, traffic noise impacts at sensitive receptors occur when future predicted noise levels with the project in place either (1) results in a substantial noise increase (12 dBA or higher) from the existing levels, or (2) approach or exceed the NAC established by the FHWA shown on Table 3.2-13. The term "approach" is defined by Caltrans as one dBA below the criterion. Noise abatement measures are considered for this project when predicted future peak hour traffic levels are equal to or exceed 66 dBA.

In addition, the FHWA procedures for noise abatement allow for use of federal funds only if all of the following conditions are met:

(1) A traffic noise impact has been identified;

(2) The noise abatement measures will reduce the traffic noise impact, and;

(3) The overall noise abatement benefits are determined to outweigh the overall adverse social, economic, and environmental effects and the costs of the noise abatement measures.

The Caltrans Protocol states that if it is predicted that there would be traffic noise impacts, all reasonable and feasible noise abatement measures must be identified and implemented. Under Caltrans' policy a "feasible" soundwall is one that can achieve a readily noticeable reduction of 5dBA or more, and is buildable.

Feasibility also refers to engineering issues such as safety, topography, soil, drainage, and local access requirements. The feasibility of the abatement measures being considered is determined by noise analysis and subsequent engineering studies. "Reasonableness," as defined under the policy, consists of two parts: "preliminary reasonableness," which is based on cost; and "final reasonableness," which takes into account public input and any other pertinent factors (i.e., social, environmental, aesthetic, etc.). The determination of final reasonableness is stated at the end of this section. Only the walls that have been determined to be *feasible* and *reasonable* will be included in this project.

3.2.7.2 Affected Environment

Noise Fundamentals

Noise is defined as unwanted sound. Levels of sound are measured in terms of decibels (dB). Since the human ear cannot perceive all frequencies equally well, measured sound levels are often adjusted, or weighted to correspond to human hearing. For noise associated with traffic and similar human activity, these adjustments are referred to "A-weighted" decibels or dBA. Table 3.2-14 shows typical A-weighted noise levels.

Table 3.2-14 Common Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet Fly-over at 300m (1000 ft)	110	Rock Band
Gas Lawn Mower at 1 m (3 ft)	100	
Diesel Truck at 15 m (50 ft), at 80 km (50 mph)	90	Food Blender at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	80	Garbage Disposal at 1 m (3 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	70	Vacuum Cleaner at 3 m (10 ft) Normal Speech at 1 m (3 ft)
	60	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime Quiet Suburban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Rural Nighttime	30	Library
	20	Bedroom at Night, Concert Hall (Background) Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Sound in our daily environment fluctuates over time. One way of describing fluctuating sound over a specific time period is to present the changing levels of sound as if they had occurred at a steady unchanging level for a specific time period. Since highway traffic noise impacts are evaluated by using the average noise levels at sensitive receivers during the worst, or the noisiest, one hour period of the day, the sound level equivalents of the acoustical energy received in one hour is the descriptor used for this purpose, which is represented as Leq(h)[5].

[5] Leq - the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period. Leq(h). The hourly value of Leq. (Source: 47 FR 29654 and 47 FR 33956)

Decibels are logarithmic units. A doubling of the number of noise sources, such as cars on a roadway, increases the noise levels by 3 dBA. A ten-fold increase in the number of noise sources adds 10 dBA to the noise levels. Furthermore, with normal human hearing, an increase of 10 dBA in sound levels is perceived as twice as loud, while a change of 3 dBA is barely perceivable. For every doubling of distance between the noise source and the receptor, traffic noise would decrease by 3 dBA over hard ground (e.g., paved surface) or 4.5 dBA over soft ground (e.g., vegetated plowed soil). Table 3.2-15 shows relationships between decibels, energy and loudness.

Table 3.2-15 Relationships Between Decibels (dBA), Energy, and Loudness

Sound Level Change	Human Perception	Relative Energy Change
+10 dBA	Twice as Loud	10
+5 dBA	Readily Perceptible	3.16
+3 dBA	Barely Perceptible	2
0+ dBA	Reference	0
-3 dBA	Barely Perceptible	1/2
-5 dBA	Readily Perceptible	1/3
-10 dBA	Half as Loud	1/10
-20 dBA	1/4 as Loud	1/100
-30 dBA	1/8 as Loud	1/1,000
-40 dBA	1/16 as Loud	1/10,000

Existing Noise Environment

To describe the existing noise environment, representative noise levels were measured at eight locations throughout the project boundaries. The 24-hour noise measurements were generally chosen from the first row of homes closest to the freeway, since these “receptors” are most vulnerable to changes in the noise environment along US 101.

As it pertains to the MSN Project boundaries, there are residential and commercial areas on both sides of US 101 in the City of Novato. Within this segment, the roadway alignment is basically straight. However, the roadway elevation relative to the adjoining uses varies, ranging from a few meters to nearly 10 m (32.8 ft) below the surrounding residential areas at the south end and above the surrounding residences at the north end.

The residential areas between Novato Boulevard and the south end of Redwood Boulevard on the western side of US 101 have soundwalls constructed on earth berms. Wall heights vary from about 2.4 m (8 ft) to about 6.1 m (20 ft) above the edge of the freeway. Also in Novato, the residential areas between Cherry Street and Orange Avenue have 1.2-m (4-ft) high earth berms on both sides of US 101. The Novato Community Hospital near Rowland Way on the eastern side of US 101 has a large and wide parking area adjacent to the freeway.

In the expressway segment of the project boundaries, there is a motel and a few scattered houses along US 101 with most of the areas adjacent to the freeway being undeveloped land. In the segment through the City of Petaluma, residential and commercial uses straddle US 101, where the roadway alignment is basically straight with a roadway elevation a few meters above the surrounding residential areas.

Overall, existing peak hour noise levels ranging from 59 to 75 dBA Leq(h) were measured at locations within the project boundaries along US 101. Some residences in Petaluma are already exposed to noise levels over the Federal/State NAC of 67 dBA Leq(h) (see Table 3.2-14). These residences are located on the eastern side of US 101 from about Gumwood Lane, northward from the SR 116 Overhead to the East Washington Interchange. Likewise north of Washington Creek, where Arlington Drive parallels the western side of US 101, measurements at these residential locations were measured at 70 dBA Leq(h) to 72 dBA Leq(h).

3.2.7.3 Impacts

State policy requires that projects started after January 15, 2005 use the FHWA computer model TNM, Version 2.5. Since this traffic noise study was started in August 2001, the computer model SOUND2000 program was used. This program is a version of the FHWA Highway Traffic Noise Prediction Model and Noise Barrier Cost Reduction procedure STAMINA2/OPTIMA.

The Federal-Aid Highway Program Manual (FHPM 7-7-3) suggests that the future worst-case noise levels generated from highway traffic would occur when traffic operates under Level of Service C conditions. For Level of Service C conditions, it is assumed that 1,800 vehicles per lane per hour are traveling at 105 km (65 mi) per hour on the freeway. The traffic inputs consist of 5 percent medium trucks and 5 percent to 8 percent heavy trucks based upon field traffic counts and the SOUND2000 computer model analysis.

Fixed HOV Lane Alternative. Under this alternative, two HOV lanes, one in each direction, would be constructed in the existing median of US 101 through all three segments of the project boundary. Based on the future volumes on US 101 with two HOV lanes, predicted future peak noise levels along US 101 would range from 60 to 76 dBA Leq(h) at residential areas, an estimated increase in noise levels of approximately one to two dBA Leq(h). Table 3.2-16 presents the predicted noise levels at 42 locations along the project corridor.

Receptors along Kenwood Court in Novato experience existing traffic noise levels between 59 and 62 dBA Leq(h). Under the Fixed HOV Lane Alternative, the noise levels would be between 60 and 63 dBA Leq(h), well within NAC standards. The residential areas bordered by the soundwalls in Novato had measured and predicted noise levels at less than 66 dBA Leq(h), which is also within NAC standards.

As noted earlier, there are existing receptors within residential areas that had measured noise levels exceeding NAC standards. Although the Fixed HOV Lane Alternative is not expected to cause a significant increase over existing noise levels, Caltrans studied soundwalls to abate future worst case traffic noise as part of the MSN Project (see Figure 3.2-3). An example of this situation exists in Novato along Redwood Boulevard, where existing and future worst case traffic noise levels would be 73 dBA Leq(h) with or without the Fixed HOV Lane Alternative. Although the project would not cause an increase in traffic noise, a soundwall would provide noise abatement, to reduce future traffic noise to 66 dBA Leq(h). At the Novato Community Hospital, because only the parking lot is exposed to freeway noise, further noise abatement considerations are not needed for this facility.

In Segment B, land uses are predominantly rural, including farmlands and grazing areas. These uses, along with the Redwood Landfill, and other agricultural operations are classified as undeveloped lands for which there are no noise abatement criteria (see Table 3.2-13, Activity Category D). There are some institutional uses and the Birkenstock business in Segment B, which are not

Table 3.2-16 Existing and Future Worst-case Traffic Noise Levels with the MSN Build Alternatives

Rec #	Segment A	Existing Peak Noise	No Build	Build Alternatives Build Worst-Case Noise Level (dBA)				Barrier #	Barrier		# Homes Shielded
				8'Wall	10' Wall	12'Wall	14' Wall		Height (m)	Length (m)	
R-1	617 Manuel Dr.	63(M)	67	65	63	62	---	1	3.7	200	9
R-2	613 Davidson St.	61(E)	66	64	63	61	---		(12 ft)	(660 ft)	
R-3	101 Kenwood Ct.	61(M)	62	---	---	---	---				
R-4	201 Kenwood Ct.	62(E)	63	---	---	---	---	No Wall Recommended			
R-5	221 Kenwood Ct.	59(E)	60	---	---	---	---				
R-6	Apartment	71(E)	72	---	66	64	63				
R-7	1508 Armstrong Ave.	71(E)	71	---	69	67	66	2	4.3	480	17
R-8	Pool-Mobile Home (Armstrong)	65(E)	65	---	63	62	61		(14 ft)	(1,600 ft)	
R-9	16 Elmwood Ct.	65(E)	66	---	---	---	---				
R-10	Playground(Olive/Elmwood)	65(E)	65	---	---	---	---	No Wall Recommended			
R-11	725 W Orange Ave.	64(E)	64	---	---	---	---				
R-12	43 Reichert Ct.	65(E)	66	65	64	62	---				
R-13	702 Lamont Ave.	67(E)	67	64	63	62	---	3	3.7	500	9
R-14	701 Lamont Ave.	65(E)	66	63	62	61	---		(12 ft)	(1,650 ft)	
R-15	7 Hankle Rd.	67(E)	68	65	63	62	---				
R-16	1 Corinthian Ct., Novato	71(E)	72	---	68	67	66	4	4.3	270	27
R-17	1280 Redwood Blvd., Novato	73(E)	73	---	67	66	66		(14 ft)	(890 ft)	
R-18	82 Rosewood Dr., Novato	62(E)	63	---	---	---	---				
R-19	706 Somoa Lane, Novato	63(M)	65	---	---	---	---	No Wall Recommended			
R-20	Basketball Court	62(E)	63	---	---	---	---				
R-21	1101 Gumwood Ln.	71(E)	72	---	72	72	71				
R-22	5 Ramona Ct.	73(E)	74	---	70	68	67				
R-23	1178 Lindberg Ct.	74(E)	74	---	69	67	66				
R-24	1227 Kresky Way	72(E)	73	---	68	67	65				61
R-25	1247 Kresky Way	72(E)	72	---	68	66	65	5	3.7	1,760	
R-26	506 Stuart Dr.	69(M)	72	---	68	66	65		(12 ft)	(5,800 ft)	
R-27	434 Stuart Dr.	72(E)	73	---	67	66	64				
R-28	354 Stuart Dr.	75(E)	75	---	68	66	65				
R-29	314 Stuart Dr.	69(M)	72	---	67	66	64				

Table 3.2-16 Existing and Future Worst-case Traffic Noise Levels with the MSN Build Alternatives

Rec #	Segment A	Existing Peak Noise	No Build	Build Alternatives Build Worst-Case Noise Level (dBA)				Barrier #	Barrier		# Homes Shielded
				8'Wall	10' Wall	12'Wall	14' Wall		Height (m)	Length (m)	
R-a	333 Vintage Chateau	75(E)	75	---	72	71	69	6	4.3 (14 ft)	230 (750 ft)	18
R-b	333 Vintage Chateau	75(E)	76	---	73	71	70				
R-c	333 Vintage Chateau	75(E)	75	---	73	71	70				
R-30	63 W Napa Dr.	72(E)	73	---	70	69	68	7	4.3 (14 ft)	920 (3,040 ft)	20
R-31	1018 Napa Ct.	70(M)	72	---	70	69	68				
R-32	1002 Sonoma Dr.	72(E)	72	---	70	69	67				
R-33	89 Pamela Ct.	72(E)	72	---	70	68	67				
R-34	6 Belle Dr.	71(M)	72	---	70	69	68				
R-35	127 Pamela Ct.	71(E)	72	---	70	69	68				
R-36	13 Arlington Dr.	72(E)	73	---	68	66	65	8	3.7 (12 ft)	820 (2,700 ft)	34
R-37	53 Arlington Dr.	72(E)	72	---	67	66	65				
R-38	125 Arlington Dr.	70(M)	72	---	68	67	65				
R-39	153 Arlington Dr.	65(M)	69	---	65	64	62				

M = measured noise level in the field.
E = estimated noise level based on traffic volumes.

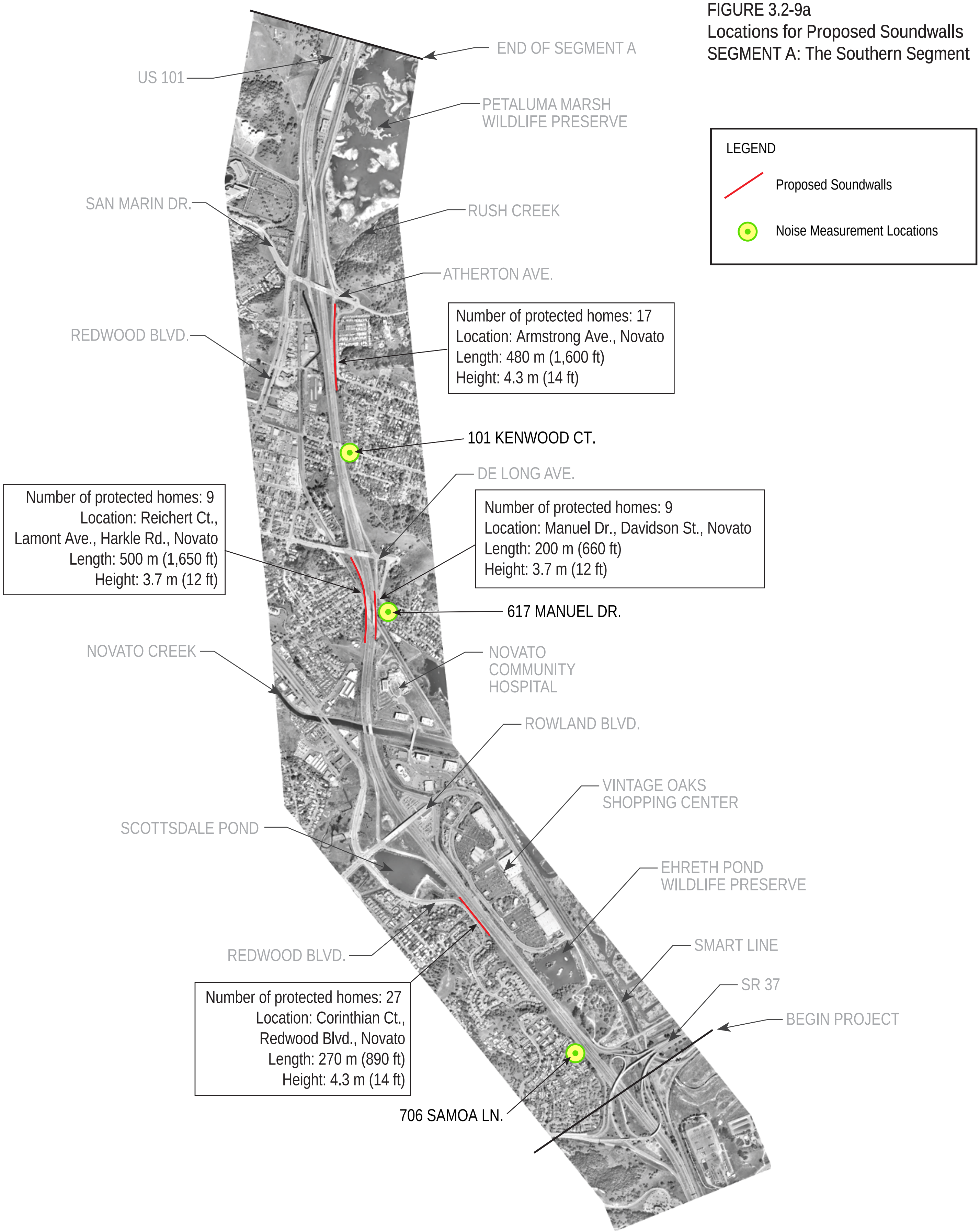
considered noise-sensitive and thus classified as Activity Category C with an exterior noise abatement criteria of 72 dBA Leq(h). A motel and rural residences in this segment might be considered the only sensitive receptors. However, these receptors are not concentrated but dispersed over the length of Segment B. Predictions of worst case traffic noise levels would be about 73 dBA Leq(h) at 30.48 m (100 ft) from the roadside, approximately 4 dB greater than estimated noise levels under the No Build Alternative in year 2030. Because of the rural nature of this area, the isolated and dispersed location of rural residences, and the change in noise environment of less that 12dB (between existing and future conditions), noise abatement would not be effective for this segment.

The highest recorded traffic noise was measured at 75 dBA Leq(h) along Vintage Chateau in Petaluma in Segment C. Under the Fixed HOV Lane Alternative, future worst case traffic noise would increase to 76 dBA Leq(h). Here, a soundwall would reduce future worst case traffic noise to 70 dBA Leq(h). This residential area occurs along one of eight soundwalls that were studied along the MSN Project boundaries, illustrated in Figures 3.2-9a and b.

Reversible HOV Lane Alternative. Within Segments A and C, the Reversible HOV Lane Alternative and the Fixed HOV Lane Alternative would be identical in terms of footprint, US 101 improvements, and proposed soundwalls. Accordingly, the impacts identified above for the Fixed HOV Lane Alternative would be identical for the Reversible HOV Lane Alternative.

With respect to Segment B, the footprint and improvements to US 101 (principally the upgrading of this segment from an expressway to a freeway), the Reversible HOV Lane Alternative would be identical to the Fixed HOV Lane Alternative. The only difference between the two Build Alternatives would be the HOV lane in the median of US 101. Under the Reversible HOV Lane Alternative, there would only be one HOV lane and it would only operate in one direction, depending on the time of day. Since the Fixed HOV Lane Alternative has one more traffic lane in Segment B than the Reversible HOV Lane Alternative, it is reasonable to expect that the Reversible HOV Lane Alternative would have a slightly smaller capacity during the peak hours and that traffic may be slightly more congested in the mixed flow lanes. These two factors, volume and speed, are directly related to the noise levels generated by vehicular traffic. The slightly reduced volume and speed under the Reversible HOV Lane Alternative (Caltrans, Traffic Operational Analysis Report, 2005) would result in lower noise levels than

FIGURE 3.2-9a
Locations for Proposed Soundwalls
SEGMENT A: The Southern Segment

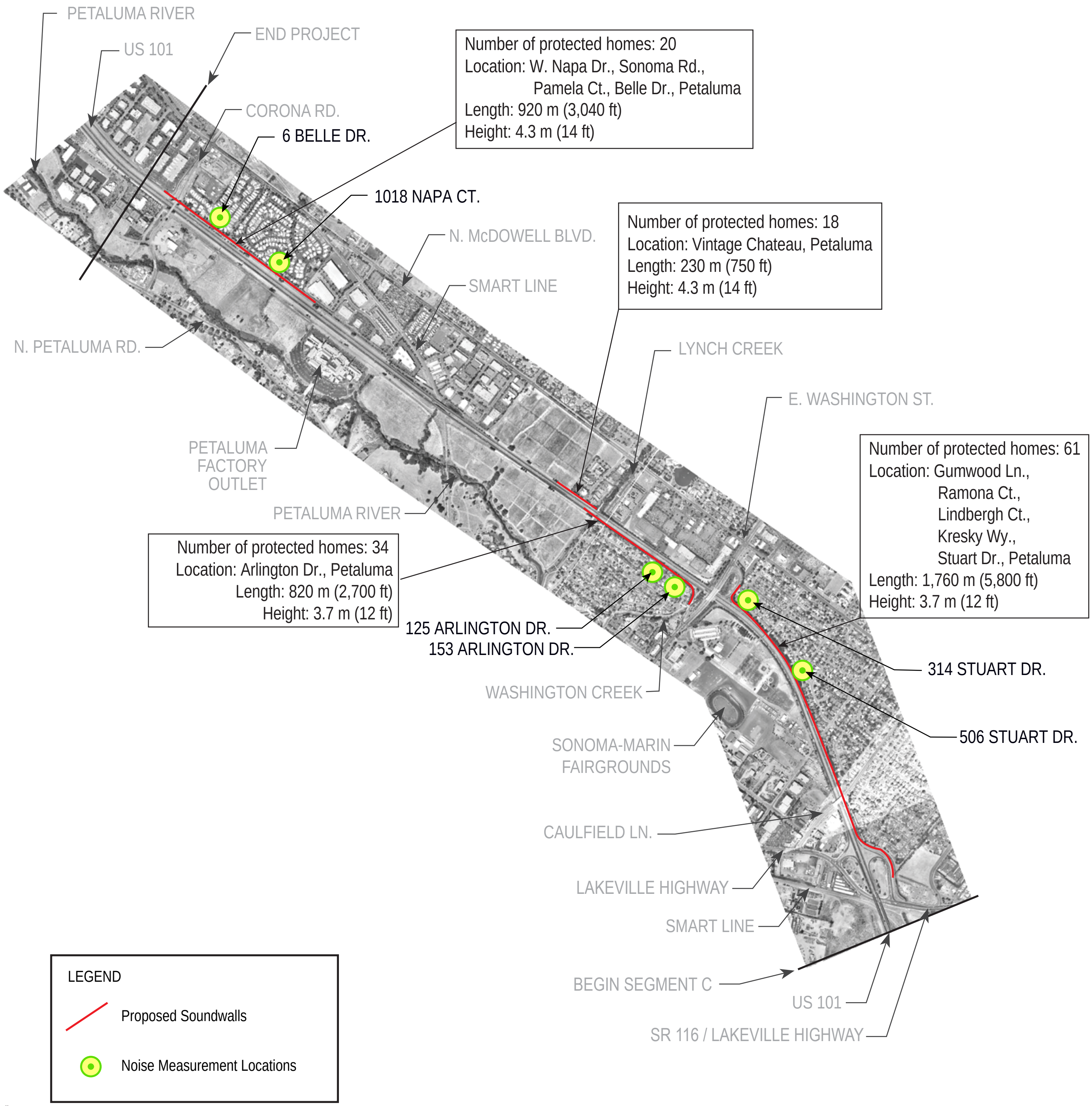


Note: Not to scale.

TB042006002BAO fig3_2_3A_soundwalls.pdf

MARIN SONOMA NARROWS

FIGURE 3.2-9b
Locations for Proposed Soundwalls under the Preferred Alternative
SEGMENT C: The Northern Segment



TB042006002BAO fig3_2_3B_soundwalls.pdf

MARIN SONOMA NARROWS

Note: Not to scale.

reported for the Fixed HOV Lane Alternative. Since there were no impacts identified for the Fixed HOV Lane Alternative, no impacts would be expected for the Reversible HOV Lane Alternative.

To confirm this assumption, noise levels were predicted for a receiver hypothetically located 100 feet from the roadway, using the A.M. peak volumes in 2030 and speeds reported in the Caltrans Traffic Operational Analysis Report. For this assessment during the A.M. peak period, both HOV lanes would be operational for the Fixed HOV Lane Alternative; under the Reversible HOV Lane Alternative, the single HOV lane would be available for southbound traffic only. Table 3.2-17 compares the resultant noise levels for the No Build and Build Alternatives.

Table 3.2-17 Comparison of Predicted Noise Levels in Segment B under No Build and Build Alternatives, Year 2030

Alternative	Predicted Noise Level (Leq(h))	
	West Side of US 101	East Side of US 101
Fixed HOV Lane	73.2	73.3
Reversible HOV Lane	71.1	70.9
No Build	69.2	69.2

Source: PBS&J, 2007.

Table 3.2-17 shows that both Build Alternatives would result in higher noise levels than under the No Build conditions. The Reversible HOV Lane Alternative would result in less noise exposure than the Fixed HOV Lane Alternative, as expected, and neither of the Build Alternatives would result in adverse effects in Segment B.

Access Options. The four Access Options propose various combinations of interchanges and access roads due to the upgrading of the expressway to an access-controlled freeway in Segment B. As proposed, new access roads would be non-continuous to serve existing low-density land uses adjacent to US 101. Therefore, the number of vehicles on the interchanges and access roads would be very limited. Based on Caltrans assumptions, traffic volumes for access roads under the Access Options would be 879 vehicles. For the purposes of analysis, Caltrans used a portion of the traffic volume of South Petaluma Boulevard Interchange in Petaluma to stand-in as traffic volumes for the Access Options. The land uses and traffic volume associated with South Petaluma Boulevard are higher than would be expected along the access roads in Segment B, but allow for a very conservative analysis of noise levels under the Access Options. For the purposes of analysis, there are no differences between the Access Options due to the relative distance of the access roads to dispersed receptors through Segment B. The analysis indicates that traffic noise on the access roads would result in a maximum of 69 dBA at Receptor R-B7, which would be less than the Noise Abatement Criteria, and would therefore not substantially contribute to the predicted noise levels under the mainline alternatives, the Fixed HOV Lane or Reversible HOV Lane Alternative (Table 3.2-16). As described above, neither of the Build Alternatives would adversely affect receivers in Segment B, where the Access Options are proposed. Consequently, neither of the Access Options is expected to result in noise exposure exceeding the Noise Abatement Criteria.

No Build Alternative. Under the No Build Alternative, future noise levels for residents along US 101 would not increase significantly since this alternative only proposes routine maintenance and upkeep which would not bring traffic closer to sensitive noise receptors.

Construction Impacts

There are no commonly accepted thresholds for acceptable levels of noise from construction activities. However, noise guidelines recommended by the USDOT (Federal Transit Administration. May 2006. Transit Noise and Vibration Impact Assessment) for construction noise are shown below for reference. These guidelines state that there may be an adverse community reaction if the one-hour Leq value (measured in dBA) from construction noise would exceed the values shown in Table 3.2-18.

Table 3.2-18 U.S. Department of Transportation Construction Noise Guidelines

Land Use	One-Hour Leq (dBA)	
	Day	Night
Residential	90	80
Commercial	100	100
Industrial	100	100
Source: Federal Transit Administration, 2006.		

Table 3.2-19 summarizes noise levels produced by construction equipment that are commonly used for roadway-construction projects. As shown in the table, most construction equipment is expected to generate noise levels ranging from

70 to 90 dB at a distance of 15.2 m (50 ft). Pile driving is expected to generate noise levels up to 101 dB at a distance of 15.2 m (50 ft). Construction equipment is considered a stationary source; therefore, noise produced by construction equipment would be reduced at a rate of about 6 dB per doubling of distance.

Table 3.2-19 Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 15 m (50 ft) from Source
Air compressor	81
Backhoe	80
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, derrick	88
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Impact wrench	85
Jack hammer	88
Loader	85
Paver	89
Pile driver (impact)	101
Pile driver (sonic)	96
Pneumatic tool	85
Pump	76
Rock drill	98
Roller/sheep's foot	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Truck	88
Source: FTA, 1995.	

Fixed HOV Lane Alternative. Under the Fixed HOV Lane Alternative, noise from construction activities (primarily operation of heavy equipment) may intermittently dominate the noise environment in the immediate area of construction. In general, adverse noise impacts from construction are not anticipated because construction would be short-term, intermittent, and dominated by local traffic noise. This circumstance would be especially true for the construction of the HOV lanes within the US 101 median in Novato and Petaluma. In other cases, where interchange improvements, road realignments, bridge widening/replacement, retaining walls, and soundwalls are proposed, traffic noise would still be dominant, but these types of improvements would occur closer to the sensitive receptors along the US 101 right-of-way.

A reasonable worst-case assumption for the Fixed HOV Lane Alternative is that the three loudest pieces of equipment anticipated for use on the project (paver, loader, and truck) would operate simultaneously and continuously for at least a one-hour period. At 15.2 m (50 ft) from the source, the combined sound level would be 92 dBA. Table 3.2-20 summarizes predicted noise levels at various distances from an active construction site, assuming this combined source level, distance attenuation (6 dB per doubling of distance), and attenuation from ground absorption (1 to 2 dB per doubling of distance).[6]

The results in Table 3.2-20 indicate that noise-sensitive land uses located within about 15.2 m (50 ft) of an active construction site may be exposed to construction noise that exceeds the daytime construction threshold of 90 dBA for residential uses**.** Noise-sensitive land uses located within about 41.1 m (135 ft) of an active construction site may be exposed to construction noise in excess of the nighttime construction threshold of 80 dBA. The table also indicates that commercial or industrial receptors within about 15.2 m (50 ft) may be exposed to construction noise from pile driving that exceeds the daytime construction standard of 100 dBA. Noise sensitive uses within about 45.8 m (150 ft) may be exposed to construction noise from pile driving that exceeds the daytime construction threshold of 90 dBA.

Table 3.2-20 Estimated Construction Noise from Construction Activities

Distance Between Source and Receiver	Calculated Sound Level (dBA)	
	Construction Equipment	Pile Driving
15.2 m (50 ft)	92	101
30.5 m (100 ft)	84	93
61.0 m (200 ft)	76	85
91.4 m (300 ft)	71	80
122.0 m (400 ft)	68	77
152.4 m (500 ft)	65	75

[6] Hoover, R.M., R.H. Keith. 1996. Noise control for buildings, manufacturing plants, equipment and products. Hoover & Keith, Inc. Houston, TX.

Table 3.2-20 Estimated Construction Noise from Construction Activities

Distance Between Source and Receiver	Calculated Sound Level (dBA)	
	Construction Equipment	Pile Driving
182.9 m (600 ft)	63	72
213.4 m (700 ft)	62	71
243.8 m (800 ft)	60	70
274.3 m (900 ft)	59	68
304.8 m (1,000 ft)	58	67

Source*:* PBS&J, 2007.

Note:

Calculations based on FTA 1995 guidance. This calculation includes geometric attenuation and ground effects; it does not include the effects, if any, of local shielding, which may reduce sound levels further.

However, there may be instances where construction activity in proximity to noise-sensitive land uses could result in noise levels that exceed the thresholds defined above. This would be considered an adverse effect.

Reversible HOV Lane Alternative. The temporary construction noise impacts under the Reversible HOV Lane Alternative would be identical to those under the Fixed HOV Lane Alternative in Segments A and C, because the footprint, improvements, and scope of work for the two Build Alternatives would be identical. In these segments, construction noise would have an adverse effect on noise-sensitive land uses.

In Segment B, both Build Alternatives involve significant construction activities as the mainline facility would be upgraded from an expressway to a freeway. In addition, new interchanges and bridges would be constructed in this stretch of the MSN Project corridor. In the median of the new, realigned US 101, the Reversible HOV Lane Alternative would have a single reversible HOV lane, shoulders and barriers; the Fixed HOV Lane Alternative would have two HOV lanes, shoulders, and barriers. Thus, the scope of work and improvements would be different between the two Build Alternatives, but the type of construction equipment and construction hours on any given day would be identical. As a result, the construction noise impacts for the Reversible HOV Lane Alternative would be similar to, but not identical to, those described above for the Fixed HOV Lane Alternative. In summary, the construction-period noise impacts for the Reversible HOV Lane Alternative would be adverse.

Access Options. Construction under the four Access Options involve combinations of interchanges, access roads, and bicycle/pedestrian facilities. The construction equipment described above for the Build Alternatives would also be needed to construct the improvements proposed under each of the Access Options. As illustrated in Figure 2-4 in Chapter 2, Project Alternatives, the Access Options include a number of common features through the length of Segment B. The differences focus on the number and location of interchanges and whether the access roads are constructed for stretches along the west or east side of US 101. Construction impacts would be most adverse where the interchanges and/or overcrossings are proposed, given the nature of the improvements and duration to complete the facilities. As a result, in the vicinity of San Antonio Road and US 101, Access Options 4b, 14b, and 14d, which include a new San Antonio Road Interchange, would result in greater construction noise impacts than Access Option 12b. In the vicinity of the Redwood Landfill Overcrossing, Access Options 4b and 12b, which would convert the overcrossing to a full interchange, would result in greater construction noise impacts than Access Options 14b and 14d, which adapt the overcrossing for public access but would not upgrade the facility to an interchange.

No Build Alternative. The No Build Alternative involves no major construction activities and only routine maintenance and upkeep of the existing US 101 facilities. As a result, there may be noise impacts during maintenance and rehabilitation activities, but the effects would be relatively short in duration and affect far fewer receivers.

3.2.7.4 Avoidance, Minimization, and/or Abatement Measures

Regulatory standards distinguish between noise abatement and noise mitigation. Mitigation is warranted where a project may cause future worst case noise levels that either show a substantial increase (12 dBA or higher) from the existing levels, or approach or exceed the NAC established by FHWA for different land uses.

Soundwalls to Abate Existing Noise Exposure. None of the receptors within the project boundaries would have a 12 dBA or more increase in future predicted noise level as a result of either Build Alternative. Consequently, mitigation is not recommended. However, abatement for existing noise levels has been identified at eight locations. Figure 3.2-9 depicts the approximate soundwall locations. Caltrans will consider a number of factors in making its determination, including whether the soundwalls would substantially reduce noise exposure (at least

5 decibels), whether they are cost effective, whether they pose visual impacts or adversely affect environment resources, and if they are acceptable/desirable in the local jurisdictions. A description of the soundwalls follows.

Soundwall Number 1. In Novato, a soundwall location was studied on the eastern side of US 101 on a bridge crossing over the SMART railway line, just south of the De Long Overcrossing parallel to Davidson Street. If constructed, the barrier would be 3.7 m (12 ft) high and approximately 200 m (660 ft) long at the outside edge of shoulder of the freeway. The future predicted noise levels in this residential area could be reduced from 67 dBA Leq(h) to 62 dBA Leq(h). An existing 1.2 m (4 ft) high earth berm would be replaced by this soundwall under the MSN Project. Approximately nine residences would be shielded from future traffic noise. The reasonable allowance, if approved, for this soundwall is estimated to be $450,000.

Soundwall Number 2. A soundwall location was studied from Cherry Street northward toward Atherton Avenue Overcrossing, parallel to Armstrong Avenue on the eastern side of US 101 in Novato. If located at the outside edge of shoulder of the freeway the soundwall would be 4.3 m (14 ft) high and approximately 480 m (1,600 ft) long. The future predicted noise levels with the soundwall could be reduced from 72 dBA Leq(h) to 63 dBA Leq(h) in the adjacent residential area. Approximately 17 homes would be shielded from future traffic noise. The reasonable allowance for this soundwall, if approved, is estimated to be $850,000.

Soundwall Number 3. Approximately nine homes could benefit from a soundwall whose location was studied on the western side of US 101 north of Novato Creek and south of De Long Overcrossing. The new soundwall would be 500 m (1,650 ft) long and 3.7 m (12 ft) high at the outside edge of shoulder of the freeway. The future predicted noise levels in this residential area could be reduced from 68 dBA Leq(h) to 62 dBA Leq(h). The existing 1.2 m (4 ft) high earth berm would be removed due to roadway realignment. The reasonable allowance for this soundwall, if approved, is estimated to be $432,000.

Soundwall Number 4. A soundwall of approximately 270 m (890 ft) and 4.3 m (14 ft) high was studied in a location south of Rowland Boulevard and parallel to Redwood Boulevard on the eastern side of US 101 in Novato, shielding approximately 27 homes from future traffic noise. If constructed along the right-of-way, future predicted noise levels in this residential area could be reduced from

73 dBA Leq(h) to 66 dBA Leq(h). The reasonable allowance for this soundwall, if approved, is estimated to be $1,404,000.

Soundwall Number 5. In Petaluma, there are two options for achieving a minimum 5 dBA predicted noise level reduction in the residential areas adjacent to the eastern side of US 101. Option 1 studied a soundwall located at the outside edge of shoulder beginning just north of the SR 116 Overhead. This soundwall could be 3.7 m (12 ft) high and approximately 1,760 m (5,800 ft) long, ending at the East Washington Street Interchange. Under Option 2 the soundwall could be broken up into three parts. From the same starting point, a 4.9 m (16 ft) high and 245 m (800 ft) long soundwall could be constructed at the right-of-way line. A second soundwall could be 3.7 m (12 ft) high and 300 m (1,000 ft) in length located at the outside edge of shoulder, ending just before Caulfield Lane. A third segment 3.7 m (12 ft) high could begin at the outside edge of the freeway shoulder just north of Caulfield Lane and extend for 1,215 m (4,000 ft), ending at the East Washington Interchange. Either option could reduce future predicted noise levels in the adjacent residential areas from 74 dBA Leq(h) to 67 dBA Leq(h) and shield 61 homes from future traffic noise. If approved, the reasonable allowance for this soundwall is estimated to be $3,294,000.

Soundwall Number 6. Also studied was a soundwall location on the eastern side of US 101 that could shield eighteen homes, including an apartment area, from future predicted noise levels. This soundwall could be 4.3 m (14 ft) high beginning just north of Lynch Creek for a distance of approximately 230 m (750 ft). If positioned at the outside edge of shoulder, future predicted noise levels could be reduced from 76 dBA Leq(h) to 70 dBA Leq(h). The reasonable allowance for this soundwall, if approved, is estimated to be $972,000.

Soundwall Number 7. The next soundwall would be on the eastern side of US 101, beginning north of the Petaluma Factory Outlet Mall and extending to just north of Corona Road. At 4.3 m (14 ft) high and approximately 920 m (3,040 ft) long, it could be constructed at the outside edge of shoulder. Another option at this location is the same length of wall with a height of 4.9 m (16 ft) placed at the right-of-way line. Under either option, the future predicted noise levels in the adjacent mobile home area could be reduced from 73 dBA Leq(h) to 68 dBA Leq(h). Approximately 20 homes could benefit from this soundwall. If approved, the reasonable allowance for this soundwall is estimated to be $1,000,000.

Soundwall Number 8. From just north of Washington Creek and extending 820 m (2,700 ft) to just north of Lynch Creek, a 3.7 m (12 ft) high soundwall was studied to be located at the outside edge of shoulder on the western side of US 101. The soundwall could reduce future predicted noise levels from 73 dBA Leq(h) to 66 dBA Leq(h), shielding approximately 34 homes. The reasonable allowance for this soundwall, if approved, is estimated to be $1,768,000.

Although the soundwalls under consideration in Novato and Petaluma have allowances that have been deemed “reasonable,” two single family residences at 5381 Redwood Highway and 4747 Redwood Highway have predicted noise levels of 69 dBA and 72 dBA, respectively. Based upon a preliminary assessment, noise abatement for these two residences would not be considered further, as it is not deemed feasible to construct a soundwall to abate future noise levels for these residences.

Reflected Noise. Under certain circumstances, soundwalls have the potential of increasing noise at some locations. When this happens the increase can be no more than 3dBA (the smallest change in traffic noise that a person is capable of detecting). The conditions under which this can occur are: (1) parallel walls that are too close together; or (2) the freeway is in a deep cut surrounded by residences on hillsides. Neither of those conditions exists within the project limits. Therefore, there should be no increase in noise levels due to reflected noise from any of the proposed soundwalls.

Determination of Final Reasonableness. The aforementioned soundwalls Numbers 1 through 8 were presented in the Draft Environmental Document and the Public meetings. Preliminary reasonableness was determined based on 2007 construction costs and were compared to 2007 reasonable allowances. This comparison is provided in Table 3.2-21.

Table 3.2-21 Soundwall Construction Costs and Allowances

Soundwall Numbers	Number of Benefited Receptors	2007 Reasonable Allowances*	2007 Construction Costs	Cost-Effective?
1	9	$450,000	$416,250	yes
2	17	$850,000	$774,000	yes
3	9	$432,000	$851,000	no
4	27	$1,404,000	$763,250	yes
5	61	$3,294,000	$3,163,500	yes

Table 3.2-21 Soundwall Construction Costs and Allowances

Soundwall Numbers	Number of Benefited Receptors	2007 Reasonable Allowances*	2007 Construction Costs	Cost-Effective?
6	18	$972,000	$494,500	yes
7	20	$1,000,000	$1,870,500	no
8	34	$1,768,000	$1,406,000	yes
* Source: Traffic Noise Analysis Protocol, August 2006, and Traffic Noise Impact Report, August 2007.				

After consideration of cost effectiveness, public input, and other factors noted in the Caltrans Traffic Noise Analysis Protocol (August 2006), the following determination of *final* reasonableness was made:

Caltrans and FHWA have determined that soundwalls No. 1, 2, 4, 5 (option 1), 6 and 8 are feasible and reasonable and will be constructed as part of the MSN Project.

FHWA has determined that soundwall No. 3 is feasible and not reasonable because it is not cost effective (Table 3.2-21). As such, the construction cost of this soundwall would not be a funded by FHWA.

As indicated in Section 3.2.7.4, Caltrans has considered a number of factors in making its determination toward the proposed soundwalls, including whether they are cost effective and acceptable/ desirable in the local jurisdictions. In addition, meeting attendees were informed that public input would be considered in Caltrans' decision toward approval of the soundwalls.

Caltrans received several comments of support for soundwall No. 3 from the local residents whose homes would benefit from the noise abatement this soundwall would provide. Outside of general support for all the walls from county officials, Caltrans received no support for soundwalls No. 7 from local residents during the public comment period.

For this reason Caltrans has determined that, although both soundwalls No. 3 and 7 are not considered cost effective under the Traffic Noise Analysis Protocol (August 2006), soundwall No. 3 is reasonable and may be constructed with state funds. However, due to lack of public support in addition to lack of cost effectiveness soundwall no. 7 will not be constructed as part of the MSN Project.

This determination of final reasonableness is based on preliminary project alignments and profiles, which may be subject to change. As such, the physical characteristics of noise abatement described herein also may be subject to change. If pertinent parameters change substantially during the final project design, the proposed abatements may be changed or be eliminated from the final project design.

The following measures apply to both the Build and No Build Alternatives.

Construction Noise Mitigation Measures. The construction contractor will employ noise-reducing construction practices such that noise from construction does not exceed 90 dBA at noise-sensitive uses during daytime hours. Measures that can be used to limit noise may include the following:

- Locating equipment as far as practical from noise-sensitive uses;
- Using sound-control devices such as mufflers on equipment;
- Turning off idling equipment;
- Using equipment that is quieter than standard equipment;
- Selecting construction-access routes that affect the fewest number of people;
- Using noise-reducing enclosures around noise-generating equipment;
- Constructing barriers between noise sources and noise-sensitive land uses or taking advantage of existing barrier features (terrain, structures) to block sound transmission; and
- Temporarily relocating residents during periods of high construction noise that cannot be reduced effectively by other means.

The construction contractor will prepare a detailed noise control plan based on the construction methods proposed. This plan will identify specific measures determined to be feasible by Caltrans that will be taken to ensure compliance with the noise limits specified above. The noise control plan will be reviewed and approved by Caltrans before any noise-generating construction activity begins.

The construction contractor will designate a noise disturbance coordinator who will be responsible for responding to complaints regarding construction noise. The coordinator will determine the cause of the complaint and ensure that reasonable measures are implemented to correct the problem. A contact telephone number for the noise disturbance coordinator will be posted conspicuously on construction site fences.

3.2.8 Energy

The energy impacts of transportation projects are typically divided into two components: (1) the direct energy required for ongoing operations, in this case, the use of petroleum-based fuels and alternative fuels for motor vehicle travel within the project area, and (2) the indirect energy required to produce the materials for and to carry out construction of the project. In the long term, the direct, or operating, energy requirements are usually greater and of primary importance. This discussion, therefore, focuses on the direct energy requirements for ongoing US 101 operations with and without the proposed project. Because the proposed project has no potential for substantial energy impacts, in accordance with Caltrans' Standard Environmental Reference Guidelines, only a qualitative energy analysis was conducted.

3.2.8.1 Regulatory Setting

NEPA (42 USC Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

The CEQA Guidelines, Appendix F, Energy Conservation, state that EIRs are required to include a discussion of potential energy impacts of the proposed project, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.

3.2.8.2 Impacts

Freeway Traffic

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would increase capacity, improve roadway operations and, by the addition of fixed HOV lanes, encourage the use of transit and carpooling along the study area. Average travel time, vehicle delay and duration of congestion on US 101 would decrease considerably with the Fixed HOV Lane Alternative compared to No Build conditions. The Fixed HOV Lane Alternative would reduce traffic delay on the US 101 mainline and at interchanges and surrounding intersections within the project area. While the Fixed HOV Lane Alternative would not eliminate all capacity problems in 2030, it would allow the highway to carry more of the total peak-hour travel demand when compared to the No Build Alternative. Under the No Build Alternative, it would require 2.58 to 5.41 more minutes to clear one car on those congested bottlenecks than under the Fixed HOV Lane Alternative.

In the northbound direction, the average travel speeds would improve from as low as 10 mph at the worst bottleneck under the No-Build Alternative, up to the posted speed limit (65 mph) for the Build Alternative. In the southbound direction, the average vehicle speeds would improve from as low as 9 mph at the worst bottleneck under the No-Build Alternative up to the posted speed limit for the Build Alternative. The Fixed HOV Lane Alternative would improve average travel speeds in both directions, thereby reducing average travel times along the MSN Project corridor.

The Fixed HOV Lane Alternative could reduce peak-hour delay at some bottlenecks by over 89 percent. It would reduce overall delay by 2.5 to 7.2 minutes, a 49 to 76 percent reduction, depending on the peak hour (A.M. and P.M.) and direction. This reduction in delays would result in more efficient energy consumption. Due to all the above-mentioned advantages, the long-term impacts of the Fixed HOV Lane Alternative on transportation, and vehicular traffic energy use would generally be beneficial.

Reversible HOV Lane Alternative. Although the Reversible HOV Lane Alternative is predicted to have the same vehicle miles traveled as the Fixed HOV Lane Alternative, the Reversible HOV Lane Alternative would result in greater travel time for motorists in the mixed flow lanes, compared to the Fixed HOV Lane Alternative. The Reversible HOV Lane Alternative would also result in two bottlenecks that would not occur under the Fixed HOV Lane Alternative. One bottleneck would occur in Segment C in the southbound direction during the P.M. peak period because the HOV lane in Segment B would not be operational (it would only be operating in the northbound direction during this peak period). The other bottleneck would occur in the northbound direction at Atherton Avenue during the A.M. peak period because the reversible lane would only be operational in the southbound direction, which is where the greater demand would be during the A.M. peak period. These bottlenecks and queues indicate that the Reversible HOV Lane Alternative would result in a greater amount of energy consumption than the Fixed HOV Lane Alternative.

Access Options. The Access Options would not increase or alter the vehicle miles traveled or the congestion and delays experienced along the US 101 mainline under the Build Alternatives. As a result, the Access Options would not result in energy consumption that would be distinguishable from that described for the Build Alternatives. Because the Access Options are intended primarily to replace existing at-grade connections to US 101, to replace access to local properties, and to provide bicycle/pedestrian paths, they would not induce substantial increases in annual average daily traffic or vehicle miles traveled. Thus, the Access Options would not result in adverse energy consumption impacts, and the differences among the Access Options would be indistinguishable.

No Build Alternative. By 2030, without capacity improvements to US 101, congested traffic conditions would prevail in the traffic study area; the freeway would be unable to serve the projected demand. Due to insufficient mainline capacity for the forecast volumes, bottlenecks and queues would develop at certain locations along the mainline. Low travel speeds and long delays would be experienced during peak hours. Under the No Build Alternative, without highway capacity improvements, only about 72 percent of forecast peak hour demand could be accommodated through the traffic study area in 2030. This indicates that substantial delay would occur in 2030. Such congested traffic conditions contribute to inefficient energy consumption as vehicles use extra fuel while idling in stop-and-go traffic or moving at slow speeds on a congested roadway.

Local Traffic

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would substantially reduce congestion at some of the bottleneck areas, and reduce delay through the traffic study area, providing incentive for commuter and through-traffic to remain on the freeway, freeing arterials and other local streets to serve local traffic. This reduction in congestion on local streets would contribute to more efficient fuel consumption.

Reversible HOV Lane Alternative. Like the Fixed HOV Lane Alternative, the Reversible HOV Lane Alternative would have a positive long-term impact on traffic and energy consumption. However, because the reversible HOV lane would only operate in one direction at any given time, those motorists that are traveling in the opposite direction of the reversible HOV lane would continue to travel in mixed flow and not experience congestion relief. Traffic diversion from local streets would be less under the Reversible HOV Lane Alternative, with a corresponding reduction in the benefits identified for the Fixed HOV Lane Alternative, above.

Access Options. As previously noted, the Access Options would primarily serve local traffic and alleviate the stop-and-go conditions that currently occur with at-grade connections to US 101. Thus, compared to No Build conditions, the Access Options would improve upon existing and projected delays in Segment B. The Access Options, however, would not substantially change local traffic in Segment B and thus would not increase or reduce energy consumption related to local traffic.

No Build Alternative. Traffic diversions near bottlenecks are common and can cause considerable delay. By 2030, as congestion on the freeway increases, traffic diversion to local streets, such as Old Redwood Highway, would also increase. This increase in “cut-through” traffic would deteriorate conditions on local streets, increasing delay and energy consumption.

Transit and HOV Lane Usage

Fixed HOV Lane Alternative. The HOV lanes provided under the Fixed HOV Lane Alternative would offer dedicated peak hour capacity and a high level of traffic service to transit and carpool vehicles. This would substantially improve travel time for intercity buses and carpooling commuters as they would operate at speeds of 65 mph in the new HOV lanes. This compares to speeds as low as 9 mph in congested mixed flow lanes under the No Build Alternative. Not only would transit travel time be reduced but also transit schedule reliability would be improved. Carpools and vanpools also would have improved speeds and reduced travel times. The improved speeds and schedule reliability would work as incentives for commuters and other travelers to carpool and/or take advantage of local and express buses that would move freely along the HOV lanes. A shift by more commuters into HOVs would lead to further energy savings.

Reversible HOV Lane Alternative. Like the Fixed HOV Lane Alternative, the Reversible HOV Lane Alternative would have a positive long-term impact on traffic and energy consumption. However, because the reversible HOV lane would only operate in one direction at any given time, those motorists that are traveling in the opposite direction of the reversible HOV lane would continue to travel in mixed flow and not experience congestion relief. As a result, the energy benefits of the Reversible HOV Lane Alternative would not be as great as those of the Fixed HOV Lane Alternative.

Access Options. The Access Options would have no-to-minimal effect on the use of transit, carpools or HOV lanes, and thus, little effect on energy savings from use of these services and facilities.

No Build Alternative. Under the No Build Alternative, this alternative would not construct HOV lanes in the stretch from Novato to Petaluma. As a result, transit would continue to operate in mixed flow traffic in this stretch and be subject to delays. Consequently, there would be no benefits associated with greater use of this more energy-efficient mode of travel.

3.2.8.3 Avoidance, Minimization, and Mitigation Measures

Since the Build Alternatives would have generally beneficial energy effects, avoidance, minimization, and mitigation measures would be unnecessary.

3.2.9 Paleontology

3.2.9.1 Regulatory Setting

Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized or funded projects (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1935 [200 USC 78]). Under California law, paleontological resources are protected by the California Environmental Quality Act, the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309, and Public Resources Code Section 5097.5.

3.2.9.2 Affected Environment

According to the Preliminary Geotechnical Report prepared in August 2005 by the Caltrans Geotechnical Design Office, and the Paleontological Identification Report (PIR) prepared in June 2009 by Garcia and Associates (GANDA), the geologic units included in the project area are: Mesozoic basement rocks of the Franciscan Formation, the younger Mio-Pliocene marine sediments of the Wilson Grove Formation, and the older Quaternary sedimentary units of the Glen Ellen Formation.

The Franciscan Rock Formation has been shown to yield Late Jurassic fossils (Geomatrix, 2007). However, due to the rarity of these fossil finds, this rock unit is not considered to be an important paleontological resource.

The marine Wilson Grove Formation was identified through literature review and database search to have a high sensitivity for paleontological resources. The Wilson Grove Formation contains gastropod and mollusks shell hash (Black et al., 2002; Powell et al., 2004). Within the Wilson Grove Formation, 107 fossil localities have been mapped within Sonoma County and part of Marin County. The closest mapped fossil localities within the Wilson Grove Formation are approximately 2 miles southeast of the project area. All of the listed fossils from the Wilson Grove Locality are marine mollusks.

While a single marine invertebrate (shell or shell fragment) encountered in the Wilson Grove Formation would possess minimal scientific significance, entire assemblages of marine invertebrates from the Wilson Grove Formation have played an important role in understanding the geological and environmental history of this portion of California. This area has transitioned from coastal to interior in a geologically short span of time and well-controlled collections from the Wilson Grove Formation could help to uncover additional fossil assemblages that could assist in clarifying: the age of the upper potion of the Wilson Grove Formation, the effects of environmental change and the chronology of oceanic cooling at the Plio-Pleistocene boundary, and the taxonomy of the Wilson Grove mollusks.

Quaternary Alluvium and Quaternary artificial fill over marine and marsh deposits have a low paleontological sensitivity. Neither is known to contain fossils within the project area.

3.2.9.3 Impacts

Construction activities can impact paleontologically sensitive geologic units when vehicles or other work equipment impact previously undisturbed sediments by excavating, grading, or crushing bedrock exposed in or underlying a project. This can result in adverse impacts to fossils by destroying them or otherwise altering them in such a way that their scientific value is lost.

The MSN Project includes ground-disturbing activities. Excavations for new lanes will be to a depth or approximately 2.5 feet. There will also be drainage modifications and improvements in isolated areas to depths of about 6 feet. In addition, an existing structure over the railroad near Petaluma will be replaced, and the roadway north and south of the railroad will be reconstructed to provide sight distance. The new railroad crossing will have two abutments and two bents with foundations greater than 20 feet.

Ground-disturbing activities within the northernmost two miles of the Project Study Area (PSA) could potentially impact paleontological resources. The paleontologically sensitive Wilson Grove Formation is exposed at the surface in this area. In addition, Quaternary alluvial deposits appear to be thin and directly deposited over the Wilson Grove Formation.

3.2.9.4 Avoidance, Minimization, and/or Mitigation Measures

Avoidance and minimization measures will be utilized whenever possible. As excavation for construction gets underway, it is possible that new and unanticipated paleontological resources might be encountered. In the event that fossils are discovered, all construction work will be stopped within a 50 ft radius of the find until a qualified paleontologist can assess the significance of the find. If the discovery is significant or potentially significant, the paleontologist will employ data recovery and analysis, prepare a data recovery report, and accession of the recovered fossil material to an accredited paleontological repository, such as the University of California’s Museum of Paleontology.

3.3 Biological Environment

3.3.1 Introduction

The information presented under Biological Environment is based upon Caltrans Natural Environment Study, revised August 2008.

This section covers the diversity of plant and wildlife species and habitats found in the MSN Project area. Natural communities, including the areas' extensive bay-oak woodlands, are described in Section 3.3.2. Wetland habitats that receive state and federal protection are presented in Section 3.3.3. Plant communities and wildlife species known to occur in the project vicinity are discussed in Sections 3.3.4 and 3.3.5, respectively. Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act (FESA) are discussed in the Threatened and Endangered Species Section 3.3.6. Finally, a description of invasive plant species is provided in Section 3.3.7.

In preparation of this analysis, Caltrans obtained a list of species that may potentially occur in the project area from California Department of Fish and Game (CDFG), California Natural Diversity Database (CNDDB) and United States Fish and Wildlife Service (USFWS). The special status species with the potential to occur within the project include the federal and state endangered salt-marsh harvest mouse (SMHM) (*Reithrodontomys raviventris)*, the federal threatened Central California coast steelhead (CCCS) (*Oncorhynchus mykiss*), the federal threatened southern DPS North American green sturgeon (*Acipenser mediaostris*), the federal threatened and state species of special concern California red-legged frog (CRLF) (*Rana aurora draytonii*), and seven listed plant species. These plants are Sonoma alopecurus (*Alopecurus aequalis var. sonomensis*) (federal endangered), soft bird's beak (*Cordylanthus mollis ssp. mollis*) (federal endangered), Baker's larkspur (*Delphinium bakeri*) (federal endangered), Burke's goldfields (*Lasthenia burkei*) (federal endangered), Contra Costa goldfields (*Lasthenia conjugens*) (federal endangered), and showy Indian clover (*Trifolium amoenum*) (federal endangered).

In addition, potential habitat for fall-run Central Valley Chinook salmon (Chinook salmon) (*Oncorhynchus tshawytscha*) within and downstream of the project is designated as Essential Fish Habitat (EFH). EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (NMFS, 2007d). Animal species, like the Chinook salmon, that are present in the project area, but not under the jurisdiction of the FESA or the California Endangered Species Act (CESA), are discussed in Section 3.3.5.

A list of these and other species and habitats within the MSN Project area can be found in Appendix H.

Figure 3.3-1a-d presents some of the significant biological resources in the MSN Project area. The information is generalized and intended only to show the approximate extent and location of the some of the natural resources that occur in the project area. As noted above, more detailed information is available.

3.3.2 Natural Communities

This section discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

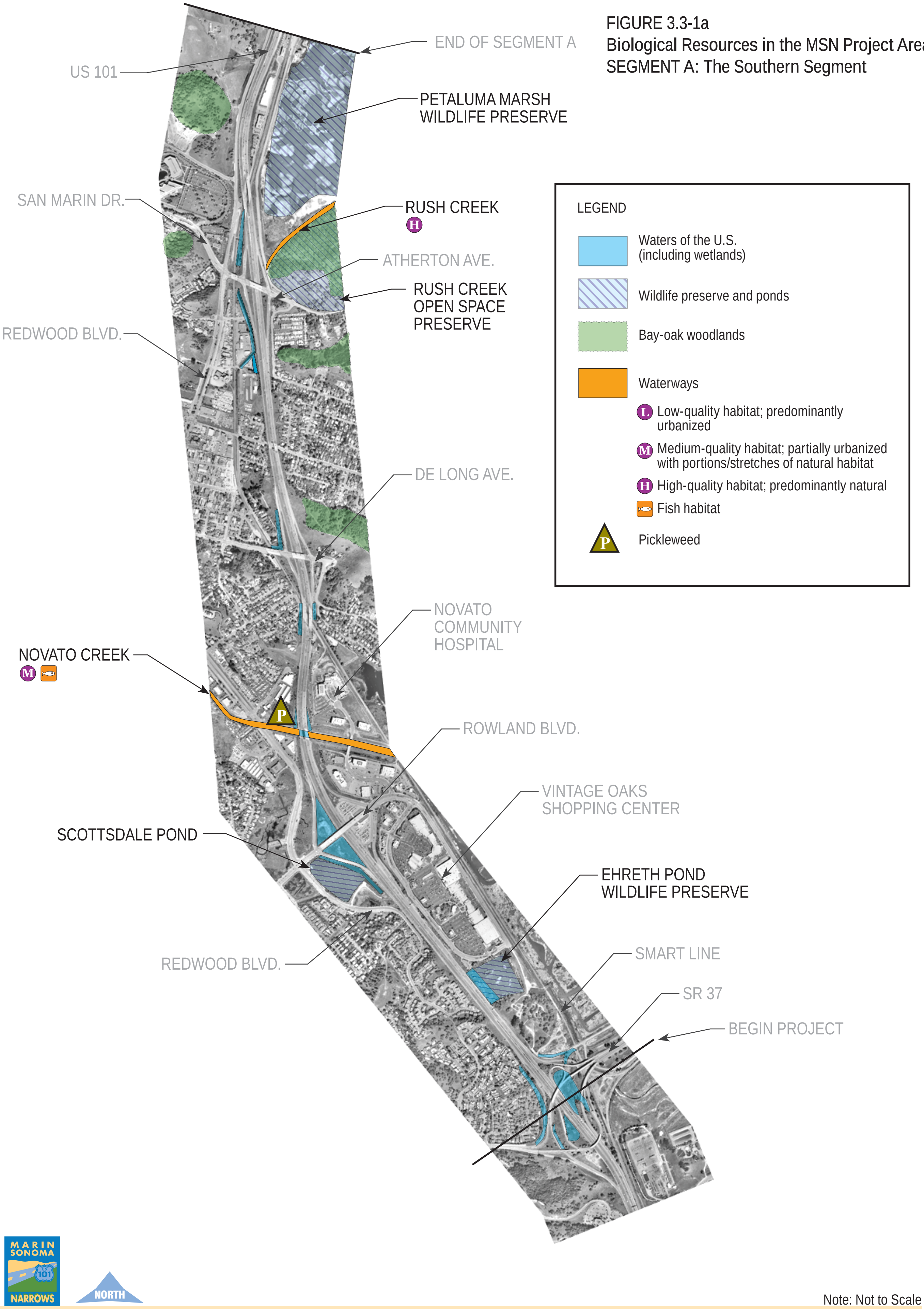
Natural communities that encompass wetlands and other waters are also discussed in Section 3.3.3. Communities that have been designated as critical habitat under the Federal Endangered Species Act are discussed in the Threatened and Endangered Species, Section 3.3.6.

3.3.2.1 Regulatory Setting

Fish and game code sections 1600-1616 declare that the protection and conservation of the fish and wildlife resources of this state are of utmost public interest. An entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake, unless certain criteria set forth by the Department of Fish and Game are met.

An innovative effort called the California Oak Woodlands Conservation Program, enacted by Chapter 588, Statutes of 2001, has been implemented. The Act recognizes the importance of California's oak woodlands, their contribution to the

FIGURE 3.3-1a
Biological Resources in the MSN Project Area
SEGMENT A: The Southern Segment



Note: Not to Scale

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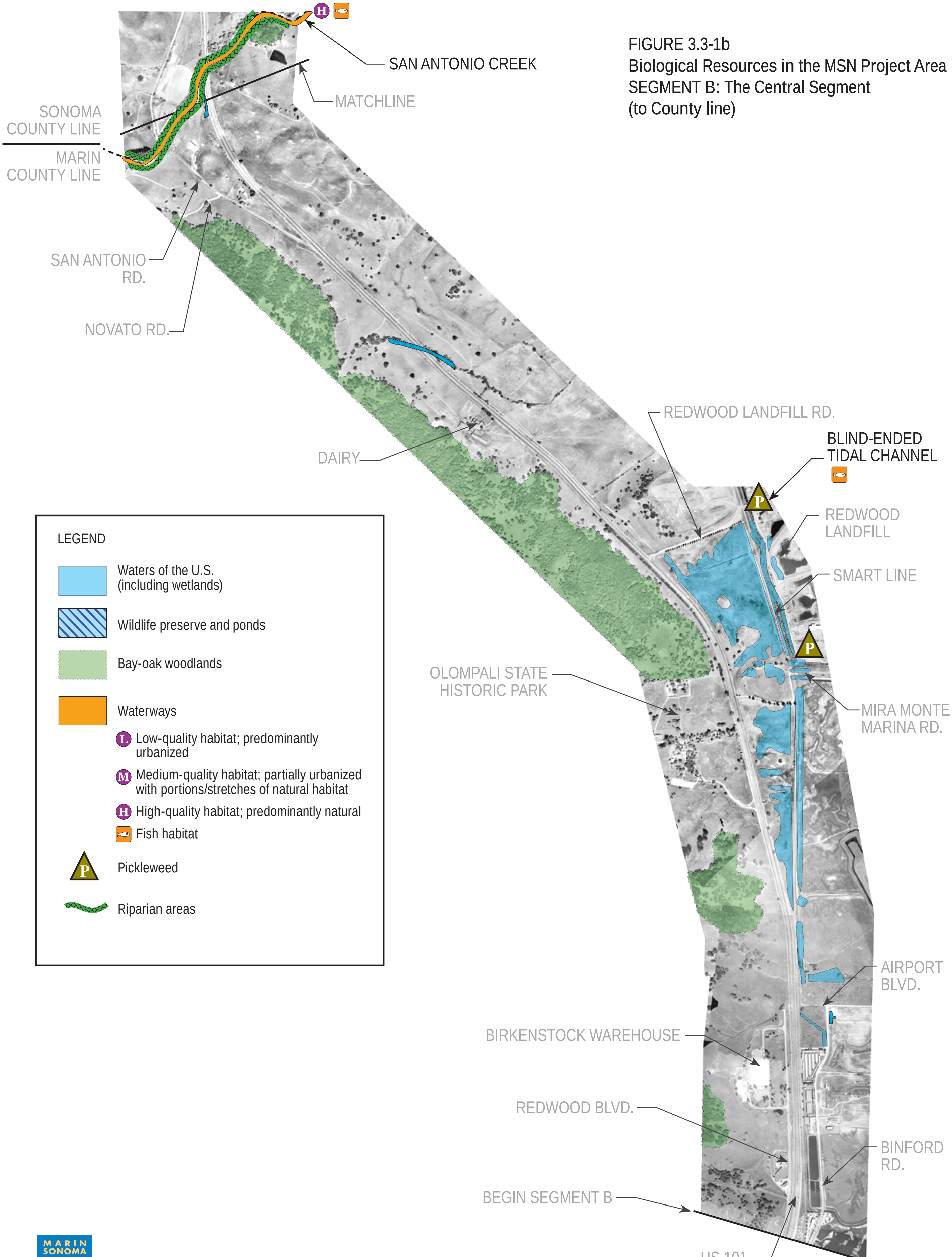
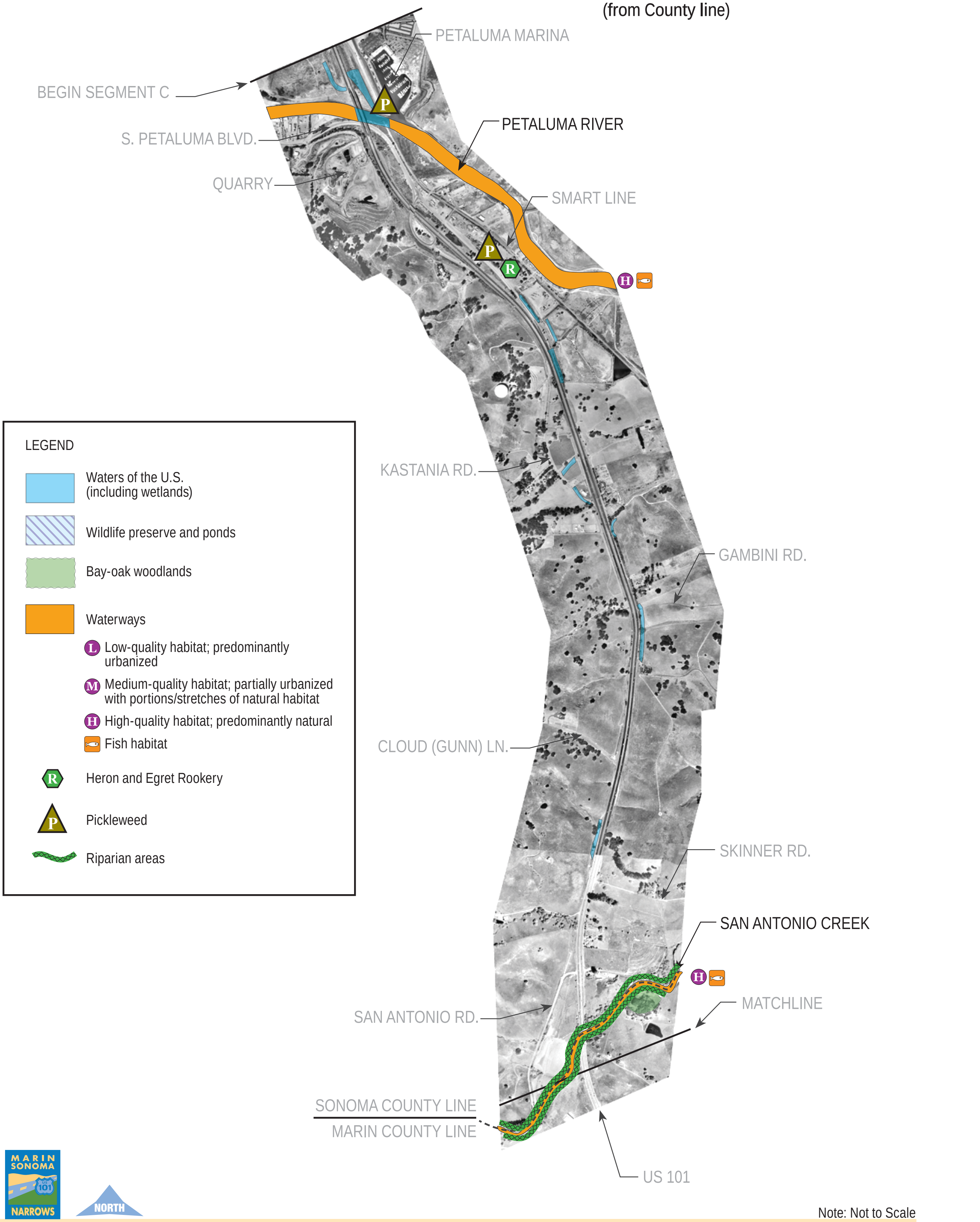
FIGURE 3.3-1b
Biological Resources in the MSN Project Area
SEGMENT B: The Central Segment
(to County line)



Note: Not to Scale

TB042006002BAO_MSN_basemaps.indd 10-09-07

FIGURE 3.3-1c
Biological Resources in the MSN Project Area
SEGMENT B: The Central Segment
(from County line)



Note: Not to Scale

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FIGURE 3.3-1d
Biological Resources in the MSN Project Area
SEGMENT C: The Nothern Segment

Note: Not to Scale

natural and scenic, the critical role of the private landowner and the importance of private land stewardship. The Act further acknowledges how oak woodlands increase the monetary and ecological value of real property and promote ecological balance. The Oak Woodlands Conservation Program offers landowners, conservation organizations, cities and counties, an opportunity to obtain funding for projects designed to conserve and restore California's oak woodlands. To accomplish the legislative intent, the Act identifies the Wildlife Conservation Board (WCB) as the responsible entity to implement the Oak Woodlands Conservation Program. The Act authorizes the WCB to purchase oak woodland conservation easements and provide grants for land improvements and restoration efforts.

Subsequently, Senate Bill 1334, enacted in January 2005, provides oak woodlands mitigation options for counties. The Oak Woodlands Conservation Environmental Quality Act seeks to create a vehicle for feasible and proportionate habitat mitigation choices for counties that have prepared a countywide oak woodland management plan pursuant to the Oak Woodlands Conservation Act. Specifically, following identification of a significant oak woodlands impact under CEQA, SB 1334 identifies the following mitigation approaches: (1) conserve through conservation easements, (2) plant an appropriate number of trees at a minimum of two new ones for each one removed, (3) contribute funds to the Oak Woodlands Conservation Fund, or (4) other measures.

3.3.2.2 Affected Environment

General Description

The City of Novato near the southern terminus of the project consists of steep upland slopes and poorly-drained soils associated with bays and tidelands. Novato Creek and Rush Creek are two major creeks located within this area of the project (see Figure 3.3-1a). Novato Creek has some tidal influence and flows east, emptying into San Pablo Bay; while Rush Creek is contained within the Rush Creek Open Space Preserve. Two other hydrologic resources include Ehreth Pond Wildlife Preserve and Scottsdale Pond, located in the vicinity of the Vintage Oaks Shopping Mall.

Northward past Atherton Avenue, and for approximately 15.5 km (9 mi), the project area transitions to a rural setting, with several scattered ranches. The west side of US 101 consists of rolling hills dominated by oak woodlands, while the east side is characterized by seasonal wetlands and brackish marsh that border the Petaluma River as it flows to San Pablo Bay (see Figure 3.3-1b). This area also consists of steep upland slopes and well-drained loams derived from shale and sandstone.

San Antonio Creek, surrounded by mature riparian habitat, flows east at the border of Marin and Sonoma Counties, draining into the tidally influenced Petaluma River (see Figure 3.3-1c). This segment also contains several ephemeral drainage channels and large seasonal wetlands. Habitat types in this setting also include bay-oak woodlands, grasslands, alkali meadows, tidal salt marshes, agricultural pastures (e.g., cattle fields, equestrian stables), and ruderal habitat associated with roadsides.

Further north, the project area transitions back to dense suburban development in the City of Petaluma. Several creeks flow west and empty into the Petaluma River (see Figure 3.3-1d). These creeks, which include Washington Creek, Lynch Creek, and Corona Creek, are highly urbanized flood control channels and are degraded due to dense development.

Tree Communities

Intact oak woodlands, once a common component of California's landscape, are diminishing and continually threatened by the encroachment of urbanization, agriculture, overgrazing, and the spread of invasive weeds. A growing concern for the future of California's oak woodlands is the spread of Sudden Oak Death Syndrome.

Bay-oak woodland and scattered oak savannah dominate much of the landscape in the Central Segment from north of Atherton to South Petaluma Boulevard. The western side of US 101 along the southern and central portion of this segment is fairly flat immediately adjacent to the roadway. Toward the west, the landscape then rises along the east-facing slope of Mount Burdell. The sloped face of Mount Burdell, which includes Olompali State Historical Park, is dominated by bay-oak woodland (see Figure 3.3-1b). The most common species in this area include California bay (*Umbellularia californica*), valley oak (*Quercus lobata*), coast live oak (*Quercus agrifolia*), and blue oak (*Quercus douglasii*). The northern section of this area consists of rolling hills and scattered oaks. The eastern side of US 101 is relatively flat, and is characterized by oak savannah with scattered large-diameter oaks that fan out toward the salt marshes of San Pablo Bay.

Outside of the oak woodlands and riparian corridors, a variety of types of both native and non-native trees are found through the project area. Some occur naturally, while a wide variety of ornamental trees have been planted, particularly in the northern and southern urbanized segments of the project area. In the non-urbanized Central Segment of the project area, California bay laurel, a native species, is commonly found among the oak woodlands, oak savannah, and riparian corridors.

Although native to the coastal region of northern California, there are many redwood trees (*Sequoia sempervirens*) in the Petaluma corridor that are considered non-native. These redwoods were planted along the shoulder of US 101 and would not naturally occur in that area, as they require a cool, moist environment characteristic of the coast. The redwoods in this area are in very poor condition due to the fact that they are subject to hot, dry summers and constantly exposed to high levels of vehicle exhaust. Several unknown species of eucalyptus (*Eucaplyptus* sp.) have been planted and are common along the shoulder of the roadway in this Sonoma County segment. These and various other types of ornamental tree species are scattered along the length of the project.

Riparian Communities

San Antonio Creek is a major riparian corridor that divides Marin and Sonoma Counties. Riparian vegetation along San Antonio Creek is dominated by California buckeye (*Aesculus californica*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), California black walnut (*Juglans nigra*), coast live oak, valley oak, and bay laurel. Many types of wildlife were observed during field visits, including coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), and a wide diversity of birds such as wild turkey (*Meleagris gallopano*). Evidence of two species of night-roosting bats, including pallid bat (*Antrozous pallidus*) and either big brown bat (*Eptesicus fucus*) or little brown bat (*Myotis lucifugus*) and cliff swallow nests (*Petrochelidon pyrrhonota*) were also observed during field visits.

The presence of riparian habitat varies in the waterways crossing the project area. The Petaluma River is tidally-influenced and dominated by pickleweed along its banks. Washington Creek, Lynch Creek, and Corona Creek are all urbanized, flood control channels/freshwater creeks that contain low-quality habitat and feed into the Petaluma River. These creeks are degraded due to their proximity to the densely urbanized portion of Petaluma. While Washington Creek does not flow year-round, Caltrans biologists observed large puddles during the summer months. The dominant vegetation present along Washington Creek consists of willow (*Salix* sp.), poplar (*Populus* sp.), redwood (*Sequoia sempervirens*), and a variety of ornamental shrubs. There was no evidence of bats or swallow nests observed during field visits.

Lynch Creek has both urban and perennial qualities. The northern embankment of the creek within the project boundaries is adjacent to a bicycle path. This unvegetated northern embankment is composed of cemented rip-rap. Along the eastern portion of the creek, there are a few trees separating the bicycle path from a parking lot. These trees consist of white alder (*Alnus rhombifolia*) and redwood. The southern embankment east of the bridge contains a dense stand of red willow, arroyo willow, California buckeye, and redwood. The western portion the creek is dominated by cattails (*Typha* sp.) with a few previously planted coast live oak saplings along the southern embankment. Caltrans biologists observed cliff swallow nests beneath the undercrossing and western toad (*Bufo boreas*) juveniles within the creek on the western side of US 101.

Corona Creek is ephemeral with little to no riparian vegetation. The creek contains a moderate amount of wetland vegetation, mainly cattails, within its banks.

Fish Communities

San Antonio Creek is a well-established creek containing high-quality seasonal rearing habitat for CCCS and Chinook salmon. The portion of the creek within the project boundaries dries up during the summer months. The bottom of the streambed is composed of large cobble, although the area beneath the San Antonio Creek Bridge on US 101 contains a deep layer of silt.

In addition to San Antonio Creek, juvenile steelhead and Chinook salmon may seasonally rear in the lower segments of Novato Creek and within the project limits of the Petaluma River and Lynch Creek. Seasonally, migratory adult steelhead and Chinook salmon are known to pass through the project area at Novato Creek and the Petaluma River to and from habitat further upstream. Both adult and juvenile steelhead and Chinook salmon may also seasonally occupy the project features known as the “Landfill Channel” and the “Lakeville Channel” downstream of the flapgate at Lakeville Highway.

Lynch and Washington Creeks may provide habitat suitable for spawning, incubation, and rearing for Sacramento splittail.

Green sturgeon may be present within the Petaluma River.

See further discussions of Central California coast steelhead, green sturgeon, and Chinook salmon in Sections 3.3.6 and 3.3.5.

3.3.2.3 Impacts

Fixed HOV Lane Alternative. This alternative has been identified as the Preferred Alternative. Table 3.3-1 summarizes the number of native and non-native trees that would be impacted by the Fixed HOV Lane Alternative by project segment. These numbers are preliminary and will be updated during the design phase. Efforts will be made to minimize impacts to trees throughout the design and construction phases. Project impacts to trees would differ by Access Option, as shown in Figures 3.3-2a-d and described below.

Table 3.3-1 Trees Potentially Impacted by the MSN Project Including the Fixed HOV Lane, Reversible HOV Lane, and No Build Alternatives

Category	Segment A (Southern Segment)	Segment B (Central Segment)				Segment C (Northern Segment)
		Access Option 4b	Access Option 12b	Access Option 14b	Access Option 14d	
Native Oaks	84	331	441	344	311	44
Other Native	15	381	576	347	346	4
Non Native Trees	33	250	250	248	247	259
Totals	132	962	1267	939	904	307
Combined Totals*	--	1401	1706	1378	1343	--
No Build	0	0	0	0	0	0

Shaded areas depict potential impacts under either Build Alternative.

* Combined totals depict the potential impacts under each Access Option combined with the southern and northern segments (e.g., 132+962+307=1401).

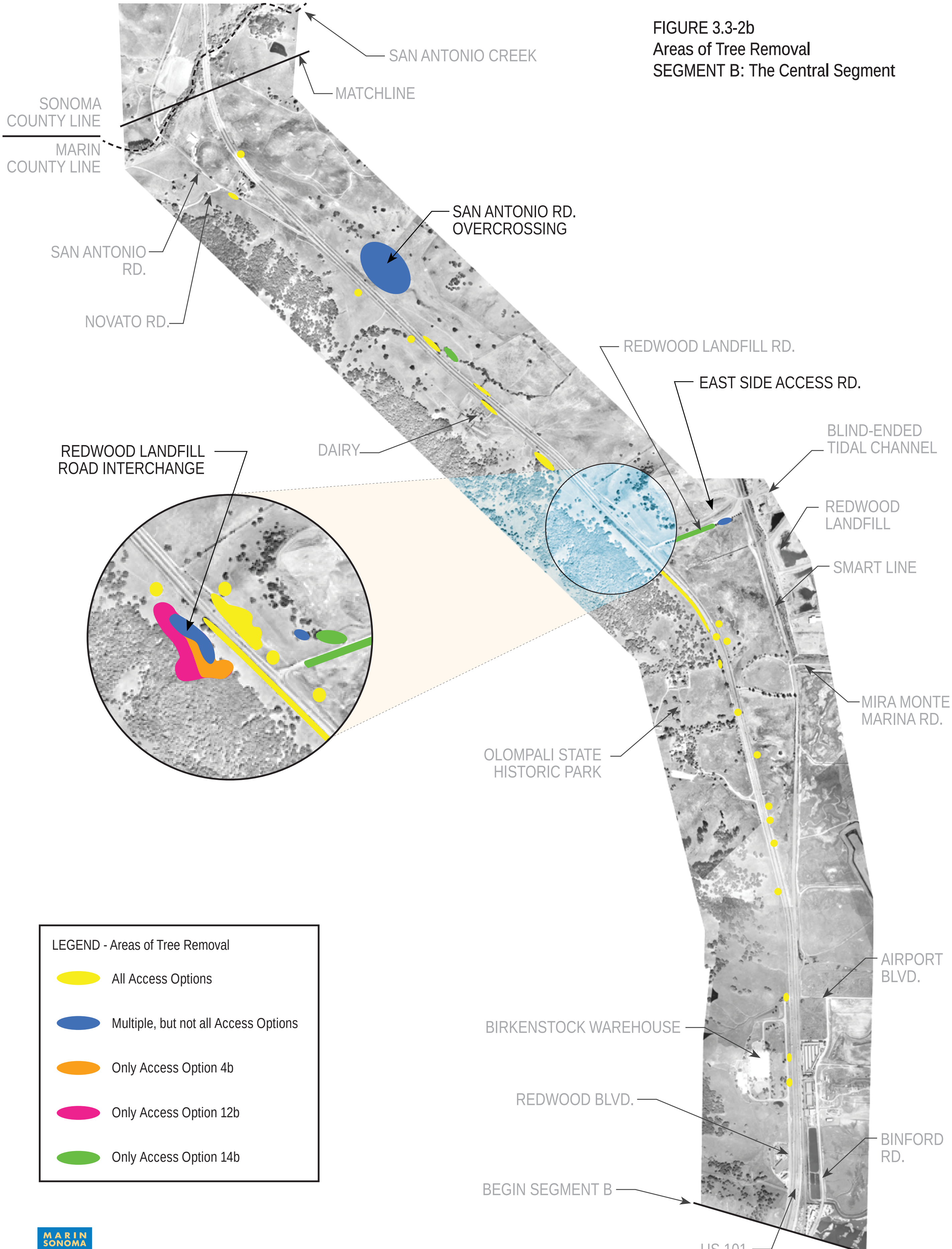
While the Fixed HOV Lane Alternative would result in the removal of trees in the more urbanized areas of Novato and Petaluma (Segments A and C, respectively), the greatest amount of tree removal would occur in Segment B (the Central Segment). This alternative could result in the removal of approximately 1,343 to 1,706 native and non-native trees, including approximately 311 to 441 native oaks (*Quercus* sp.) depending upon the Access Option identified as part of the Preferred Alternative (Table 3.3-1, also see discussion below).

FIGURE 3.3-2a
Areas of Tree Removal
SEGMENT A: The Southern Segment

TB042006002BAO_Fig3.3-2_TreeRemoval.indd

Note: Not to Scale

FIGURE 3.3-2b
Areas of Tree Removal
SEGMENT B: The Central Segment



LEGEND - Areas of Tree Removal

- All Access Options
- Multiple, but not all Access Options
- Only Access Option 4b
- Only Access Option 12b
- Only Access Option 14b

MARIN SONOMA 101 NARROWS

NORTH

Note: Not to Scale

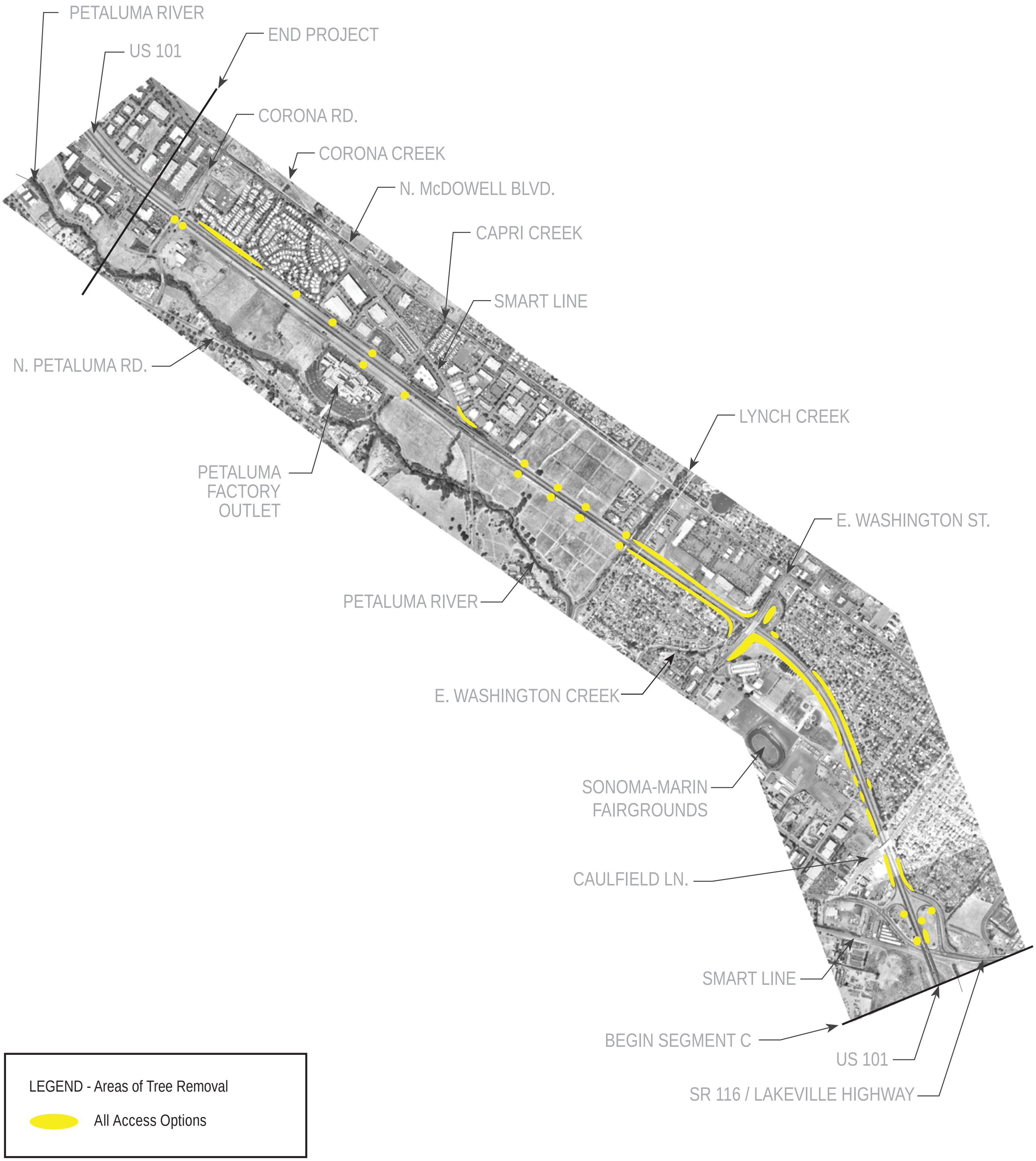
TB042006002BAO_Fig3.3-2_TreeRemoval.indd

FIGURE 3.3-2c
Areas of Tree Removal
SEGMENT B: The Central Segment
(from county line)

TB042006002BAO_Fig3.3-2_TreeRemoval.indd

Note: Not to Scale

FIGURE 3.3-2d
Areas of Tree Removal
SEGMENT C: The Northern Segment



MARIN SONOMA 101 NARROWS

NORTH

Note: Not to Scale

TB042006002BAO_Fig3.3-2_TreeRemoval.indd

Riparian tree impacts would mainly result from the bridge work at San Antonio Creek in Segment B and Lynch Creek in Segment C. No riparian trees would be impacted in Segment A as bridgework would occur in tidally influenced waterways.

Reversible HOV Lane Alternative. Table 3.3-1 summarizes the number of native and non-native trees that would be impacted by the Reversible HOV Lane Alternative by project segment. Project impacts to trees would differ by Access Option, as shown in Figure 3.3-2a-d.

The Reversible HOV Lane Alternative would include the same footprint as the Fixed HOV Lane Alternative. As a result, the Reversible HOV Lane Alternative would have the same impact to trees as identified above for the Fixed HOV Lane Alternative.

Access Options. Any of the Access Options would work with either of the Build Alternative. Access Option 12B has been identified as the preferred one to complete Segment B of the Fixed HOV Lane Alternative. Access Option 12b would impact the largest number of trees (1,706); 131 of the trees impacted are less than 5 inches in diameter breast height (dbh).[7] The majority of the oak trees (368) that would be affected by Access Option 12b range from 5 to 16 inches dbh. The next largest group (129) ranges from 17 to 30 dbh, and few (34) trees that would be affected by Access Option 12b exceed 30 dbh. This profile is similar to that of the other native and non-native trees surveyed in Segment B.

Access Option 12b would impact more trees than the other Access Options due to the westward alignment of a proposed frontage road on the west side of US 101 at the Redwood Landfill Road Interchange. The frontage road would cut deeper into the hillside than any of the other Access Options.

Riparian trees are represented under Native Oaks, Other Natives, and Non Native tree in Table 3.3-1. Riparian tree impacts in Segment B would result from bridgework over San Antonio Creek. The impact to riparian trees varies depending on the Access Option. More specifically, 286, 298, 280, and 277 riparian trees would be impacted under Access Options 4b, 12b, 14b, and 14d, respectively.

[7] Diameter at breast height (dbh) is a measurement of the width of the tree trunk at approximately 4.5 feet above the ground.

No Build Alternative. The No Build Alternative proposes no modifications to US 101 within the project boundaries other than routine maintenance and rehabilitation to support the continuing operations of the existing freeway when needed. While tree removal could occur in the execution of these activities, impacts would be negligible.

3.3.2.4 Avoidance, Minimization, and/or Mitigation Measures

Caltrans follows the CEQA and the NEPA guidelines, which direct the agency to avoid and minimize impacts to natural resources to the practicable extent possible. In accordance with these guidelines, Caltrans will preserve and maintain as many healthy trees and native vegetation as practicable during the planning, design, and construction of the MSN Project.

During the alternatives development process, Caltrans reduced the size of the project footprint and eliminated several interchange alternatives to avoid and minimize impacts to many biological resources, including oak trees. The original project footprint contained approximately 2,217 native oak trees, approximately 978 native riparian trees (dominated by California buckeye, California black walnut, Fremont cottonwood (*Populus fremontii*), arroyo willow, and red willow), and approximately 926 California bay laurel trees along the length of the project.

Although the tree loss has been substantially reduced, Caltrans will continue to reduce impacts to trees where practicable throughout the design process. Avoidance and minimization measures to lessen tree removal would also be in effect during construction. In addition, establishment of environmentally sensitive areas and implementation of erosion control measures would be implemented to minimize disturbance to riparian areas.

Caltrans' identification of potential tree impacts has led to discussions with CDFG regarding various mitigation measures. Caltrans will develop mitigation measures for native and non-native trees based upon the Preferred Alternative and final project plans and then develop a mitigation agreement with CDFG. On-site locations will be utilized to the fullest extent possible; however, due to the size of this project, both on and off-site mitigation locations may be required to fulfill proposed mitigation.

Although specific off-site locations have not been identified, Caltrans is exploring various resource areas, such as California State Parks, and private conservation covenants.

3.3.3 Wetlands and Other Waters of the United States

3.3.3.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act, 33 U.S.C. 1344 (CWA), is the primary law regulating wetlands and waters. The Clean Water Act regulates the discharge of dredged or fill material into Waters of the U.S., including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program that provides that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the USACE with oversight by the USEPA. NEPA and the 404 process have been integrated through a Memorandum of Understanding (MOU) between various agencies with responsibilities over both processes. The NEPA/404 process for the MSN Project is described in Section 6.3, Regulatory Agency Coordination.

The EO for the Protection of Wetlands (E.O. 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as the FHWA, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: (1) that there is no practicable alternative to the construction and (2) the proposed project includes all practicable measures to minimize harm.

The Preliminary LEDPA is the Fixed HOV Lane Alternative with the 12b Access Option as stated in Section 2.4. Caltrans considered all practicable measures to minimize harm in considering this Alternative. A wetland only practicable finding has been developed to satisfy E.O. 11990 and can be found in Appendix Q.

At the state level, wetlands and waters are regulated primarily by CDFG and the RWQCB. In certain circumstances, the Coastal Commission (or Bay Conservation and Development Commission) may also be involved. Sections 1600-1607 of the Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFG.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The RWQCB also issues water quality certifications in compliance with Section 401 of the CWA. Please see Water Quality, Section 3.2.3, for additional details.

3.3.3.2 Affected Environment

Wetlands

Brackish Novato Creek consists of an isolated stand of dense pickleweed, and some saltgrass (*Distichlis spicata*) is scattered throughout portions of the project area that quickly transitions to upland as it approaches US 101.

Throughout the project, roadside ditches occur adjacent to US 101, the majority of which are considered freshwater wetlands. The majority of the remaining ditches are considered Waters of the U.S. These roadside ditches would function mainly in filtering roadside runoff. Other functions and values of wetlands in general that may pertain to these ditches include surface and subsurface water storage, nutrient cycling (including processing of organic wastes), particulate removal, maintenance of plant and animal communities, water filtration or purification, and groundwater recharge.

Birds and mammals may also rely on wetlands for food, shelter, and water, especially while migrating and/or breeding. Since most of the wetlands in the project area are seasonal, we can apply this information seasonally to species such as deer and cattle, which would use it during both wet and dry periods.

Birds that could utilize these areas while wet would be waterfowl, including various ducks, geese, great blue heron (*Ardea herodias*), great egret (*Ardea albus*), snowy egret (*Egretta thula*), various swallows, tri-colored blackbird (*Agelaius tricolor*), red-winged blackbird (*Agelaius phoeniceus*), black phoebe (*Sayornis nigricans*) and saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*). Birds that may utilize the area while dry, and could also overlap the ones mentioned above, include red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensus*), oak titmouse (*Baeolophus inornatus*), white-tailed kite (*Elanus leucurus*), loggerhead shrike (*Lanius ludovicianus*), various hummingbird and sparrow species, and turkey vulture (*Cathartus aura*). Amphibians, such as CRLF (*Rana aurora draytonii*) may use the area while wet, as well as during dry periods as a dispersal corridor. However, the probability of amphibians in the area is low.

Cattle use one of the largest wetland areas within the project boundaries; specifically, the areas on the east side of US 101 in Segment B across from Olompali SHP (see Figure 3.3-1b). It is unknown whether cattle's use of these areas is seasonal. Use during wet periods could detrimentally impact soils formation and trample plant and animal habitat.

The roadside ditches in this area are also part of a larger network of wetlands between US 101 eastward toward the Petaluma River, providing drainage for the western side of US 101 as well as the expressway within Segment B itself.

There is a channel adjacent to the Mira Monte Marina driveway north of Novato and east of the highway, which consists of sparse, fragmented pickleweed, but is dominated by other types of hydrophytic plant species (see Figure 3.3-1b).

Heading north, there is also a channel located on a parcel belonging to the Redwood Sanitary Landfill east of the highway (see Figure 3.3-1b). This channel contains a narrow band of pickleweed bordering the channel’s ordinary high-water mark. Further north there is a portion of a wetland consisting of pickleweed adjacent to the South Petaluma Boulevard off-ramp.

There is pickleweed along the northeast side of the Petaluma River Bridge, and a tidally-influenced channel that runs perpendicular to the bridges containing a small amount of pickleweed (see Figure 3.3-1c).

Waters of the U.S.

In Novato, Rush Creek is contained within the Rush Creek Open Space Preserve. Ehreth Pond Wildlife Preserve, Scottsdale Marsh, and Scottsdale Pond are located in the Vintage Oaks Shopping Mall area. Novato Creek and Rush Creek are tidally-influenced waterbodies that contain non-riparian wetland vegetation along their banks.

In Segment B, San Antonio Creek is a major riparian corridor that divides Marin and Sonoma Counties. The Petaluma River is tidally-influenced and dominated by pickleweed along its banks. As noted earlier, Washington Creek, Lynch Creek, and Corona Creek are all urbanized, flood control/freshwater creeks that feed into the Petaluma River. While Washington Creek does not flow year-round, Caltrans biologists observed large puddles during the summer months.

3.3.3.3 Impacts

Wetlands

Fixed HOV Lane Alternative. Impacts to wetlands in Segments A and C are minor compared to Segment B of the project (Table 3.3-2). The impact numbers are based on the jurisdictional determination received from the USACE on December 23, 2008. The largest area of potential wetland impacts under the Fixed HOV Lane Alternative occurs along roadside ditches across from the Olompali SHP, along the east side of US 101. The wetland impacts in this area would be due to an eastward mainline realignment and an access road parallel to the mainline. The amount of wetlands impacted would vary slightly depending on the Access Option identified, as described below.

Table 3.3-2 Potential Impacts to Waters of the U.S. under the Build and the No Build Alternatives

Segments		Wetlands Hectares (Acres)		Other Waters of the U.S. Hectares (Acres)	
		Temporary	Permanent	Temporary	Permanent
Segment A (Southern Segment)		0.07 (0.17)	0.037 (0.092)	0.003 (0.007)	0.04 (0.1)
Segment B (Central Segment)	4b	0.89 (2.19)	2.94 (7.32)	0.23 (0.56)	1.17 (2.90)
	12b	0.85 (2.10)	2.89 (7.15)	0. 25 (0.62)	1.19 (2.93)
	14b	0.78 (1.92)	2.75 (6.80)	0.27 (0.66)	1.07 (2.66)
	14d	0.89 (2.19)	2.94 (7.32)	0.25 (0.62)	1.2 (2.96)
Segment C (Northern Segment)		0.014 (0.035)	0.08 (0.19)	0.003 (0.007)	0.03 (0.07)
Total Temporary		0.86-0.97 (2.13-2.40)		0.24-0.28 0.59-0.69	
Total under either Build Alternative		0.86-0.97 (2.13-2.40)	2.87-3.06 (7.09-7.56)	0.24-0.28 0.59-0.69	1.14-1.27 (2.82-3.14)
No Build Alternative		0	0	0	0
Shaded areas depict potential impacts for either Build Alternative.					

Because Caltrans would be replacing and enlarging culverts throughout the project, the functions of the wetlands would not be adversely impacted.

Reversible HOV Lane Alternative. Impacts to wetlands under the Reversible HOV Lane Alternative would be the same as those identified for the Fixed HOV Lane Alternative, above, because both alternatives propose the same project footprint and alignment. The operational differences between the two alternatives (i.e., the operation of the HOV lane) would not affect wetlands.

Access Options. The majority of wetland impacts would occur in Segment B, and the amount of wetlands impacted would vary slightly by Access Option. Access Option 12b would affect a slightly larger area of wetlands (2.89 ha, or 7.15 ac) than Access Option 14b (2.75 ha, or 6.8 ac) and Access Option 14d and 4b (2.94 ha, or 7.3 ac).

No Build Alternative. The No Build Alternative proposes no modifications to US 101 within the project boundaries other than routine maintenance and rehabilitation to support the continuing operations of the existing freeway when needed. As such, this alternative would produce no effects on wetlands.

Other Waters of the U.S.

Fixed HOV Lane Alternative. Table 3.3-2 summarizes the temporary and permanent to wetlands and other Waters of the U.S. (other waters) In Segments A and C, the Fixed HOV Lane Alternative would result in permanent impacts of 0.07 ha (0.17 ac) to other Waters of the U.S. Additional potential impacts to other waters in Segment B depend upon the Access Option, but in total, the Fixed HOV Lane Alternative could result in between 1.07 and 1.2 ha (2.66 to 2.96 ac) in permanent impacts to Waters of the U.S. Temporary impacts would affect between 0.23 and 0.27 ha (0.56 and 0.66 ac).

Reversible HOV Lane Alternative. Impacts to other waters for the Reversible HOV Lane Alternative would be equal to those identified for the Fixed HOV Lane Alternative. Both alternatives propose the same project footprint and alignment and scope of work.

Access Options. Within Segment B, the amount of other waters affected by the Access Options would be virtually identical (see Table 3.3-2). For permanent impacts, the drainage channels adjacent to the south side of Silveira Dairy would be affected (see Volume 2 Waters of the U.S). In addition, Access Options 4b, 14b, and 14d would impact drainage channels on the east side of US 101 in the footprint of the South San Antonio Road Overcrossing. Access Options 4b and 14d would impact 1.20 ha (3.2 ac) and Access Option 14b would impact 1.07 ha (2.66 ac); in contrast, Access Option 12b would have no impacts in this area, because Access Option 12b omits this overcrossing.

Other impacts to other waters common to all the Access Options would occur with the Petaluma River Bridge replacement, involving 0.26 ha (0.64 ac) of temporary impacts.

No Build Alternative. The No Build Alternative proposes no modifications to US 101 within the project boundaries other than routine maintenance and rehabilitation to support the continuing operations of the existing freeway when needed. As such, this alternative would produce no immediate impacts to other waters.

3.3.3.4 Avoidance, Minimization, and/or Mitigation Measures

Consultations with state and federal regulatory agencies and subsequent design modifications have led to wetland impact reductions from approximately 61.8 ha

(152.5 ac) to approximately 1.99-3.00 ha (4.91-7.43 ac), depending upon the identified Access Option for all the segments combined. Similar efforts have led to impact reductions in other waters at Scottsdale Pond, Rush Creek, Ehreth Pond Wildlife Preserve, Black John Slough, Scottsdale Marsh, Lakeville Channel, Novato Creek, San Antonio Creek, and the Petaluma River.

Clean Water Act 404 Permit and Streambed Alteration Agreement. Caltrans will obtain a 404 Individual Permit from the USACE under Section 404 of the Clean Water Act, and a 1602 Lake and Streambed Alteration Agreement from the CDFG. During the mitigation phase of this process, Caltrans and the FHWA, in consultation with the USEPA, the USACE, and the RWQCB will determine replacement ratios to mitigate for impacts to wetlands and other waters. It is expected, however, that the hectares (or acres) realized through compensation would result in a net increase over the amount of wetlands impacted under the Build Alternatives based upon FHWA’s nationwide goal for replacing impacted wetlands at 1.5:1. In addition, Caltrans and FHWA would establish successful wetland compensation ahead of construction to compensate for impacts associated with project segments undertaken. Therefore, there would be no temporary impacts. Potential mitigation sites for permanent impacts are being explored by Caltrans and include Skaggs Island, Petaluma River, and other locations potentially available through private conservation covenants.

The majority of the wetland mitigation would be to restore and enhance freshwater and seasonal wetland habitat. Accordingly, this mitigation may also incorporate habitat for aquatic species, including salmonids and the California red-legged frog, affected by the Build Alternatives.

Wetland Only Practicable Finding

The following analysis of the alternatives, including No Build, and all practicable measures to minimize harm, is intended to satisfy the requirement of Executive Order 11990, Protection of Wetlands.

The need and purpose of the action (project) and alternatives considered and withdrawn are presented in Chapters 1 and 2, respectively. The permits and regulations that pertain to the project are discussed throughout this volume and summarized in Section S.5.As discussed in Section 2.4, the Fixed HOV Lane Alternative with Access Option 12b has been identified as the Preferred Alternative, to add both a northbound and a southbound HOV lane along US 101 throughout the 26 km (16.1 mi) project boundaries. This alternative would also entail upgrading the expressway in Segment B to full freeway standards. Section 2.2 provides a description of the alternatives.

Although the Preferred Alternative meets the project need and purpose, it will reduce 2.89 ha (7.15 acres) of wetlands and 1.19 hectares (2.93 acres) of other waters of the U.S. (see Table 3.3-2). The Preferred Alternative will require a Section 404 Permit from the USACE, a 1602 Lake and Streambed Alteration Agreement from the CDFG, and a Section 401 Water Quality Certification from the California Regional Water Quality Control Board (RWQCB).

The Caltrans also considered other alternatives, which would reduce or eliminate impacts to wetlands. Under the No Build Alternative only routine repairs and emergency maintenance would be conducted within the project limits, therefore no immediate impacts to wetlands are anticipated. However, the No Build Alternative would not meet the need and purpose of the project and would propagate existing and projected traffic congestion and operational deficiencies (see Section 2.2.3). The No Build Alternative is also not consistent with planned congestion management measures because congestion relief measures cannot be effectively implemented under existing (baseline) conditions through Segment B of US 101 (see Section 3.1.2.3).

Caltrans and FHWA also evaluated complete avoidance of wetlands, in particularly on the east side of US 101. Considerations included shifting the mainline alignment further west, which would have encroached into Olompali SHP right-of-way. While this strategy could have avoided or considerably reduced impacts to wetlands and waters, there are multiple adverse effects that would result. A westward alignment shift would widen the project footprint due to the existing mountainous topography on the west side of US 101, adding substantial earthwork and the need for disposal or off-hauling of excess materials. Extensive excavation and additional retaining walls would also be required, marring the natural rolling terrain in this rural area of the project. In addition, a further westerly alignment into the Park would impact more native trees and reduce oak tree mitigation planting area. This shift would also significantly increase adverse impacts to archaeological sites that are within Olompali SHP than are impacted under the Preferred Alternative. Finally, Olompali SHP is a 4(f) resource under the DOT Act (see Section 3.1.43), and FHWA would not be able to justify impacts to the Park that could otherwise be avoided, with few public or environmental benefits.

Other project alternatives were also considered and withdrawn from further consideration because they cannot meet the need and purpose of the project, and these are discussed in Section 2.6.

All Practical Measures to Minimize Harm

Caltrans and FHWA have been incorporating all practicable measures to minimize environmental harm into the project design. . During the environmental scoping process, Caltrans and FHWA minimized the original footprint, which included approximately 61.8 ha (152.5 ac) of USACE jurisdictional wetlands, and at least 12 ha (30 ac) of jurisdictional waters of the United States. Reducing the project footprint through this process eliminated several interchange alternatives and minimized potential harm to biological resources and many acres of wetlands. In order to further minimize harm to wetlands, Caltrans has realigned an access road away from higher-value wetlands and will incorporate 2:1 slopes and 1-3 feet between tow of slope and right of way in maintenance areas. Further avoidance, minimization, and mitigation efforts will continue throughout the Design, PS&E and construction processes.

Caltrans will develop a wetland habitat mitigation plan to compensate for the impacts of the Preferred Alternative. Proposed mitigation measures are discussed in Section 3.3.3.4.

The increased impervious surface may reduce the functions of the wetlands in the project area. Minimizing harm to wetlands will be accomplished by adding numerous bioswales to help filter the water coming off of the highway (Section 3.2.3.4).

Finding

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. In light of the above considerations, the Preferred Alternative is also the Preliminary LEDPA. Through the incorporation of all practicable measures to minimize harm into the design of the Preferred Alternative, the permanent loss of wetlands and other waters of the U.S. will be reduced and/or mitigated. There is no other alternative that can meet the need and purpose and avoid or further reduce construction within the subject wetlands.

Through the project alternatives analysis and participation in the NEPA/404 process, Caltrans and FHWA have satisfied the requirements of Executive Order 11990, Protection of Wetlands, and incorporated all measures to minimize harm. Caltrans and FHWA will continue to avoid and minimize harm throughout project design and construction.

3.3.4 Plant Species and Vegetation

3.3.4.1 Regulatory Setting

The USFWS and CDFG share regulatory responsibility for the protection of special-status plant species. “Special-status” species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please refer to Section 3.3.6 in this document for a discussion of these species.

This section of the document discusses all the other special-status plant species, including CDFG species of special concern, USFWS candidate species, and non-listed California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at U.S.C.16, Section 1521, et. seq. See also 50 CFR Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, et. seq. Caltrans projects are also subject to the Native Plant Protection Act, found at Fish and Game Code, Section 1900-1913, and CEQA.

3.3.4.2 Affected Environment

Caltrans biologists conducted plant surveys according to the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species* (USFWS 1996). Although appropriate habitat for several special status species or sensitive plants is present in the project area, non-federal or state-listed special status plant species were not observed within the project boundaries.

The dominant plant species found in the riparian corridors within the project area include poison oak (*Toxicodendron diversilobum*), California bay laurel, California buckeye, red willow, arroyo willow, valley oak, and stinging nettle (*Urtica dioica*).

The dominant plant species found in the bay-oak woodlands within the project area include coast live oak, blue oak, valley oak, California bay laurel, California buckeye, and poison oak. There are also a variety of grass species, such as perennial rye grass (*Lolium perenne*), slender wild oats (*Avena barbata*), ripgut grass (*Bromus diandrus*), and soft chess (*Bromus hordeaceus*).

Grasslands, pastures, alkali meadows, and seasonal wetlands are also dominated by the above-mentioned grasses as well as many species of wildflowers, including narrow-leaf mule-ears (*Wyethia glabra*), California buttercup (*Ranunculus californicus*), blow-wives (*Achyrachaena mollis*), blue dicks (*Dichelostemma capitatum*), smooth tidy-tips (*Layia chrysanthemoides* var. *chrysanthemoides*), and blue-eyed grass (*Sisyrinchium bellum*). Other dominant vegetation in these areas include rattlesnake grass (*Briza maxima*), yellow star thistle (*Centaurea solstitialis*), Fuller's teasle (*Dipsacus sativus*), hayfield tarweed (*Hemizonia congesta*), Italian thistle (*Carduus pycnocephalus*), coyote brush (*Baccharis pilularis*), and winter vetch (*Vicia villosa*).

The dominant vegetation along the roadsides, including the shoulders and the ditches primarily consists of wild oat, sweet fennel (*Foeniculum vulgare*), yellow star thistle, Italian thistle, wild mustards (*Brassica* sp.), common nut sedge (*Cyperus eragrostis*), common sow thistle (*Sonchus oleraceus*), cut-leaved geranium (*Geranium disectum*), and wild radish (*Raphanus sativus* var. *sativus*).

3.3.4.3 Impacts

Fixed HOV Lane Alternative. There would be no impacts to non-federal or state listed special status plant species under the Fixed HOV Lane Alternative, because there are no special status plant species within the project footprint.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative has the same footprint as the Fixed HOV Lane Alternative. Accordingly, the impacts for the two Build Alternatives would be identical. As described for the Fixed

HOV Lane Alternative, there would be no impacts to special status plant species under the Reversible HOV Lane Alternative, because there are no special status plant species within the project footprint.

Access Options. The project area associated with the Access Options was surveyed along with the mainline project area. The results are the same as those reported under the Fixed and Reversible HOV Lane Alternatives above. There would be no impacts to special status plant species.

No Build Alternative. The No Build Alternative would involve routine maintenance and upkeep of US 101 and would have no impacts to special status plant species are anticipated.

3.3.4.4 Avoidance, Minimization, and/or Mitigation Measures

The project area originally included an area east of the SMART railway known to contain special status plant species. However, a design modification resulted in reducing the project footprint to exclude this potential encroachment and completely avoiding impacts to this sensitive area.

3.3.5 Animal Species

3.3.5.1 Regulatory Setting

Many state and federal laws regulate impacts to wildlife. The USFWS, the National Marine Fisheries Service (NOAA Fisheries) and the CDFG are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with wildlife not listed or proposed for listing under FESA or CESA. Species listed or proposed for listing as threatened or endangered are discussed in Section 3.3.6. All other special-status animal species are discussed here, including CDFG fully protected species and species of concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
- Fish and Wildlife Coordination Act
- Magnuson-Stevens Fishery Conservation and Management Act

State laws and regulations pertaining to wildlife include the following:

- California Environmental Quality Act
- Sections 1601-1603 of the Fish and Game Code
- Sections 3511, 4700, 5050, and 5515 of the Fish and Game Code

3.3.5.2 Affected Environment

Sacramento Splittail (splittail)

Habitat surveys for sensitive fish were conducted prior to the 2003 delisting of Sacramento splittail (*Pogonichthys macrolepidotus*) as federally threatened. This fish remains a federal and state species of special concern. According to that report, the lower reaches of Novato Creek, the tidal channel at the Redwood Landfill, a portion of the Lakeville Channel, and the lower reaches of Lynch Creek may provide spawning, incubation, and rearing habitat for Sacramento splittail (see Figures 3.3-1a-d). The Petaluma River may also provide migration and rearing habitat for this species. The lower reaches of Washington Creek may provide limited spawning, incubation, and rearing habitat if access to Petaluma River is provided. However, poor seasonal hydrology and limited seasonal duration of connectivity to the Petaluma River minimizes potential presence of splittail at Washington Creek. Other factors against species presence are poor habitat quality and quantity, and the lack of upstream watershed areas from Washington Creek.

Chinook Salmon

Potential habitat for Chinook salmon (*Oncorhynchus tshawytscha*) within and downstream of the project is designated as EFH. EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (NMFS, 2007d). The Evolutionary Significant Unit of this species present in the action area, fall-run Central Valley Chinook salmon, is not federally listed and therefore not under the jurisdiction of the Federal Endangered Species Act.

Personal communication with Bill Cox, CDFG, on February 7, 2003 led to Caltrans identifying potential habitat for Chinook salmon in the project area., Novato Creek, San Antonio Creek, Petaluma River, and Lynch Creek are all considered essential habitat for these salmon under the Magnuson-Stevens Fishery and Conservation Act.

Chinook salmon may be periodically found in the tributary streams to Northern San Francisco Bay including the Petaluma River (NMFS, 2007a). The use of habitats within the action area by Chinook salmon are most likely by wandering adult Chinook salmon natal to streams within the Central Valley of California. Novato Creek may serve as a migratory corridor for Chinook salmon. The stream channel in the action area may provide seasonal rearing habitat. The Petaluma River may provide migration and rearing habitat for Chinook salmon. The blind end of the tidal channel adjacent to the Redwood Landfill may provide seasonal rearing habitat if the salmon can access this area from the Petaluma River. San Antonio Creek may provide seasonal rearing habitat for Chinook salmon. Chinook salmon may occur seasonally in the area (Hamaker pers. comm.). The blind end of the tidal channel downstream of the flapgate at the Lakeville Channel also provide seasonal rearing habitat if this species is present in the Petaluma River. The portion of Lynch Creek downstream of the action area may provide seasonal spawning and/or rearing habitat for Chinook salmon if hydrological conditions and access to the Petaluma River is provided.

Roosting Bats

A substantial amount of potential bat habitat is present throughout the project area. The large quantity of trees and the presence of several old barns may provide roosting habitat for bats in the area surrounding the MSN Project.

Biologists observed urine staining and bat guano beneath San Antonio Creek Bridge along US 101, indicating the presence of roosting bats. However, no bats were observed during daytime site visits. Caltrans biologists visited the site at night and observed several individuals of either big brown bat or little brown bat. Caltrans biologists also observed that the piles of bat guano contained exoskeletons of Jerusalem crickets (*Stenopelmatus* sp.), indicating that the site may also serve as a night roost for pallid bats.

Nesting Birds

There is a large abundance of potential nesting habitat within the project area. Trees, shrubs, grasslands, bridges, and some commercial and residential structures may provide nesting habitat for many species of birds.

Cliff swallow nests were observed beneath the Novato Creek Bridge structure and the San Antonio Creek Bridge structure along US 101. Similarly, nests were observed beneath the San Antonio Creek Freeway Historic Bridge along San

Antonio Road. Several large nests were observed in a stand of eucalyptus trees located on private property adjacent to San Antonio Road. These large nests appeared to be vacant and thus were impossible to identify. Caltrans biologists speculate that they were most likely either raptor nests, such as red-shoulder red hawk or red-tailed hawk, great-blue heron, snowy egret or great egret nests. A snowy egret, great egret and great blue heron rookery is also present along Petaluma Boulevard near Station 2043.

Several unidentified nests were observed in the oak woodlands in Olompali SHP and on property belonging to the Silveira Dairy.

Other Species

Other species that may potentially be found in the MSN Project area include various species of birds protected by the Migratory Bird Treaty Act and the state species of special concern northwestern pond turtle (*Emys* (=*Clemmys*) *marmorata marmorata)*.

According to CNDDB records, there are black rail in close proximity to SR 37. However, Caltrans believes it is unlikely that this state threatened species is present within the project boundaries. Their preferred cordgrass habitat is not present in the area. Pickleweed, another preferred habitat area, occurs in a very small patch adjacent to the Petaluma River Bridge bordered by a parking lot and the SMART railroad tracks. Furthermore, noise disturbances associated with extensive development as well as US 101 and SR 37 indicate the existence of this species within the project boundaries is unlikely.

3.3.5.3 Impacts

Sacramento Splittail

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would completely avoid impacts to the tidal channel at the Redwood Landfill and the portion of Lakeville Channel that may provide spawning, incubation, and rearing habitat for Sacramento splittail. Therefore, impacts to potential Sacramento splittail habitat would be limited to Novato Creek, Lynch Creek, and the Petaluma River, as shown in Table 3.3-3. In total, this alternative would permanently impact approximately 0.257 ha (0.63 ac) of splittail habitat.

Table 3.3-3 Potential Impacts to Potential Sacramento Splittail Habitat

Habitat	Area
Novato Creek (Segment A)	0.0425 ha (0.1050 ac)
Petaluma River (Segment B)	0.20 ha (0.49 ac)
Lynch Creek (Segment C)	0.0149 ha (0.0369 ac)
Total Area	0.257 ha (0.63 ac)

Reversible HOV Lane Alternative. Both Build Alternatives propose the same project footprint, alignment, and scope of work in the three waterways that could provide spawning, incubation, and rearing habitat for Sacramento splittail. The Reversible HOV Lane Alternative would have the same impacts to potential splittail habitat as the Fixed HOV Lane Alternative.

Access Options. Potential impacts to splittail would not vary by Access Option. All four Access Options would permanently impact approximately 0.20 ha (0.49 ac) of splittail habitat along the Petaluma River.

No Build Alternative. Under the No Build Alternative, there would be no impacts to Sacramento splittail, since this alternative would involve no improvements other than routine maintenance and upkeep of the existing US 101 facilities.

Chinook Salmon

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would result in approximately 0.47 ha (1.16 ac) of permanent impacts to salmonid habitat, including Chinook salmon. Table 3.3-4 lists the effects by water body.

Table 3.3-4 Summary of Impacts to Potential Chinook Salmon Habitat

Project Segment	Creek	Permanent Impacts (ha/ac)
A	Novato Creek	0.0425 ha (0.1050 ac)
B	Tidal Channels	0
	San Antonio Creek New Mainline Bridge	0.2004 ha (0.4911 ac)
	San Antonio Creek SB Bridge Removal	-0.0304 ha (-0.0711 ac)
	San Antonio Creek New County Bridge	0.0305 ha (0.0712 ac)
	Petaluma River	0.20 ha (0.49 ac)
Total		0.40 ha (0.98 ac)
C	Lynch Creek	0.0149 ha (0.0369 ac)
	Washington Creek	0.0106 ha (0.0261 ac)
Total		0.0304 ha (0.070 ac)
Overall Total		0.47 ha (1.16 ac)

The Fixed Lane HOV Alternative would involve work in Novato Creek, Petaluma River, San Antonio Creek, Lynch Creek, and Washington Creek. While the Novato Creek and Lynch Creek bridges would be widened, Petaluma River Bridge would be replaced with a new structure. The San Antonio Freeway Bridge would be replaced with a new structure and a second crossing would be constructed just west of the historic San Antonio Creek Bridge for two-way traffic on San Antonio Road.

The Fixed HOV Lane Alternative would not propose work in the blind-ended tidal channel adjacent to the Redwood Landfill; thus, potential effects would be limited to Novato Creek, San Antonio Creek, Lynch Creek, and the Petaluma River and could impact the Chinook salmon that could use these waterways for seasonal rearing habitat as well as provide migratory channels for adults passing through the project area to and from upstream habitat areas.

Caltrans and FHWA determined that there would be an adverse affect to Chinook salmon Essential Fish Habitat (EFH). NOAA Fisheries concluded in EFH consultation that conservation measures in the project description and Terms and Conditions in the Biological Opinion (BO) would minimize adverse affects to Chinook salmon EFH.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would have identical effects to the Chinook salmon as the Fixed HOV Lane Alternative, because the Reversible HOV Lane Alternative proposes the same footprint and improvements in the areas around Novato Creek, San Antonio Creek, Lynch Creek, Washington Creek, and the Petaluma River. In total, this alternative would approximately 0.47 ha (1.16 ac) of permanent impacts to salmonid habitat.

Access Options. Each of the Access Options would have similar, temporary effects to the Chinook salmon, because the improvements around San Antonio Creek and the Petaluma River are common to all Access Options.

No Build Alternative. Under the No Build Alternative, there would be no effects to Chinook salmon or their habitat, because this alternative proposes no improvements other than routine maintenance and upkeep of the existing US 101.

Roosting Bats

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative could temporarily impact bat roosting habitat by preventing bats from roosting beneath the northbound section of the San Antonio Creek Freeway Bridge structure during demolition of the southbound section of the bridge. This is the only structure that was identified as being utilized by bats for roosting purposes within the project boundaries.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative proposes the same improvements to the San Antonio Creek Freeway Bridge structure as the Fixed HOV Lane Alternative. Consequently, bats would be temporarily impacted in the same manner as described above for the Fixed HOV Lane Alternative. In addition, the Reversible HOV Lane Alternative would include the same footprint as the Fixed HOV Lane Alternative. As a result, the Reversible HOV Lane Alternative would have the same impact to trees as identified above for the Fixed HOV Lane Alternative and thus the same potential impact to roosting bats.

Access Options. The modifications to the San Antonio Creek Freeway Bridge structure are common improvements under both Build Alternatives and all four Access Options. As a result, the Access Options have the same potential impact to roosting bats.

No Build Alternative. The No Build Alternative would continue existing operations and maintenance of US 101, which would not impact roosting bats.

Nesting Birds

Fixed HOV Lane Alternative. The nesting bird season in Marin and Sonoma counties is between February 15 and September 1. If no avoidance measures are taken, nesting birds could be affected by tree and vegetation removal operations under the Fixed HOV Lane Alternative as reported in Table 3.3-1.

Reversible HOV Lane Alternative. As described above for the Fixed HOV Lane Alternative, if no avoidance measures are taken, the Reversible HOV Lane Alternative could affect nesting birds. Because the footprint of the Reversible HOV Lane Alternative is identical to that of the Fixed HOV Lane Alternative, the impacts would be the same for both Build Alternatives.

Access Options. Each of the Access Options would require tree and vegetation removal. As shown in Table 3.3-1, tree removal would vary between 1,401 trees under Access Option 4b and 1,706 trees under Access Option 12b. If no avoidance measures are taken, each of the four Access Options could affect active nests of birds.

The rookery of great egrets, snowy egrets and great blue herons east of Petaluma Road is directly within the MSN Project footprint and the rookery itself will be impacted. Modifications were made under the Preferred Alternative to decrease the radius of the ramp along Petaluma Boulevard in order to minimize impacts to the rookery; however, it is not possible to avoid the rookery entirely. Caltrans has learned that, in addition to the MSN Project, the Dutra Asphalt and Recycling Facility Project in Sonoma County will likely impact the rookery (please see discussion in Chapter 5 Cumulative Impact Assessment).

In general, trees with active nests will be treated in accordance with the Migratory Bird Treaty Act. This is discussed under the Avoidance, Minimization, and Mitigation section below.

Because the San Antonio mainline will be reconstructed, and the Novato Creek Bridge and the San Antonio Historic Bridge will be left in place, it is anticipated that they will continue to serve as bird nesting habitat.

No Build Alternative. The No Build Alternative would continue existing operations and maintenance of US 101 and would not require tree removal. As a result, the No Build Alternative would not impact nesting bird habitat.

Other Species

Fixed HOV Lane Alternative. As described in the Affected Environment section, above, other animal species are not expected to be present within the project footprint, although the various bird species could roost or forage in the area. The earlier analysis of tree removal and nesting birds could apply to the other bird species that may occur in the project area, due to the potential tree removal under this alternative (Table 3.3-1).

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative, with the same footprint as the Fixed HOV Lane Alternative, would result in the same potential impacts to other animal species as the Fixed HOV Lane Alternative.

Access Options. The presence of other animal species in the footprint of any of the four Access Options is unlikely; however, there is the potential for sensitive bird species to be in the vicinity. The potential impact to other species would, therefore, be similar for each of the Access Options, except for bird species which would be expected to vary in proportion to the amount of tree removal reported in Table 3.3-1.

No Build Alternative. The No Build Alternative, which does not include major construction activities, would not affect other animal species.

3.3.5.4 Avoidance, Minimization, and/or Mitigation Measures

Sacramento Splittail Habitat. The avoidance and protection measures for Central California coast steelhead and green sturgeon in Section 3.3.6.3 would also be protective of Sacramento splittail.

Chinook Salmon Habitat. The avoidance and protection measures for Central California coast steelhead and green sturgeon would also be protective of Chinook salmon (please see Section 3.3.6.4 for more details).

Bat Roosts. Under both of the Build Alternatives, Caltrans would replace the existing southbound San Antonio Creek Bridge along US 101. The northbound section of the bridge would remain in place to serve as a roadway and Class 2 bikeway. Caltrans will conduct demolition during the winter season when bats are not present to avoid impacting the roosting bats due to high sound levels during the demolition phase of the southbound bridge. If it is not possible to demolish the bridge during that time period, Caltrans will install exclusionary netting to prevent bats from roosting beneath the northbound bridge prior to demolition.

A bat structure will be installed as part of the design of the new San Antonio Creek Freeway Bridge to allow bats to roost again once construction is complete.

Nesting Birds. Minimization measure will be employed where feasible to avoid further impacts to the snowy egret, great egret, and great blue heron rookery during final design and during project construction. Prior to the nesting season, Caltrans will use exclusionary netting where possible to prevent birds from nesting in or on structures that will be impacted by the project.

In accordance with the Migratory Bird Treaty Act, the contractor will conduct tree trimming and removal first and foremost outside of the nesting bird season of

February 15-September 1. Under both of the Build Alternatives, Caltrans will conduct surveys for nesting birds prior to beginning construction on any of the culverts or bridge structures in the project area. A qualified biologist will conduct nesting surveys prior to vegetation removal to ensure that no active nests are impacted by the project.

Trees may be identified for removal during the nesting season only if a qualified biologist has surveyed the trees and confirmed that there are no active nests present within the trees identified for removal or immediately adjacent. If any active nests are identified during this period, the trees cannot be disturbed for the duration of the nesting season.

Although it is true that the project will impact a substantial number of trees under the Build Alternatives, many more trees will remain in the project area that can provide alternative nesting habitat. A tree replacement plan will also be implemented, particularly in Segment B wherever it is feasible, but plantings may take 10-20 years to reach maturity. Any temporary or permanent loss of habitat that would serve as potential nesting habitat will be compensated in the riparian and oak woodland tree replacement projects (see Appendix J).

Please also see discussion of further avoidance and minimization efforts in Sections 3.3.2 and 3.1.10.

Other Wildlife Species. Caltrans will restrict work in aquatic areas to the dry season, when water levels would be at their lowest. Caltrans will assign a qualified biologist to be available during construction to remove sensitive aquatic species, including the northwestern pond turtle, out of the project area.

3.3.6 Threatened and Endangered Species

3.3.6.1 Regulatory Setting

The primary federal law protecting threatened and endangered species is the FESA: 16 United States Code (U.S.C), Section 1531, et seq. (see also 50 CFR Part 402). This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as FHWA, are required to consult with the USFWS and NOAA Fisheries to ensure that they are not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographical locations critical to the existence of a threatened or endangered species.

California has enacted a similar law at the state level, the CESA, California Fish and Game Code, Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project caused losses of listed species populations and their essential habitats. The CDFG is the agency responsible for implementing the CESA.

3.3.6.2 Affected Environment

Caltrans obtained a list of species that may potentially occur in the project area from the CNDDB and the USFWS on July 3, 2008. These lists can be found in Appendix H. The sensitive species potentially found within the project area include the federal and state endangered salt-marsh harvest mouse (SMHM), (*Reithrodontomys raviventris*), the federal threatened Central California coast steelhead (CCCS) (*Oncorhynchus mykiss*), the federal threatened southern DPS North American green sturgeon (*Acipenser mediaostris*), the federal threatened and state species of special concern CRLF (*Rana aurora draytonii*), and six listed plant species. These are Sonoma alopecurus (*Alopecurus aequalis var. sonomensis*) (federal endangered), soft bird's beak (*Cordylanthus mollis ssp. mollis*) (federal endangered), Baker's larkspur (*Delphinium bakeri*) (federal endangered), Burke's goldfields (*Lasthenia burkei*) (federal endangered), Contra Costa goldfields (*Lasthenia conjugens*) (federal endangered), and showy Indian clover (*Trifolium amoenum*) (federal endangered).

Similar to the state threatened black rail (discussed in Section 3.3.5), there are known CNDDB records of the federal and state endangered clapper rail (*Rallus longirostris obsoletus*); however, this species is unlikely to be within the project boundaries. Their habitat is very limited in the project area and consists of a small, isolated patch of pickleweed bordered by a parking lot and the SMART railroad tracks. These factors as well as noise disturbance associated with development and the established US 101 and SR 37 roadway facilities preclude the existence of this species within the project boundaries. There is no designated critical habitat for either of these species.

Salt Marsh Harvest Mouse (SMHM)

The SMHM is federal and state listed as endangered, and is also listed by the state as a "fully protected" species. No critical habitat has been designated for this species to date. CDFG Code Sections 3511, 4700, 5050, and 5515 state that "a fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting of species for scientific research and relocation of bird species for the protection of livestock." Due to the "fully protected" status of the SMHM, Caltrans was unable to conduct surveys and, therefore, submitted an Inferred Presence Determination for SMHM to FHWA in May 2005 (see Table 6-3). Field meetings were held with CDFG and USFWS (November 2003 and January 2004, respectively). During the course of these meetings, potential SMHM habitat locations to avoid were discussed and agreed upon by both CDFG and USFWS. There is no critical habitat designated for this species.

Caltrans biologists surveyed the project area for SMHM and its habitat at five locations based upon CNDDB records. Additionally, consultations with CDFG on July 31, 2001, established the potential presence of SMHM in various locations within the project area. The five locations with habitat for SMHM are described below:

- North of Novato Creek and west of US 101 in Novato. The pickleweed is healthy at this location. There is also pickleweed/upland mix nearby that transitions into upland habitat. This transition habitat mix is the most ideal habitat for the SMHM at this site.
- North of Novato, east of US 101and near the Marina driveway. This site contains seasonal wetland habitat. Habitat is marginal due to sparse and fragmented pickleweed along the channel crowded out by other hydrophytic plants. However, there is a direct connection to high quality habitat downstream of the channel.
- A blind-ended tidal channel near San Antonio Creek on the east side of the SMART railway. Although the areas on either side of the bridge structure are devoid of habitat, there is a thin line of pickleweed that borders the channel's ordinary high water mark.
- East of the South Petaluma Boulevard exit on the east side of US 101. The project boundaries are fairly close to the existing highway in this location, and

potential habitat is present approximately 45.5 m (150 ft) from the existing right-of-way line.

- Either side of the existing US 101 bridge structures on the northern bank of the Petaluma River. A patch of pickleweed on the eastern side of the bridge is dense and fairly well established, while a patch on the western side of the bridge is sparse and of very low quality. There is little to no pickleweed habitat along the Petaluma River on the southern bank. Despite its marginal quality, the potential presence of SMHM in the area is high because CNDDB records show populations occur downstream from the Petaluma River Bridge.

California Red Legged Frog (CRLF)

The CRLF, a federal threatened species and CDFG species of concern, is found primarily in wetlands and streams in the coastal drainage channels of central California. A visual survey was conducted in March 2002 that identified over 20 potential CRLF sites along the length of the project.

In 2002, Caltrans biologists coordinated with herpetologists to identify areas requiring potential protocol-level surveys, according to USFWS 1997 Guidelines. In 2005, the USFWS issued new guidelines *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (USFWS 2005a), in which it is stated that the results of site assessments and surveys for CRLF will be considered valid for no more than two years. In 2005, the USFWS issued a revised survey protocol for CRLF. According to the *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (USFWS 2005), results of site assessments and surveys for CRLF are considered valid for two years. Therefore, Caltrans conducted additional surveys according to the revised 2005 guidance in 2007.

Several areas initially investigated as potential habitat were eliminated from the 2002 surveys due to the fact that there was no appropriate CRLF habitat present. Areas were eliminated either due to heavy tidal influence or lack of any appropriate vegetative cover.

At the remaining locations, no CRLF were observed during surveys conducted by herpetologists, although other aquatic species, including Pacific treefrog (*Hyla regilla*), bullfrog (*Rana catesbeiana*), western toad, Louisiana red-swamp crayfish (*Procambarus clarkii*), and mosquito fish (*Gambusia affinis*) were observed at some locations.

CRLF dispersal habitat was identified by examining aerial photographs, U.S. Geological Survey (USGS) topographic maps and CNDDB information. Ponds within 8 km (5 mi) of the action area were identified and this information was entered into GIS. A few ponds located within areas of heavy, ongoing disturbance (such as at the landfill and gravel processing facility) were considered unsuitable for use by CRLF. All other ponds as well as San Antonio Creek were considered potentially suitable breeding habitat for this species. Caltrans selected 3.2 km (2 mi) as the maximum migration distance between breeding ponds and other habitats. Review of the potential breeding sites, 2003 and 2007 survey data, and the proposed project alignment indicated that the project will not impact breeding habitat for CRLF. Therefore, project-related effects focus on upland dispersal habitat.

A review of the entire project alignment determined that some barriers between potential CRLF breeding ponds and the action area are present in Segments A, B and C. These barriers include the urbanized core areas of Petaluma and Novato, the high salinity areas of the Petaluma River and Petaluma Marsh. The Petaluma River remains tidal and brackish throughout the City of Petaluma.

Although the paucity of CNDDB records of CRLF in the project vicinity or observed by Caltrans biologists may be due in part to limited access in some areas, it is possible that the relatively undeveloped areas of Segment B may be considered low quality CRLF dispersal habitat. This is based on the presence of stock ponds that lie between the CNDDB occurrences and the action area. CRLF are often found in stock ponds in Marin County and these ponds are often very useable habitats for the species, although bullfrogs, a CRLF predator, are also often present. Stock ponds with no vegetation present have been known to be used by CRLF. (Gary Fellers, pers. comm. with CH2M HILL Biologist Corinna Lu. February 22, 2008). Given these factors, the potential for occurrence of CRLF in the unurbanized section of Segment B cannot be completely eliminated.

There are no critical habitat units present within the project limits.

Central California Coast Steelhead (CCCS)

Steelhead are the anadromous form of the rainbow trout, a salmonid species, which is native to western North America and the Pacific Coast of Asia. In North America, steelhead can be found in Pacific Ocean drainages from southern California to Alaska (CDFG 2002). CCCS is a subspecies of steelhead found in watersheds from the Russian River in Sonoma County, to Soquel Creek in Santa Cruz County, and the San Francisco Bay and San Pablo Bay basins (CDFG 2002).

On February 10 and 11, 2003, biologists conducted reconnaissance-level habitat surveys for special status fish species, including the federal threatened CCCS. Personal communication with Bill Cox at CDFG (May 29, 2002) led to Caltrans identifying potential habitat for CCCS. After consultation with NOAA Fisheries (May 14, 2002 and December 5, 2007), four species were considered to potentially occur within the project area: CCCS, Chinook salmon, southern DPS North American green sturgeon and Sacramento splittail.[8]

Caltrans' surveys and consultations with NOAA Fisheries concerning CCCS have resulted in identifying potential habitat within the project area (see Figures 3.3-1a-d). NOAA Fisheries disclosed that seasonally, migratory adult CCCS are known to pass through the project area at Novato Creek to and from habitat further upstream. In addition NOAA reported that juvenile CCCS may be found seasonally in the lower-most segments of San Antonio Creek, which may provide seasonal rearing habitat as well as provide a migratory channel for adults passing through the project area to and from upstream habitat areas.

A blind-ended tidal channel adjacent to Redwood Landfill may be considered potential seasonal habitat for adult and juvenile CCCS. The Petaluma River near the bridge may also provide migratory habitat to and from upstream habitat.

It is also believed that CCCS may seasonally rear in the lower-most segments of Lynch Creek. Adults may periodically occupy and attempt to spawn within the lower segments, downstream of the project boundaries, although spawning and incubation habitat conditions are poor within the project reach. There is no critical habitat for this species within project limits.

Southern Distinct Population Segment (DPS) North American Green Sturgeon

Green sturgeon is the most widely distributed member of the sturgeon family (NMFS 2007b) in North America. Green sturgeon are found in rivers from British Columbia south to the Sacramento River, California (Moyle 2002). NMFS has

[8] At the time of the surveys, all three species were listed as threatened under the Federal Endangered Species Act (FESA). Since that time, Sacramento splittail has been de-listed and is now considered a "species of special concern" under both FESA and the California (ESA). This discussion is under Section 3.3.5.

determined that this species consists of two distinct population segments along the west coast of the U.S. and Canada: the northern and southern DPS North American green sturgeon. The northern DPS green sturgeon is made up of spawning populations from the Rouge River, Oregon and the Eel and Klamath rivers in California (NMFS 2007b). This species is federally listed as threatened.

No habitat surveys were specifically conducted for green sturgeon for this project. However, evidence of their presence in the action area comes from a letter to Melanie Brent, Office Chief of the Office of Environmental Analysis, Caltrans District 4 from Richard Butler, Area Office Manager, NMFS Santa Rosa (NMFS 2007a). Mr. Butler stated that an acoustically tagged adult green sturgeon was detected in the vicinity of the Port within the Petaluma River during 2007. NMFS also believes that juvenile green sturgeon likely utilize the Petaluma River year-round as rearing habitat.

Chinook Salmon

The waterways identified for Chinook salmon habitat also provide similar habitat values for the federally threatened CCCS. Personal communication with Bill Cox, CDFG, on February 7, 2003 led to Caltrans identifying potential habitat for Chinook salmon in the MSN Project area. Under the Magnuson-Stevens Fishery and Conservation Act, Novato Creek, San Antonio Creek, Petaluma River, and Lynch Creek are all considered essential habitat for these salmon. The blind-ended tidal channel downstream of the flapgate at the Lakeville Channel may provide seasonal rearing habitat, if this species is present in the Petaluma River. NOAA Fisheries reported that the Petaluma River may provide migratory and rearing habitat for Chinook salmon, and the portion of Lynch Creek downstream of the project area may provide seasonal spawning and/or rearing habitat if hydrological conditions and access to the Petaluma River is provided. There is no critical habitat for this species within project limits.

Federal and State Listed Plants

Caltrans biologists conducted plant surveys within the project area in 2002 and 2004. Although appropriate habitat for several special status species or sensitive plants is present in the project area, no special status plant species were observed within the project boundaries. A habitat assessment of rare plant habitat in the project area was conducted in 2008. Surveys conducted according to the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species* (USFWS 1996) were conducted in accessible parcels in areas that have been identified as having potential sensitive plant species habitat within the project area in the late summer 2008 and the spring and summer of 2009. Pre-construction surveys following the protocol will be conducted in parcels that were not accessible in 2008 and 2009. Protocol-level surveys will be conducted prior to construction to determine if rare plants are present.

3.3.6.3 Impacts

The two MSN Build Alternatives may impact the following federally listed species and/or their habitat: SMHM, CRLF, green sturgeon, CCCS, Sonoma alopecurus, soft bird's beak, Baker's larkspur, Burke's goldfields, Contra Costa goldfields, and showy Indian clover. Caltrans and FHWA entered into formal consultation with both the USFWS and NOAA Fisheries for potential effects on these species in compliance with the Section 7 process.

Salt Marsh Harvest Mouse (SMHM)

Fixed HOV Lane Alternative. Under the Fixed HOV Lane Alternative, avoidance measures during construction would avert impacts at all the SMHM locations, except habitat near the Petaluma River Bridge. The proposed replacement of the Petaluma River Bridge would impact SMHM habitat by bringing the toe of the embankment closer to the Petaluma River. Placement of abutment fill could impact up to 0.02 ha (0.05 ac) of pickleweed on the eastern side of the bridge structures. Construction would also place abutment fill in the existing channel that currently connects the patches of pickleweed on the east and west sides of the bridges. There is little to no pickleweed habitat along the Petaluma River on the southern bank.

Pursuant to Section 7 of the FESA, Caltrans and FHWA prepared a Biological Assessment (BA) that further discussed potential effects on the SMHM and its habitat and identified additional measures to reduce harm to this federally and state listed endangered species. In the BA, Caltrans and FHWA determined that the project may affect and is likely to adversely affect SMHM. A BO was issued by the USFWS for this project on April 1, 2009 (see Appendix N). In the BO, the USFWS determined that the project is not likely to result in jeopardy to the continued existence of the SMHM and provided an Incidental Take Statement.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would also replace the Petaluma River Bridge, resulting in the same impacts to the SMHM described above. Like the Fixed HOV Lane Alternative, the Reversible HOV Alternative would impact (up to 0.02 ha [0.05 ac]) pickleweed habitat.

Access Options. None of the four Access Options would require construction activities near the SMHM locations. Therefore, none of the four Access Options would affect the SMHM.

No Build Alternative. The No Build Alternative would not propose any improvements near the SMHM locations and, therefore, would have no impact on the SMHM or its habitat.

California Red Legged Frog (CRLF)

Fixed HOV Lane Alternative. No aquatic habitat suitable for breeding by CRLF will be affected by the project, and thus, no eggs or larvae will be affected directly. The highly disturbed upland areas along the margin of the roadway do not provide high-quality foraging habitat due to existing development, the presence of disturbed areas and the paucity of vegetation in many areas. If CRLF occur within the affected areas, the primary use of the affected areas by CRLF would be by individuals dispersing away from breeding areas located within 3.2 km (2.0 mi) of the action area. Dispersal through the project action area leads only to the US 101 traffic lanes, where survival of CRLF is unlikely. The roadway margin is characterized by cut and fill slopes or compacted and graveled areas that have few mammal burrows for refugia and as such is of minimal value to CRLF individuals or populations, such that any effects to the species resulting from loss of this habitat would be negligible. Construction within the project area would permanently impact approximately 82.47 ha (203.78 ac) and temporarily impact approximately 1.34 ha (3.16 ac) of upland habitat.

Caltrans and FHWA determined in the BA that the project may affect and is likely to adversely affect the CRLF. The USFWS determined in the BO that the project is not likely to result in jeopardy to the continued existence of the CRLF and has provided an Incidental Take Statement based on habitat impacts.

Reversible HOV Lane Alternative. Direct and indirect impact areas would be identical to the ones discussed for the Fixed HOV Lane Alternative, since the project footprint is the same for both Build Alternatives.

Access Options. The areas of potential CRLF habitat in Segment B, where the Access Options are proposed, include two unnamed drainage channels in the vicinity of Olompali SHP, two unnamed creeks across from the Silveira Dairy, a creek at the Equine Veterinary Clinic, and a pond off San Antonio Road. Other potential areas include a portion of San Antonio Creek, an unnamed creek just north of the Marin/Sonoma County line, a pond just north of Gambini Road, and a pond just off the South Petaluma Road exit. All four of the Access Options propose improvements in these areas, and thus, all have the potential to affect, but not likely to adversely affect, CRLF.

No Build Alternative. The No Build Alternative would continue existing operations and maintenance of US 101, and would not include improvements that could impact the CRLF.

Central California Coast Steelhead (CCCS)

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would result in approximately 0.47 ha (1.16 ac) of permanent impacts to salmonid habitat, including the federal threatened CCCS. Table 3.3-4 in Section 3.3.5 lists the effects by water body within the project area.

The Fixed Lane HOV Alternative would involve work in Novato Creek, Petaluma River, San Antonio Creek, Lynch Creek, and Washington Creek. While the Novato Creek and Lynch Creek bridges would be widened, Petaluma River Bridge would be replaced with a new structure. The San Antonio Freeway Bridge would be replaced with a new structure and a second crossing would be constructed just west of the historic San Antonio Creek Bridge for two-way traffic on San Antonio Road.

The Fixed HOV Lane Alternative would not propose work in the blind-ended tidal channel adjacent to the Redwood Landfill; thus, potential impacts would be limited to Novato Creek, San Antonio Creek, Lynch Creek, Washington Creek, and the Petaluma River and could impact the CCCS that could use these waterways for seasonal rearing habitat as well as provide migratory channels for adults passing through the project area to and from upstream habitat areas.

Caltrans and FHWA determined in the BA that the project may affect, but is not likely to adversely affect CCCS. However, in the BO, issued by NOAA Fisheries on January 26, 2009 (see Appendix O), NOAA disagreed with the BA finding and determined that the project may affect and is likely to adversely affect CCCS. NOAA also determined in the BO that the project is not likely to jeopardize the continued existence of the CCCS and has provided an Incidental Take Statement. Critical habitat for this species is present in the project area; however, NOAA concluded in the BO that work would not adversely modify designated habitat.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would have identical impacts to the CCCS as the Fixed HOV Lane Alternative, because the Reversible HOV Lane Alternative proposes the same footprint and improvements in the areas around Novato Creek, San Antonio Creek, Lynch Creek, Washington Creek, and the Petaluma River. In total, this alternative would permanently impact approximately 0.47 ha (1.16 ac) of salmonid habitat.

Access Options. Each of the Access Options would have similar, temporary impacts to the CCCS, because the improvements around San Antonio Creek and the Petaluma River are common to all Access Options.

No Build Alternative. Under the No Build Alternative, there would be no impacts to CCCS or their habitat, because this alternative proposes no improvements other than routine maintenance and upkeep of the existing US 101.

Southern Distinct Population Segment (DPS) North American Green Sturgeon

Fixed HOV Lane Alternative. The Fixed HOV Lane Alternative would result in approximately 0.21 ha (0.46 ac) of permanent impacts to green sturgeon habitat.

The Fixed Lane HOV Alternative would involve work in Novato Creek, Petaluma River, San Antonio Creek, Washington Creek, and Lynch Creek. While the Novato Creek and Lynch Creek bridges would be widened, Petaluma River Bridge would be replaced with a new structure. The San Antonio Freeway Bridge would be replaced with a new structure and a second crossing would be constructed just west of the historic San Antonio Creek Bridge for two-way traffic on San Antonio Road. Green sturgeon is expected to occur only in the Petaluma River.

Caltrans and FHWA initially determined in the BA that the project may affect, but is unlikely to affect the green sturgeon. Caltrans and FHWA subsequently modified that determination to may affect and is likely to adversely affect the species. However, NOAA concluded in the BO that the effects are discountable and the chance o encountering green sturgeon during construction activities is very low. NOAA further determined in the BO that the project is not likely to jeopardize the continued existence of green sturgeon. Critical habitat was proposed for this species in September 2008. However, NOAA concluded in the BO that the proposed work would not adversely modify critical habitat.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative would have identical effects to the green sturgeon as the Fixed HOV Lane Alternative, because the Reversible HOV Lane Alternative proposes the same footprint and improvements in the areas around the Petaluma River. In total, this alternative would temporarily impact approximately 0.21 ha (0.46 ac) of permanent impacts to green sturgeon habitat.

Access Options. Each of the Access Options would have similar, temporary effects to the green sturgeon, because the improvements around the Petaluma River are common to all Access Options.

No Build Alternative. Under the No Build Alternative, there would be no effects to green sturgeon or their habitat, because this alternative proposes no improvements other than routine maintenance and upkeep of the existing US 101.

Rare Plants

Fixed HOV Lane Alternative. At this time, Caltrans and FHWA are inferring that Baker's larkspur, Sonoma alopecurus, Contra Costa goldfields and Burke's goldfields are present in suitable habitat within the project area. This inference will be verified during later surveys prior to construction.

Table 3.3-5 below summarizes the amount of potential impacts to Baker's larkspur, Sonoma alopecurus, Contra Costa and Burke's goldfields. Although suitable habitat for Burke's goldfields is present in the project area, no impacts are currently anticipated from project construction activities.

Table 3.3-5 Potential Impacts to Sonoma Alopecurus, Contra Costa Goldfields and Baker's Larkspur

Permanent Impacts	Total ha/(ac)
Contra Costa goldfields	0.09 (0.22)
Burke's goldfields	0
Sonoma alopecurus	0.35 (0.88)
Baker's larkspur	0.3 (0.7)

Showy Indian clover is only known from one extant population in Marin County, is extremely limited in distribution, and is very unlikely to occur. Showy Indian clover is therefore unlikely to be present within the project area. However, protocol-level surveys will be conducted prior to construction as previously stated.

Reversible HOV Lane Alternative. The Reversible HOV Lane Alternative has the same footprint as the Fixed HOV Lane Alternative. Accordingly, the impacts for the two Build Alternatives would be identical.

Access Options. The project area associated with the Access Options was surveyed along with the mainline project area. The results are the same as those reported under the Fixed and Reversible HOV Lane Alternatives above.

No Build Alternative. The No Build Alternative would involve routine maintenance and upkeep of US 101 and would have no impacts to special status plant species are anticipated.

3.3.6.4 Avoidance, Minimization, and/or Mitigation Measures

The elimination of certain Access Options through the criteria-based evaluation process (see Appendix A) resulted in avoiding or reducing potential impacts to critical habitat protected under federal and state listed threatened and endangered species discussed in this section. Following are specific measures to protect SMHM, CRLF, and rare plants such as the Baker's larkspur, Sonoma alopecurus, Contra Costa and Burke's goldfields.

For a complete list of the avoidance and minimization measures for protecting SMHM, CRLF, and rare plants, please see USFWS's Biological Opinion (Appendix N). For a complete list of avoidance and minimization measures for protecting green sturgeon and Central California coast steelhead (CCCS), see NOAA Fisheries' Biological Opinion (Appendix O).

Specific Measures to Protect SMHM. Following are measures developed during the project development process to fully protect SMHM.

- The Novato Creek Bridge will be widened under the Preferred Alternative. Caltrans will avoid impacts to the SMHM habitat at this location by restricting construction close to the toe of the embankment and positioning fencing to protect environmentally sensitive areas (ESA), such as pickleweed and the associated upland transition mix.

- Since, the closest potential habitat for SMHM has been found to be approximately 45.5 m (150 ft) from the existing Caltrans right-of-way, Caltrans will minimize effects on potential habitat at Location 4 by restricting construction to within 30.5 m (100 ft) of the existing right-of-way (per direction from CDFG and USFWS).

- Caltrans' consultations with CDFG also resulted in the development of avoidance measures at the Petaluma River Bridge (CDFG letter, January 11, 2006). These measures would be implemented to avoid "take"[9] of SMHM. Caltrans will realign the channel closer to the Petaluma River to maintain connectivity between the two sides of the bridge structures as mitigation. In addition, Caltrans will construct an additional channel between the Petaluma River and the western side of the bridge structures, allowing greater tidal influence to the area and improving the quality of the pickleweed habitat on the western side of the bridge. Caltrans will also expand and improve the pickleweed along the northern bank beneath the Petaluma River Bridge.

- To minimize or avoid the loss of individual SMHM from construction activities in the Petaluma River area, pickleweed vegetation will be hand-removed. A high visibility fence consisting of plastic sheeting will be placed 6.0 m (20 ft) from the boundaries of construction areas in and adjacent to the

[9] The term "take" pertains to mortality, but does not include the taking of habitat alone or the impacts of the taking under the CESA. In addition, the "fully protected" species status prohibits a state agency from issuing a take permit. Federal agencies define take as "to harass, harm, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." The avoidance, minimization, and/or mitigation measures listed above would comply with avoiding "take" as defined by state and federal agencies.

pickleweed areas after the vegetation is removed to prevent mice from pushing under the fence.

Specific measures to protect CRLF. During project development, potential CRLF habitats were excluded from the project, including:

- In Segment A, areas that will be completely avoided in the project include the Ehreth Pond Wildlife Preserve and Scottsdale Marsh.
- Areas in Segment B surveyed for CRLF that will be completely avoided by the MSN Project include a pond off of Airport Road, and two ponds on property belonging to Birkenstock® Footprint Sandals, Inc.
- Other areas that will be completely avoided include Corona Creek (owned by Sonoma County Water Agency) and Corona Ditch (owned by the City of Petaluma).

General Construction Measures to Protect Salt Marsh Harvest Mouse (SMHM) and California Red Legged Frog (CRLF). Consultations between Caltrans, the CDFG, and the USFWS (see Table 6-3) have resulted in the development of these additional avoidance and protection measures at potential SMHM and CRLF habitat locations within the MSN Project area. For a complete list of the avoidance and minimization measures for protecting SMHM, CRLF, and rare plants, please see USFWS's Biological Opinion (Appendix N).

1. Qualified biologist(s) will be designated to monitor on-site project construction activities that may have adverse effects to SMHM or CRLF. Biologist(s) will coordinate through the Resident Engineer, to stop any work that may result in take of these listed animal species. In the event that SMHM or CRLF gain access to a construction zone, work will halt immediately and the biologist and the USFWS (concerning SMHM and CRLF) and CDFG (concerning SMHM) will be contacted. Work will be suspended until the animal(s) leaves the site voluntarily or is removed by the biologist to a release site using USFWS (for SMHM and CRLF) and CDFG (SMHM) approved handling techniques.
2. Prior to working on the project site, all supervisory construction personnel working in areas of potential endangered species habitat will attend environmental education programs delivered by a qualified biologist. Emphasis will be placed on the importance of the habitat and life stage

requirements within the context of project maps showing areas where minimization and avoidance measures are being implemented, and an explanation of appropriate federal and state laws protecting endangered species as well as the importance of compliance with Caltrans and various resource agency conditions.

3. To minimize temporary disturbances in areas of potential SMHM and CRLF habitat, project-related vehicle traffic will be restricted to established roads, construction areas, and other designated areas. Off-road traffic outside of designated action areas will be prohibited.

4. To eliminate attraction of predators of the SMHM and CRLF, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers and removed at least once a day from the project construction area.

5. To avoid injury or death of the SMHM and CRLF, firearms will not be allowed in the project construction area except for those carried by authorized security personnel, or local, State, or Federal law enforcement officials.

6. To prevent harassment, injury or mortality of SMHM or CRLF or destruction of their refuge/nesting areas, canine or feline pets will not be permitted in the construction area.

7. Rodenticides and herbicides in the action area will be used in such a manner to prevent primary or secondary poisoning of SMHM or CRLF and the depletion of vegetation upon which they depend. Additional project-related restrictions may be deemed necessary by the USFWS or the CDFG.

8. Dedicated fueling and refueling practices shall be designated as part of the approved Storm Water Pollution Prevention Plan (SWPPP). On site fueling shall only be used when it is impractical to send vehicles and equipment off-site for fueling. When fueling must occur on-site, the contractor will designate an area to be used subject to the approval of the Resident Engineer. Drip pans or absorbent pads will be used during on-site vehicle and equipment fueling.

9. All grindings and asphaltic-concrete waste will be stored within previously disturbed areas absent of habitat and at a minimum of 45.7 m (150 ft) from any downslope riparian habitat, aquatic habitat, culvert, or drainage feature.

10. Prior to commencing construction work that can have adverse effects to SMHM or CRLF, and to the extent practicable, areas outside of the construction zones containing suitable habitat for SMHM or CRLF will be delineated with high visibility temporary fencing at least 1.2 m (4 ft) in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment onto sensitive areas during construction. The fencing will be removed only when all construction equipment is removed from the site.

11. If requested, before, during, or upon completion of ground breaking and construction activities, Caltrans shall allow access by USFWS (for SMHM or CRLF) and/or CDFG personnel (for SMHM) to the project site to inspect project effects to the listed animal species and their habitats.

12. For work that could have adverse effects to SMHM or CRLF, a biologist shall be on-site to monitor the initial ground disturbance activities for the road construction. The biologist shall perform a clearance survey immediately prior to the initial ground disturbance. Safety permitting, the biologist(s) shall investigate areas of disturbed soil for signs of listed species within thirty (30) minutes following the initial disturbance of that given area.

13. To prevent entrapment of SMHM or CRLF, all excavated, steep-walled holes or trenches more than 0.61 m (2 ft) deep will be covered at the close of each working day by plywood or similar materials. If it is not feasible to cover an excavation, one or more escape ramps constructed of earth fill or wooden planks shall be installed. Such holes or trenches will be thoroughly inspected for trapped animals. If at any time a trapped listed animal is discovered, the on-site biologist will immediately place escape ramps or other appropriate structures to allow the animal to escape.

14. Plastic mono-filament netting (erosion control matting) or similar material will not be used at the project site because CRLF may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

Measures to Protect Central California Coast Steelhead (CCCS) and Green Sturgeon. Caltrans will implement several measures to avoid and minimize impacts to Central California coast steelhead (CCCS), green sturgeon and their habitat. For a complete list of avoidance and minimization measures for protecting green sturgeon and CCCS, see NOAA Fisheries' Biological Opinion

(Appendix O). These measures will also be protective of Chinook salmon (discussed in Section 3.3.5), including:

1. Restricting work in Novato Creek, San Antonio Creek, the Petaluma River and Lynch Creek to low-flow periods between June 15 and October 31 to avoid effects to CCCS during the migratory season. For green sturgeon, work will be restricted in the Petaluma River only. This window can be increased based on creek and river conditions, if approved in writing by NMFS. Work from the banks and from falsework can occur year round.

2. Measures will be taken to minimize the amount and duration of pile driving. For any pile driving occurring in wetted areas that may be occupied by CCCS, sound pressure levels generated from pile driving activities within the Novato Creek, San Antonio Creek, the Petaluma River and Lynch Creek will be restricted. For green sturgeon, sound pressure levels will be restricted in the Petaluma River only. Pile-driving activities will be conducted during daylight hours only to allow movement of juvenile or adult Chinook salmon past the construction vicinity during night time hours. Monitoring of acoustic levels may be necessary to confirm that pile driving activities are not harmful to CCCS life stages.

3. Storing all equipment outside of all waterways, including wetlands. The staging areas will also be situated 15.2 m (50 ft) from existing drainages.

4. Installing ESA fences. The ESA fencing will be delineated on the final plans and the fence will be installed and remain on-site until the project is completed.

5. Using appropriate temporary coffer dams to dewater the construction sites and divert water through the project area during the construction period to prevent impeding creek flow or water flow through the work areas. If dewatering at a site is required, a qualified Caltrans biologist will be present during the dewatering period to inspect and ensure that sensitive aquatic species will not be trapped within the temporary coffer dams. If CCCS are found within the areas of construction, a qualified biologist will capture, and relocate these fish to an appropriate area away from the construction site. Caltrans will submit for approval the dewatering and fish capture and relocation plans to the appropriate resource agencies once the design plans are finalized.

6. Removing from the streambed at the completion of the construction project all materials used to maintain flow and divert water from the action area during the construction period, including coffer dams, pipes, filter fabric, and gravel.

7. Removing all project-introduced material once the work is complete.

8. Recontouring any disturbed stream channel areas to pre-project conditions or better.

9. Caltrans will utilize reflectors on portable light trees to focus the light on the work area and minimize the amount of light spilling over to adjacent areas during any night work. In addition, noise-reducing enclosures will be used around noise-generating equipment, equipment will be located as far as possible away from noise-sensitive habitat areas, and sound control devices such as mufflers will be used on construction equipment to dampen noise as much as possible.

Specific measures to protect rare plants. The following survey and avoidance measures will be incorporated into the MSN Project. Please see USFWS Biological Opinion (Appendix N) for more details regarding avoidance and minimization measures.

- Surveys will be conducted according to USFWS, CNPS, and CDFG protocols within potentially suitable habitat for the Baker's larkspur, Sonoma alopecurus, Contra Costa and Burke's goldfields, and the showy Indian clover by botanists familiar with the local flora, and surveys will be floristic in nature.

- In adherence with the protocols, surveys will be conducted during the appropriate blooming season for these plants.

- If identified during the preconstruction surveys, consultation with the USFWS will be reinitiated.

- Caltrans will also implement several measures to avoid and minimize impacts to federal listed plants and their habitat including:

  - Making minor design modifications to avoid effects to the species;

  - Designating any area where federally listed plants and/or populations have been observed within the temporary work area as an Environmentally

Sensitive Area (ESA) and mark it in the field with orange construction fencing;

- Showing the location of all ESAs on project construction drawings and monitoring them during construction.

3.3.7 Invasive Species

3.3.7.1 Regulatory Setting

EO 13112 requires federal agencies to prevent the introduction or spread of invasive species in the United States. The order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The executive order builds on NEPA, the Federal Noxious Weed Act of 1974, the state noxious weed list, and the Endangered Species Act of 1973 to prevent the introduction of invasive species; provide for their control; and take measures to minimize economic, ecological, and human health effects.

3.3.7.2 Affected Environment

Table 3.3-6 lists those species that were noted during the biological surveys in the project area that are designated as exotic pest plants of ecological concern by the California Invasive Plant Council (Cal-IPC).

3.3.7.3 Impacts

Fixed HOV Lane Alternative. Construction activities associated with the Fixed HOV Lane Alternative have the potential to introduce noxious weeds from the project area into uninfested areas. Uninfested areas that are potentially at risk include neighboring wildland areas and other areas where machinery used on the project may be used subsequently. Through the successful implementation of avoidance and minimization efforts, as described below, the Fixed HOV Lane Alternative would have no adverse impact of noxious weeds on the sensitive communities.

Table 3.3-6 Noxious Weeds Noted in Project Area

Scientific Name	Common Name
Avena barbata	slender wild oat
Bellardia trixago	bellardia
Brassica nigra	black mustard
Briza maxima	rattlesnake grass
Bromus diandrus	ripgut brome
Cardus pycnocephalus	Italian thistle
Centaurea solstitialis	yellow star thistle
Conium maculatum	poison hemlock
Cotula coronopifolia	brass buttons
Cytisus scopius	Scotch broom
Daucus carota	Queen Anne's lace
Dipsacus sativus	fuller's teasle
Eucalyptus sp.	eucalyptus
Foeniculum vulgare	fennel
Phalaris aquatica	harding grass
Raphanus sativus	radish
Rubus discolor	Himalayan blackberry
Rumex crispus	curly dock

Reversible HOV Lane Alternative. Impacts associated with the Reversible HOV Lane Alternative related to the introduction of noxious weeds would be identical to those described above for the Fixed HOV Lane Alternative. Both alternatives would have similar construction activities, which could spread noxious weeds into uninfested areas.

Access Options. The Access Options would all have similar impacts related to noxious weeds. As described for the Build Alternatives, above, construction activities associated with any of the Access Options could spread noxious weeds. No single Access Option would have more severe impacts than another, however.

No Build Alternative. The No Build Alternative would include routine maintenance activities which could include minor construction activities that could spread noxious weeds. The potential to spread noxious weeds, however, would be less than under the Build Alternatives.

3.3.7.4 Avoidance, Minimization and Mitigation Measures

Construction BMPs to Avoid Introducing Invasive Species. Caltrans will direct its contractors to include measures such as worker training, avoidance of sensitive communities, and cleaning construction machinery before use on subsequent projects in sensitive communities to reduce the likelihood that noxious weeds would be spread by the proposed project.

Caltrans will require that disturbed areas be restored and re-vegetated after construction is complete to prevent noxious weeds from colonizing new areas.

Plant Species Selection for Landscaping and Erosion Control. In compliance with the EO on Invasive Species, EO 13112, and subsequent guidance from FHWA, the landscaping and erosion control included in the project will not use species listed as noxious weeds, as identified in Cal-IPC and the state noxious weed list. In areas of particular sensitivity, extra precautions will be taken if invasive species are found in or adjacent to the construction areas. These include the inspection and cleaning of construction equipment and eradication strategies to be implemented should an invasion occur.

3.4 Irreversible and Irretrievable Commitments

Implementation of either Fixed HOV Lane Alternative or Reversible HOV Lane Alternative would involve a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous materials would be expended in the construction of either Build Alternative. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds, which are not retrievable.

3.5 Relationship between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

Fixed HOV Lanes Alternative. Short-term losses include: construction impacts, such as noise, motorized and non-motorized traffic delays or detours, and recreational impacts such as access inconveniences to Olompali SHP.

Short-term benefits include: increased jobs and revenue generated during construction.

Long-term losses include: permanent loss of plant and wildlife resources, open space, visual impacts, use of construction materials and energy, and archaeological site values lost.

Long-term gains include: Reduced congestion, improved goods movement, improvement in highway operations, safer access to US 101, and net gains in wetlands and wildlife habitat through project mitigation.

Reversible HOV Lane Alternative: The short-term and long-term losses and gains for this alternative would be the same as the Fixed HOV Lane Alternative above.

Access Options. The short-term and long-term losses and gains for the Access Options would be the same as discussed for the Build Alternatives above.

No Build Alternative. This alternative would offer none of the gains or have the losses listed above. It would, however, not resolve worsening congestion on US 101.

Chapter 4 California Environmental Quality Act Evaluation

The proposed MSN Project is a joint project by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA and the FHWA is lead agency under NEPA.

The proposed project refers to improvements to the MSN corridor. Caltrans is considering two Build Alternatives (the Fixed HOV Lane and the Reversible HOV Lane), as described in Chapter 2, Project Alternatives. In addition, four access options are being considered in the Central Segment to provide replace access to US 101 and local circulation should the expressway be upgraded to a freeway under either of the Build Alternatives. Any of the Access Options could be combined with either Build Alternative, but only one will be identified as part of the preferred alternative prior to the final environmental document.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an EIS, or some lower level of documentation, would be required. NEPA requires that an EIS be prepared when the proposed federal action (project) *as a whole* has the potential to "significantly affect the quality of the human environment." The NEPA determination of significance is based on context and intensity; CEQA is based on a similar concept—the environmental setting. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision is made regarding the need for an EIS, it is the magnitude of the impact that is evaluated and no judgment of its individual significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in environmental documents.

CEQA, on the other hand, does require Caltrans to identify each "<u>significant effect on the environment</u>" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an EIR must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated if feasible. In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance of CEQA. Therefore, this chapter discusses the effects of this project and CEQA significance.

4.1 Determining Significance under CEQA

The CEQA Guidelines Section 16064 (b) broadly defines a significant effect on the environment as a substantial or potentially substantial adverse change in the physical environment. One of the basic purposes of the CEQA is to inform state, regional, and local governmental decisionmakers and the public of impacts of proposed activities, and in particular, those impacts that are either significant or potentially significant.

Determining and documenting whether an activity may have a significant effect on the environment plays a critical role in the CEQA process. CEQA requires specific significant impacts to be determined in an EIR. Determination of significance under CEQA guidelines begins by eliminating impacts that are obviously insignificant. Those impacts whose significance is uncertain or potentially significant undergo studies. The studies determine if the impacts result in substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. A social or economic change may be considered in determining whether the physical change is significant. CEQA requires substantial evidence—"facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts"—in determining significance. Serious public controversy over the environmental effects of a project shall, however, be treated as an indicator of significance. Additionally, CEQA distinguishes four mandatory findings of significance:

- Potential to substantially degrade the environment, reduce the habitat of a fish and wildlife species, cause fish or wildlife populations to drop below self-sustaining levels, threaten or eliminate a plant or animal community, reduce the number or range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory;

- Potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals;
- Environmental effects that are individually limited but cumulatively considerable; and
- Environmental effects will cause substantial adverse effects on human beings, either directly or indirectly.

4.2 CEQA Environmental Checklist

The CEQA Environmental Significance Checklist (Appendix K in this FEIR/S) identifies direct and indirect physical, biological, social factors that might be affected by the Fixed HOV Lane Alternative and the Reversible HOV Lane Alternative. This checklist is not a National Environmental Policy Act (NEPA) requirement. The findings for the CEQA checklist were determined in consultation with the technical studies prepared for the MSN Project listed in Chapter 9.

CEQA impact levels include potentially significant impact, less than significant impact with mitigation, less than significant impact, and no impact. Table 4-1 provides a reference for project impacts under CEQA. As noted in the table, impact determinations may vary by project segment. In some cases a "no impact" determination has been made based upon the project's technical and background studies, and are not presented in this chapter. Please refer to Appendix K for the complete MSN Project CEQA Checklist.

Table 4-1 Summary of Impact Determinations under CEQA

Section No.	Topic Areas	Impact Determination
4.3.1 4.3.2	Aesthetics	Segment A: Significant Unavoidable Segment B: Significant Segment C: Cumulatively Significant
4.3.3	Agricultural Resources	All Segments: Less than Significant
4.3.3	Air Quality	All Segments: Less than Significant
4.3.3	Biological Resources	All Segments: Less than Significant
4.3.3	Hazards and Hazardous Materials	All Segments: Less than Significant
4.3.3	Hydrology and Water Quality	All Segments: Less than Significant
4.3.3	Cultural Resources	Segment B: Less than Significant
4.3.3	Mineral Resources	Segment B: Less than Significant
4.3.3	Noise	All Segments: Less than Significant

Table 4-1 Summary of Impact Determinations under CEQA

Section No.	Topic Areas	Impact Determination
4.3.3	Paleontology	Segment C: Less than Significant
4.3.3	Population and Housing	All Segments: Less than Significant
4.3.3	Recreation	Segment B: Less than Significant
4.3.3	Transportation and Traffic	All Segments: Less than Significant
4.3.5	Growth Inducing	All Segments: Less than Significant

4.3 Discussion of Significant Impacts Under CEQA

4.3.1 Significant Unavoidable Impacts of the Proposed Project

This section pertains to potential environmental effects of the Fixed HOV Lane and Reversible HOV Lane Alternatives that would remain significant even after mitigation measures are taken.

4.3.1.1 Aesthetics

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

The construction of roadway improvements and soundwalls within Segment A (the Northern Segment) could result in the removal of several hundred mature Redwood and Eucalyptus trees, which would substantially degrade the visual quality within the Northern Segment's Landscape Unit. These impacts could be partially mitigated, but would remain **significant** in the long term. Please refer to Section 3.1.11 for more information on this topic.

4.3.2 Significant Environmental Effects of the Proposed Project

4.3.2.1 Aesthetics

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

Various project features under either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative, including the construction of interchanges, access roads, and soundwalls, would result in degradation of the visual character and quality of the highway corridor. Tree removal in the highway foreground, major landform alterations due to grading and roadway re-alignments, increased roadway visual dominance, and other effects would result in a decline in the overall visual quality. However, with recommended mitigation measures, these adverse impacts would be substantially mitigated to **less than significant** levels in the long term within the Southern and Central Segments (Segments A and B) of the proposed project.

In the short term, **significant** temporary impacts would exist in the Central Segment until vegetation and tree replantings reach maturity (10-20 years). Please refer to Sections 3.1.11 and 3.3.2 for more information on this topic. For more detailed information on tree loss in the Northern Segment (Segment C), please refer to Section 3.3.2.

4.3.3 Less than Significant Effects of the Proposed Project

Following is a summary of the project impacts that are less than significant under CEQA:

4.3.3.1 Aesthetics

Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

The Build Alternatives would require concrete median barriers and may involve the construction of soundwalls, which would be treated to reduce potential glare. With recommended mitigation this impact would be **less than significant**.

Nighttime construction activities could have the potential to cause substantial light and glare impacts on motorists, adjacent residences, and other sensitive receptors. With recommended mitigation measures however, these impacts would be **less than significant.**

Temporary light and glare impacts from auto headlights could occur to residents adjoining the highway in the Northern Segment after removal of existing tree screening. With recommended mitigation measures, however, these impacts would be **less than significant**. Please refer to Section 3.1.11 for more information on this topic.

4.3.3.2 Agriculture Resources

Would the project convert prime farmland, unique farmland, or Farmland of Statewide Importance as show on maps prepared pursuant to the Farmland

Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

Under the Fixed HOV Lane Alternative and the Reversible HOV Lane Alternative, conversion of farmland to transportation use would occur, primarily in the Central Segment. The conversion of farmland to transportation would vary depending on the Access Option. The impact of Access Option 14d would be the greatest with the conversion of 73.52 ha (181.67 ac), while Access Option 12b would have the least impact with the conversion of 63.22 ha (156.23 ac).Under the Access Options, between 0.61-0.77 ha (1.5-1.9 ac) of prime and unique farmlands would be impacted under either Build Alternative. In addition, 0.73 to 0.93 ha (1.8 to 2.3 ac) of statewide or locally important farmland would be converted under either of the Build Alternative, depending upon the Access Option identified. Minor conversion would also occur in the Northern Segment. See Section 3.1.5 for more discussion on this topic.

Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

Potential conversion of Williamson Act parcels would be due to the proposed Access Options. This potential conversion is shown in Table 3.1-4, which shows that, in Marin County, potential conversions range from 5.46 to 13.5 ha (13.5 to 33.36 ha) and, in Sonoma County, from 2.68 to 3.07 ha (6.62 to 7.59 ac). The conversion of Williamson Act parcels to transportation would vary depending on the Access Option. The impact of Access Option 14d would be the greatest with conversion of 16.18 ha (39.98 ac), while Access Option 12b would have the least impact with the conversion of 8.53 ha (21.09 ac) for both counties combined. Throughout the design phase, Caltrans would continue reducing right of way impacts, where feasible.

The proposed farmland conversions would not bisect any parcels or sever existing owners from accessing their properties. Project-related construction would not interfere with the operations or functions of agricultural land uses.

For conversions that cannot be avoided, Caltrans' compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act would reduce impacts to farmlands to a less-than significant level.

Would the project involve other changes in the existing environment which, due to their location, could result in conversion of farmland, to non-agricultural use?

Under the Access Options proposed in the Central Segment, farmland would be converted to transportation and transferred to county jurisdiction. Conversion of adjacent farmland would depend upon County plans which presently support the retention of farmland (see Section 3.1.5).

4.3.3.3 Air Quality

Would the project expose sensitive receptors to substantial pollutant concentrations?

Construction activities associated with either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative, along with the identified Access Option, would generate emissions of criteria pollutants over a phased and intermittent construction period, including suspended particulate matter and equipment exhaust emissions. These construction-related emissions would be limited to the construction period but would still cause adverse effects on the local air quality. Incorporation of appropriate mitigation measures would reduce the impacts to a **less than significant** level under CEQA. Please refer to Section 3.2.6 for more information on this topic.

Would the project create objectionable odors affecting a substantial number of people?

Objectionable odors may occur during the construction phase of the Build Alternatives due to use of heavy diesel-fueled equipment; however, this is a temporary exposure and would not be expected to affect a substantial number of people. Please refer to Section 3.2.6 for more information on this topic.

4.3.3.4 Biological Resources

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

Construction of either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative would cause temporary impacts to Salt Marsh Harvest Mouse

(SMHM) habitat [0.02 ha (0.05 ac)].. California red legged frog (CRLF) habitat is present within the project area and the Build Alternatives may directly impact potential, but marginal, habitat Construction within the project area would permanently impact approximately 82.47 ha (203.78 ac) and temporarily impact approximately 1.34 ha (3.16 ac) of upland habitat. Incorporation of avoidance and minimization measures would reduce impacts to CRLF habitats to **less than significant**. Study results will be reported in the final environmental document along with the USFWS Biological Opinion in Appendix N. Please refer to Section 3.3.6 for more information on this topic.

Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations by the California Department of Fish and Game or US Fish and Wildlife Service?

Construction of either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative would result in the removal of riparian and native oak trees. However, incorporation of mitigation measures would reduce impacts to a **less than significant** level under CEQA. Please refer to Section 3.3.2 for more information on this topic.

Potential impacts on nesting birds could be considered adverse if construction occurs in the proximity of nesting birds. However, adherence to avoidance measures, such as a qualified biologist conducting nesting surveys prior to vegetation removal, would ensure that impacts to nesting birds would be reduced to a **less than significant** level.

Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act?

Construction of either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative would permanently impact between 2.86 and 3.06 ha (7.08–7.60 ac) of wetlands and temporarily impact between 0.86 and 0.97 ha (2.13-2.40 ac) of wetlands. Temporary impacts to other Waters of the US would be between 0.24 and 0.28 ha (0.57 and 0.67 ac), and permanent impacts would be from 1.16 to 1.29 ha (2.83 to 3.16 ac) depending on Access Option. Access Options 4b and 12b would involve the greatest impact to wetlands and waters of the US, 5.23 ha (12.9 ac), while Access Option 14b would involve the least impact, 4.87 ha (12.03 ac). However, through implementation of the appropriate mitigation under either Build Alternative, these impacts would be reduced to a **less than significant** level under CEQA. Please refer to Section 3.3.3 for further discussion of this topic.

Would the project interfere substantially with the movement of any native resident, migratory fish or wildlife species?

The Build Alternatives would permanently impact 0.47 ha (1.16 ac) of Central California coast steelhead and California Coast Chinook salmon habitat, 0.20 ha (0.49 ac) of green sturgeon habitat, and 0.257 ha (0.63 ac) of Sacramento splittail habitat. Adherence to avoidance and minimization measures, such as allowing bridge work only during low flow periods, would not disrupt fish migration and would reduce impacts to a **less than significant** level. See Section 3.3.6 and the NOAA Biological Opinion for more information on this topic.

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

The MSN Project area currently provides an abundance of nesting habitat for many species of birds. For instance, bridges provide habitat for cliff swallows. Several large nests have been observed in a stand of eucalyptus trees adjacent to San Antonio Road and have been identified as potential raptor nests. A snowy egret, great egret, and great blue heron rookery is also present along the Petaluma Boulevard.

Modifications were made under the Preferred Alternative to decrease the radius of the ramp along Petaluma Boulevard in order to minimize impacts to the rookery; however, it was not possible to avoid the rookery entirely. Minimization measure will be employed where feasible to avoid further impacts to the rookery during final design and during project construction.

In accordance with the Migratory Bird Treaty Act, the contractor will conduct tree trimming and removal first and foremost outside of the nesting bird season of February 15-September 1. Trees may be identified for removal during the nesting season only if a qualified biologist has surveyed the trees and confirmed that there are no active nests present within the trees identified for removal or immediately adjacent. If any active nests are identified during this period, the trees cannot be disturbed for the duration of the nesting season. Although it is true that the project will impact a substantial number of trees under the Build Alternatives, many more trees will remain in the project area that can provide alternative nesting habitat. A tree replacement plan will also be implemented, particularly in Segment B wherever it is feasible, but plantings may take 10-20 years to reach maturity (see Appendix J). Therefore, impacts to nesting bird habitat would be **less than significant.**

Would the project conflict with any local policies or ordinances protecting biological resource, such as a tree preservation policy or ordinance?

The Build Alternatives would result in the removal of substantial numbers of trees within all three segments. Under either the Fixed HOV lane or Reversible HOV lane alternative, oak tree removal would range from approximately 439 to 569 trees. In the Central Segment, tree removal would vary depending on the Access Option identified. The impact of Access Option 12b would be the greatest with the removal of 441 native oak trees, while Access Option 14d would have the least impact with the removal of 311 oak trees. These numbers are preliminary and will be revised during the final design process. Efforts to minimize impacts to oaks will be made both during the design process as well as the construction process.

The Oak Woodlands Conservation Environmental Quality Act recognizes the importance of oak woodlands. The MSN Project would comply with the OWCEQ by mitigating for oak trees that would be removed under the Build Alternatives through conservation covenants.

The Marin County General Plan (1994, as amended), Policy EQ 3.14, indicates that the county shall strive to protect large trees, trees with historical importance, and oak woodland habitat, and prevent the untimely removal of trees through implementation of tree preservation ordinance.

The Sonoma County General Plan (1989, as amended), includes the County's policy for community separators. Goal OS-1 as stated proposes to preserve visual identities of communities by maintaining open space areas between cities and communities."

Although tree loss has been substantially reduced, Caltrans will continue to limit impacts to trees where practicable throughout the design process. In accordance with Sonoma County, the MSN Project would maintain community separators.

Implementation of tree mitigation measures would be developed in consultation with CDFG would reduce these impacts to a **less than significant** level. Please refer to Sections 3.1.11 and 3.3.2 for more information on this topic.

4.3.3.5 Cultural Resources

Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Construction of either the Fixed HOV Lane Alternative or the Reversible HOV Lane Alternative would have an adverse effect on two site complexes in the Area of Potential Effects. The site complex near Olompali SHP, three sites of which are eligible for the National Register of Historic Places would be entirely or partly destroyed by construction of the project. Mitigation, including the recovery of significant data that would be destroyed by construction, would reduce this impact to a **less than significant** level. Please refer to Section 3.1.12 for more information on this topic.

Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Located near the project area is the Wilson Grove Formation, a known fossil resource. As there is low potential for fossil occurrence in the project area, the impact on paleontological resources is **less than significant**. Avoidance and minimization measures will be utilized. 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) will be prepared in order to have a qualified Principal Paleontologist evaluate the resource. If the resource is determined to be significant, monitoring and mitigation will be employed.

Would the project disturb any human remains, including those interred outside of formal cemeteries?

During project development, Caltrans modified the Build Alternatives to avoid and minimize project-related impacts to cultural resources; however, total avoidance of archaeological resources is not achievable due to the scale of the proposed construction, tight grade areas, and turning constraints. To resolve adverse effects of the proposed project on archaeological sites, Caltrans has consulted with the SHPO and interested Native American groups. A

Memorandum of Agreement (MOA) has been developed to identify mechanisms for treatment of historic properties, primarily through recovery of significant data that would be destroyed by construction of the project (Appendix D). The MOA will also outline the process for finishing identification of subsurface contexts that might contain historic properties that might be affected by the project and will also outline procedures for treatment of historic properties inadvertently discovered during construction.

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC) who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact District 4 Environmental Branch, so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable. As it is unlikely that human remains will be discovered, and, if they are, data recovery and monitoring measures are to be utilized, the impact on human remains is **less than significant.**

4.3.3.6 Geology and Soils

Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

The Fixed HOV Lane and Reversible HOV Lane Alternatives would be constructed in a seismically active area. All structures included under the Build Alternatives and Access Options would be designed to withstand the largest magnitude earthquake (7.0) the active Rodgers Creek Fault is capable of producing, thereby minimizing potential adverse effects related to ground shaking, ground failure, and liquefaction. As a result, impacts related to seismic events are considered to be **less than significant**.

Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

Slope stability in the Northern and Southern Segments would not be a concern for the Build Alternatives because of the generally level terrain in these stretches. However, slope stability hazards, such as landslides, in the Segment B, especially in areas where cuts are proposed, may be of concern. Embankments would be stabilized and appropriate cut/embankment slope ratios and benches would be analyzed during final design for the preferred Build Alternative and Access Option. Therefore risk due to landslide is considered a **less than significant** impact.

Would the project result in substantial soil erosion or the loss of topsoil?

There would be no significant increase in soil erosion as a consequence of the Build Alternatives. Materials used for any embankment or foundation construction would conform with standard specifications to ensure proper soil settlement. Adherence to Caltrans specifications and the NPDES permit under which Caltrans would construct and operate the Build Alternatives and Access Options would result in **less than significant** erosion impacts.

Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Standard design and construction methods would minimize impacts associated with unstable soils. Soil settlement problems associated with the Build Alternatives and the Access Options would be avoided by various standard engineering practices, such as the removal of soft soils, soil mixing, wick drains, lightweight fill, grouting, or stone columns. As a result, geotechnical and soil limitations would be addressed and result in **less than significant** impacts.

Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Soils with the Central Segment are subject to expansion and contraction when going from wet to dry conditions. Standard construction techniques for dealing with this soil type would ensure that potential effects of the Build Alternatives and the Access Options are **less than significant**.

For more information on Geology and Soils, please refer to Section 3.2.4.

4.3.3.7 Hazards and Hazardous Materials

Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

While US 101 operations under either the Fixed HOV Lane or Reversible HOV Lane Alternatives would not result in hazardous conditions due to accidental releases of hazardous materials, the activities related to construction of the project could release hazardous materials into the environment. During the construction phase of the preferred Build Alternative and Access Option, there would be ground disturbance that could release aerially deposited lead in surface soils adjacent to the edge of the existing pavement; lead and other potentially toxic substances found in the yellow traffic striping and/or pavement markings; naturally occurring asbestos; and mercury from mine tailings. In addition, demolition or modification of bridge structures that may contain man-made asbestos could release asbestos fibers into the air.

Finally, these hazardous materials, as well as contaminated ground water from dewatering activities, would be transported for proper disposal. In the event of an accident, the materials could be released into the environment. Without proper precautions, exposure to these hazardous materials could become human health hazards.

Implementation of mitigation measures including compliance with existing state and federal laws pertaining to the handling and disposal of hazardous materials would reduce these impacts to a **less than significant** level. Please refer to Section 3.2.5 for more information on this topic.

Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous material?

All potential hazardous waste, (naturally occurring asbestos, contaminated groundwater, aerially deposited lead, among others) generated during construction of the Build Alternatives would be transported and disposed in accordance with existing state and federal laws pertaining to the handling and disposal of hazardous materials, which would reduce hazards to a **less than significant** level. Please refer to Section 3.2.5 for more information on this topic.

Would the project be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and, as a result, would it create a significant hazard to the public or the environment?

A Preliminary Site Investigation (PSI) was completed for the Build Alternatives in 2006. There are 71 known or suspected areas of contamination located within or adjacent to the project footprint. Disturbance of these areas could result in exposure to environmental contamination that could adversely affect humans and the environment. For areas proposed for acquisition, Caltrans would prepare, during the design phase, site-specific Phase I Environmental Site Assessments (ESA) in accordance with the requirements of the Final Rule for All Appropriate inquiries promulgated as an amendment to Community Environmental Response, Compensation, and Liability Act. A Phase I ESA will provide information to determine if there is a reasonable expectation that the site is contaminated. If the Phase I ESA reveals that it is reasonable to expect that some contamination would be encountered, the potentially impacted sites would be further investigated and sampled, the constituents of concern identified, and potential impacts delineated in a Phase II ESA. Caltrans would make every effort to have the property owner or responsible party, investigate and clean-up the contamination prior to Caltrans acquisition.

For those sites not proposed for acquisition where environmental contamination may occur as determined by the PSI or by discovery of mercury mine tailings, aerially deposited lead, or naturally occurring asbestos, the construction contracts for the proposed project would require the development and implementation of plans to safeguard human health and the environment. These plans are stipulated in existing hazardous materials regulations and include a Waste Management and Disposal Plan, a Health and Safety Plan, and a Stormwater Pollution Prevention Plan.

Given the existence of existing plans and regulations to avoid or reduce hazardous materials exposure and health risks, the impact of hazardous materials exposures is considered to be **less than significant**.

For a project located within an airport land use plan or within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

The project is located less than 1.25 km (2 mi) from the Marin County Gnoss Field Airport. However, the Fixed HOV Lane and Reversible HOV Lane Alternatives and the various Access Options propose roadway improvements exclusively for transportation purposes and does not run the same risk of being involved in a severe air traffic incident as a site of public aggregation such as a school or public building. Therefore, potential impacts to local residents or the airport would be **less than significant** under CEQA.

Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Caltrans would coordinate with emergency service providers (e.g., police, fire, hospital, etc.) to develop a traffic management plan to ensure no disruptions occur to vital emergency services during construction of the preferred Build Alternative and Access Option. Implementation of the traffic management plan would reduce potential significant impacts to **less than significant** under CEQA On completion, the Fixed HOV Lane and Reversible HOV Lane Alternatives would not impair, but rather improve, the efficiency of emergency response by alleviating congestion along US 101, enabling greater maneuverability for emergency vehicle route, increasing the shoulder-width along the mainline-for emergency stops, and eliminating the at-grade connections in the Central Segment that interfere with continuous traffic movements. Thus, potential impacts to emergency response plans would be **beneficial** under CEQA.

4.3.3.8 Hydrology and Water Quality

Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Proposed grading required for the Fixed HOV Lane and the Reversible HOV Lane Alternatives may have localized impacts to the flow of groundwater. However, because the affected ground water basins are so large, the localized impacts would have **less than significant** effects on the overall direction or rate of ground water flow towards San Pablo Bay.

The addition of impervious surfaces from the widened freeway facilities would reduce the areas that serve to recharge groundwater. . In the Central Segment, increase in impervious surface would vary depending on the Access Option. The impact of Access Option 12b would be the greatest with the addition of 14.0 ha (34.6 ac) of impervious surface, while Access Option 4b would have the least impact with the addition of 11.5 ha (28.3 ac) of impervious surface. However, as noted above, the impact would be minimal because the increase is relatively small when compared to the extensive recharge areas for local ground water basins.

Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

The Fixed HOV Lane and Reversible HOV Lane Alternatives pass through or lie adjacent to several flood hazard areas. However, the Build Alternatives would not increase flood hazards or diminish the 100-year floodplain. The Build Alternatives would be designed to minimize encroachment into the floodplain. In addition, culverts would be designed and/or upgraded to enable upstream areas to drain more quickly and efficiently. As a result, it is expected that the 100-year floodplain would not increase hazards for US 101, and the Build Alternatives would not exacerbate flooding. Consequently, potential flood hazards as a result of the Build Alternatives and Access Options would be **less than significant**. For more information on this topic, please refer to Section 3.2.2.

Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?

For both the Fixed HOV Lane and Reversible HOV Lane Alternatives, increased sediment load, construction activities in the waterways, and accidental spills would all trigger temporary water quality deterioration and, in the short term, compromise maintenance of the water quality objectives that are established to protect the beneficial water uses of the water bodies in the MSN project area.

Unmitigated, the increased pollutant loading from storm water runoff could adversely affect their identified beneficial uses.

Caltrans' adherence to statewide Construction General Permit (Order No. 98-08-DWQ, CAS000002), the required Storm Water Pollution Prevention Plan, and Construction Site Best Management Practices (BMPs) would be incorporated to reduce the discharge of pollutants during construction to the maximum extent practicable. Implementation of these measures would reduce water quality, construction impacts of the Build Alternatives to **less than significant**.

Caltrans' adherence to statewide NPDES Storm Water Permit to regulate discharges from Caltrans facilities (Order No. 99-06-DWQ, CAS000003) which includes the implementation of permanent BMPs would reduce the discharge of pollutants over the life of the MSN Project to the maximum extent practicable. Furthermore, in compliance with Caltrans' NPDES requirements, water quality BMPs and drainage facilities would be included where practicable. Implementation of the appropriate mitigation measures would reduce permanent water quality impacts of the Fixed HOV Lane and Reversible HOV Lane Alternatives to **less than significant**.

Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in flooding on-or off-site, or result in substantial erosion or siltation on-or off-site or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site?

The Fixed HOV Lane and Reversible HOV Lane Alternatives would traverse areas that are characterized by high erosion hazards and subject to flooding. Perennial waterways crossed by the Build Alternatives include Petaluma River, San Antonio Creek, Basalt Creek, Rush Creek, and Novato Creek. However, replacement bridges that are part of the MSN Project would not further constrict the channels, and therefore not increase flow velocity through the bridges. The Build Alternatives and the Access Options would increase the paved surface of the area of the freeway corridor and thereby could increase storm water runoff to the regions historically affected by flooding.

Adherence to the Caltrans NPDES permit that requires preparation of a SWPPP and implementation of BMPs (particularly the earlier identified design pollution prevention measures) would mitigate alterations to the drainage pattern that would substantially increase erosion or siltation. In addition, several methods of detaining storm water runoff are being considered to ensure that storm water runoff volumes are maintained at existing levels. These measures collectively would reduce the impact related to alteration to drainage patterns to a **less than significant** level.

Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

The Build Alternatives would create approximately 83 ha (205 ac) of new impervious area, according to the Preliminary Drainage Report (Caltrans, 2006). As a result, storm waters that would otherwise have percolated into the ground would be expected to run off the new roadways, carrying pollutants that had accumulated on the roadway surface. In the Central Segment, increase in impervious surface would vary depending on the Access Option. The impact of Access Option 12b would be the greatest with the addition of 14.0 ha (34.6 ac) of impervious surface, while Access Option 4b would have the least impact with the addition of 11.5 ha (28.3 ac) of impervious surface.

In order to mitigate runoff impacts, the Build Alternatives would include upgrading all undersized drainage facilities as needed to address increased flows due to the additional impervious areas. In addition, increased runoff volumes from roadway widening would be captured and held in appropriately designed detention facilities, so that most construction runoff can be maintained at existing levels.

Finally, treatment and permanent erosion control BMPs would be implemented to the maximum extent practicable. These measures collectively would reduce the impact related to increased runoff to a **less than significant** level.

4.3.3.9 Mineral Resources

Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Under Access Options 12b, 4b, and 14d, a portion of a quarry on the Silveira property would be acquired for an access road. Caltrans will seek to reduce this impact; however, in terms of loss of availability of mineral resources to the state this impact would be **less than significant**.

4.3.3.10 Noise

Does the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Temporary and intermittent noise from construction activities would most likely impact sensitive noise receptors in the urbanized areas of Novato and Petaluma. Caltrans would identify sensitive noise receptors during the design phase based upon construction activities. Specific mitigation measures would be proposed which may include, but not be limited to, installing shrouds to temporarily reduce noise. Construction activities would conform to the latest Standard Specifications listed in Section 7-1.011 of Caltrans' Sound Control Requirements. As a result, temporary increases in ambient noise conditions in the project corridor would be reduced to **less than significant**. Please refer to Section 3.2.7 for more information on this topic.

Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Under the Fixed HOV Lane and the Reversible HOV Lane Alternatives, the predicted future peak noise levels along US 101 would increase by approximately one to two dBA Leq(h). This would be considered a **less than significant** increase in traffic noise. Although the Build Alternatives would not result in a significant increase in traffic noise, noise abatement is under consideration at some locations. For more information on this topic, please refer to Section 3.2.7.

For a project located within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The Marin County Gnoss Field Airport is in the vicinity of the expressway corridor, an area of rural land uses. The US 101 would be shifting eastward closer to the airport; however, neither the freeway nor the airport are considered sensitive receptor than would warrant special consideration for potential noise impacts. Under the Build Alternatives, construction noise and traffic noise would be **less than significant** under CEQA.

4.3.3.11 Population and Housing

Would the project displace substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere?

The Fixed HOV Lane and Reversible HOV Lane Alternatives would cause one potential residential displacement within the Central Segment. Caltrans would provide the appropriate relocation benefits to any property owner impacted by the acquisition of their property under the Build Alternatives. Because the displacement would not involve a substantial number of people, the impact is considered to be less than significant.

4.3.3.12 Recreation

Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

The Fixed HOV Lane Alternative and the Reversible HOV Lane Alternatives include the construction of bicycle/pedestrian lanes to replace bicycle access that currently exists on the expressway shoulder in the Central Segment.

The effects of these lanes are evaluated as part of the Build Alternatives. During construction, bicycle/pedestrian access may be interrupted; however, Caltrans would provide alternative routes during construction to reduce temporary closure of access roads to a **less than significant** level. Please refer to Section 3.1.10 for further discussion of Bicycle/Pedestrian facilities.

4.3.3.13 Transportation and Traffic

Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in congestion at intersections) or exceed a level of service standard established by the county congestion management agency for designated roads?

Caltrans included the US 101 Southbound and Northbound Ramps at the Atherton Avenue Intersections in the MSN Highway Operations study due to their close proximity to the Atherton Avenue/Redwood Boulevard intersection. Performance at the studied intersections is partially dependent upon operations at the Atherton Avenue/Redwood Boulevard intersection, where the westbound storage load is inadequate under existing conditions. The study determined that traffic at the US 101 Southbound ramps would operate at Level of Service (LOS) B during A.M. peak, and LOS A in the P.M. peak in Year 2030. Northbound ramps would operate at LOS C in the A.M. peak and LOS D in P.M. peak in Year 2030. According to the Marin County CMP, that establishes LOS standards, non-freeway routes on the designated system must maintain an LOS D or better. Therefore, this impact would be **less than significant** under CEQA.

In addition, there is a causal connection between the South Petaluma Boulevard bottleneck that the MSN Project is alleviating and the latent bottleneck south of Miller Creek as shown in Figure 3.1-11. However, the impact of this bottleneck is **less than significant** as the MSN Project would reduce delay and increase productivity through the 16.1-mile project area.

Would the project result in inadequate parking capacity?

The Build Alternatives would impact a small portion of the large parking lot at the Plaza North Shopping Center in Petaluma; however, there is sufficient room to reconfigure parking spaces for no net loss in the parking supply. There would be some minor temporary impacts to three Park and Ride Lots due to construction of either of the Build Alternatives. Therefore, impacts to parking due to the Build Alternatives would be **less than significant** under CEQA.

Would the project result in inadequate emergency access?

Caltrans would coordinate with emergency service providers (e.g., police, fire, hospital, etc.) to develop a traffic management plan to ensure no disruptions occur to vital emergency services during construction of the preferred Build Alternative and Access Option. Implementation of the traffic management plan would reduce potential significant impacts to **less than significant** under CEQA. Please refer to Section 3.1.8 for more information on this topic.

4.3.4 Topics that were Found to be Beneficial or have No Impact

A complete list of topics that were found to have beneficial or no impacts is found in Appendix K, CEQA Checklist, of this report. A partial list is presented below. The proposed project would not:

- Conflict with adopted policies, plans, or programs, including those concerning support for alternative transportation modes, land use and development policies, biological habitat protection and conservation.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Expose persons to long-term noise levels in excess of Caltrans standards
- Result in loss of mineral resources and conflict with mineral resource plans.

- Adversely affect fire protection, police protect, schools, parks, and other public facilities or utility systems.

- Conflict with adopted policies, plans or programs supporting alternative transportation.

- Require or result in the construction of new wastewater or stormwater facilities that would cause significant effects.

- Require additional water supplies or exceed the capacity of local wastewater treatment providers, or exceed wastewater treatment requirements.

4.3.5 Growth Inducing Impacts

The Build Alternatives would improve traffic conditions and travel times through the project area and vicinity. The Fixed HOV Lane Alternative would eliminate delay in HOV lanes, allowing the HOV lane users to travel at or very near free-flow speeds through the project area. Since the Reversible HOV Lane Alternative would not improve effective capacity in the reverse commute direction (northbound in the morning and southbound in the evening), there would be no travel time savings for traffic from Hamilton Field, Miller Creek and Central Sonoma County. Furthermore, the mixed flow lanes within the project boundaries would not be operating at free-flow speed during peak hours and would still experience congestion and delay. Therefore, growth would not be induced entirely by the HOV free-flow speeds. Hence, while the Fixed HOV Lane Alternative would support some of the planned growth in the area, it would not fully accommodate planned growth or induce unplanned growth. Other factors, in addition to traffic conditions, that influence growth, are local plans and policies that control local land use and undevelopable lands within their jurisdictions and the cost and availability of housing. In consideration of these factors, the growth inducing impacts of the MSN Project would be **less than significant**. Please see Section 3.1.4 for further information on this topic.

As noted in Section 3.1.8 of this FEIR/S, utility relocations will be necessary under the Build Alternatives due to the shifting of the US 101 mainline, occurring primarily in Segment B of the MSN Project boundaries, and not as a result of growth inducing impacts. Service expansion or facility upgrades by PG&E, Sonoma County Water Agency, North Marin Water District, or Marin Municipal

Water District would be separately planned actions by these agencies and, as such, are not addressed in this FEIR/S.

4.3.6 Climate Change

4.3.6.1 Regulatory Setting

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization’s Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas[1] (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years. In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with GHG emissions and climate change at the state level. AB 1493 requires the Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light truck GHG emissions; these regulations will apply to automobiles and light trucks beginning with the 2009 model year.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California’s GHG emissions to: (1) 2000 levels by 2010, (2) 1990 levels by the year 2020, and (3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that ARB create a plan, which includes market mechanisms, and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.” Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state’s Climate Action Team.

With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by 2020.

[1] Greenhouse gases related to human activity, as identified in AB 32, include: Carbon dioxide, Methane, Nitrous oxide, Tetrafluoromethane, Hexafluoroethane, Sulfur hexafluoride, HFC-23, HFC-134a, and HFC-152a.

Climate change and GHG reduction is also a concern at the federal level; at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. However, California, in conjunction with several environmental organizations and several other states, sued to force the U.S. Environmental Protection Agency (EPA) to regulate GHGs as a pollutant under the Clean Air Act (Massachusetts vs. Environmental Protection Agency et al., U.S. Supreme Court No. 05-1120. 549. Argued November 29, 2006—Decided April 2, 2007). The court ruled that GHGs do fit within the Clean Air Act's definition of a pollutant, and that EPA does have the authority to regulate GHGs. Despite the Supreme Court ruling, there are no promulgated federal regulations to date limiting greenhouse gas emissions.

According to recommendations by the Association of Environmental Professions on How to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA documents (March 5, 2007), an individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG. In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable." See CEQA Guidelines sections 15064(i)(1) and 15130. To make this determination the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects in order to make this determination is a difficult if not impossible task.

As part of its supporting documentation for the Draft Scoping Plan, CARB recently released an updated version of the GHG inventory for California (June 26, 2008). Figure 4-1 is a graph from that update showing the total GHG emissions for California for 1990, 2009-2004 average, and 2020 projected if no action is taken.

Figure 4-1 California GHG Inventory Forecast

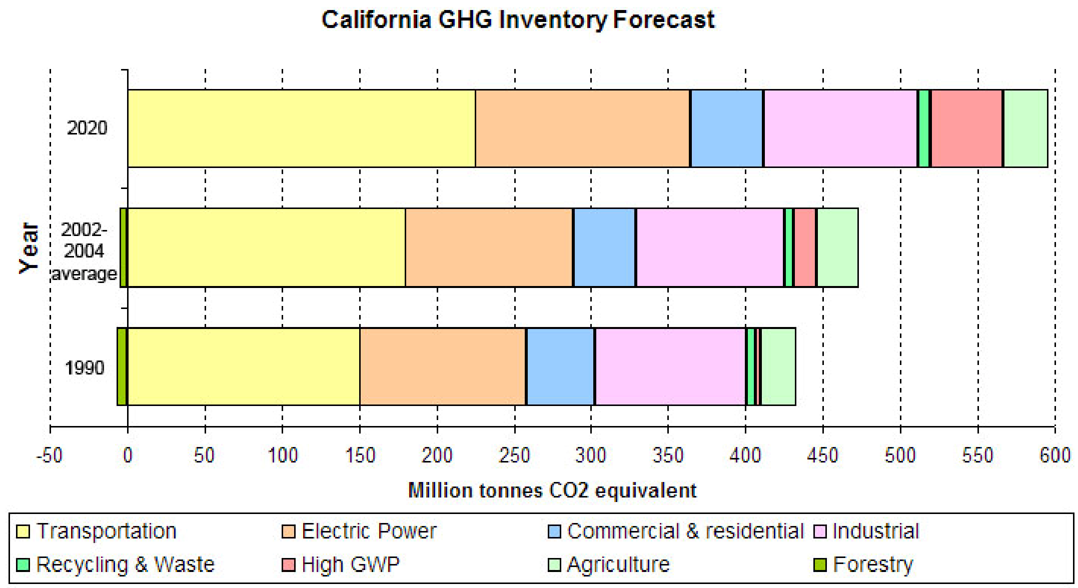


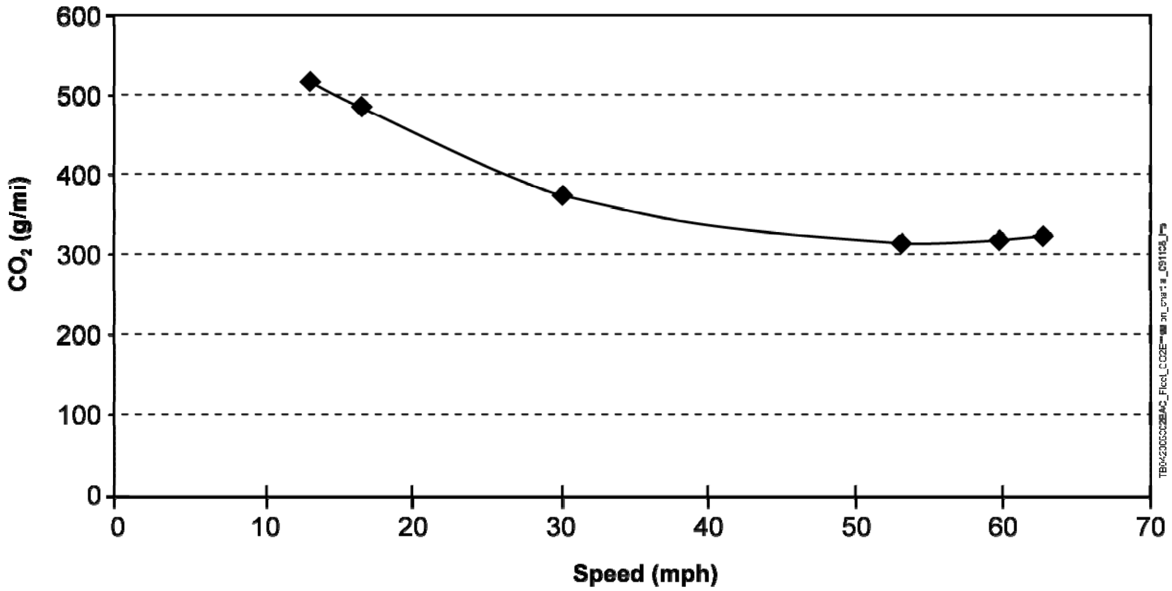
Figure taken from http://www.arb.ca.gov/cc/inventory/data/forecast.htm

Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation, Caltrans is implementing the Climate Action Program, published in December 2006. This document can be found at http://www.dot.ca.gov/docs/ClimateReport.pdf.

Project Analysis

One of the main strategies in the Department's Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 mph) and speeds over 55 mph, with the most severe emissions occurring from 0-25 mph (see Figure 4-2 below). To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors GHG emissions, particularly CO_2, may be reduced.

Figure 4-2 Fleet CO_2 Emission vs. Speed (Highway)



Source: Center for Clean Air Policy – http://www.ccap.org/Presentations/Winkelman%20TRB%202004%220(1-13-04).pdf

As stated in the alternatives analysis of this document, HOV lanes under the Build Alternatives would capitalize on the productivity trends in Sonoma and Marin Counties (Section 2.6.6). Furthermore, the performance and efficiency of HOV lanes would substantially improve travel time for carpooling commuters and transit, as they would operate at speeds of 65 mph in new HOV lanes vs. 9 mph in congested mixed flow lanes under the No Build Alternative (Section 3.2.8). Moreover, the Fixed HOV Lane (the Preferred Alternative) could reduce peak-hour delay by 2.5 to 7.2 minutes (49 to 76 percent), and by as much as 89 percent at some bottlenecks (Section 3.2.8).

Quantitative Analysis

Caltrans has conducted a quantitative analysis using the EMFAC model, the same model used to conduct project-level air quality analysis. Due to the limitations with the EMFAC model discussed below, the CO_2 emissions presented in Table 4-2 are useful principally for a comparison between the project alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions will be.

Table 4-2 Comparison of CO_2 Emissions between Build and No Build Alternatives

Year	Existing (2009/10)	No-Build Alternative in 2030	Either Build Alternative in 2030
Total CO_2 Emissions (US Tons)	569.2	611.5	777.9

Impacts Discussion

Fixed HOV Alternative. According to the modeling**,** CO_2 emissions under the Build Alternatives would be increased over existing levels and also the No Build in 2030.

Reversible HOV Alternative. Reduced travel time due to HOV lanes would be similar under the Reversible HOV alternative as under the Fixed HOV Alternative. Therefore, emissions under this alternative are anticipated to be roughly the same as those estimated for the Fixed HOV Alternative above.

Access Options. Any of the Access Options would be compatible with either Build Alternative. The Access Options would provide for new interchanges, overcrossings, and frontage roads that largely seek to replace at-grade connections to US 101. As stated in Section 3.1.4 Growth, based upon limits to access roads proposed under the Build Alternatives, and continued stability of land use zoning toward agricultural and open space land uses in Segment B, most traffic will continue to be destined for the city of Novato and southward or the city of Petaluma and northward. Therefore, the CO_2 emissions estimates in Table 4-2 under the Fixed HOV and Reversible HOV Alternatives also include the CO_2 emissions resulting from either of the Access Options (4b, 12b, 14b, or 14d), and no separate evaluation is needed.

No Build Alternative. No Build Alternative would require routine maintenance of US 101, and would not include congestion-relieving improvements. As shown in Table 4-2, even the No Build Alternative is anticipated to have increased CO_2 emissions when compared to existing conditions.

Limitations and Uncertainties with Modeling

EMFAC

Although EMFAC can calculate CO_2 emissions from mobile sources, the model does have limitations when it comes to accurately reflecting CO_2 emissions. According to the National Cooperative Highway Research Program report, *Development of a Comprehensive Modal Emission Model* (April 2008), studies have revealed that brief but rapid accelerations can contribute significantly to a vehicle's carbon monoxide and hydrocarbon emissions during a typical urban trip. Current emission-factor models are insensitive to the distribution of such modal events (i.e., cruise, acceleration, deceleration, and idle) in the operation of a vehicle and instead estimate emissions by average trip speed. This limitation creates an uncertainty in the model's results when compared to the estimated emissions of the various alternatives with baseline in an attempt to determine impacts. Although work by EPA and the CARB is underway on modal-emission models, neither agency has yet approved a modal emissions model that can be used to conduct this more accurate modeling. In addition, EMFAC does not include speed corrections for most vehicle classes for CO_2 – for most vehicle classes emission factors are held constant which means that EMFAC is not sensitive to the decreased emissions associated with improved traffic flows for most vehicle classes. Therefore, unless a project involves a large number of heavy-duty vehicles, the difference in modeled CO_2 emissions due to speed change will be slight.

It is interesting to note that CARB is currently not using EMFAC to create its inventory of greenhouse gas emissions. It is unclear why the CARB has made this decision. Their website only states:

> REVISION: Both the EMFAC and OFFROAD Models develop CO_2 and CH_4 [methane] emission estimates; however, they are not currently used as the basis for [CARB's] official [greenhouse gas] inventory which is based on fuel usage information. However, ARB is working towards reconciling the emission estimates from the fuel usage approach and the models.

Other Variables

With the current science, project-level analysis of greenhouse gas emissions is limited. Although a greenhouse gas analysis is included for this project, there are numerous key greenhouse gas variables that are likely to change dramatically during the design life of the proposed project and would thus dramatically change the projected CO_2 emissions.

First, vehicle fuel economy is increasing. The EPA's annual report, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2008 (http://www.epa.gov/oms/fetrends.htm)," which provides data on the fuel economy and technology characteristics of new light-duty vehicles including cars, minivans, sport utility vehicles, and pickup trucks, confirms that average fuel economy has improved each year beginning in 2005, and is now the highest since 1993. Most of the increase since 2004 is due to higher fuel economy for light trucks, following a long-term trend of slightly declining overall fuel economy that peaked in 1987. These vehicles also have a slightly lower market share, peaking at 52 percent in 2004 with projections at 48 percent in 2008. Table 4-3 shows the alternatives for vehicle fuel economy increases studied by the National Highway Traffic Safety Administration in its Final EIS for New Corporate Average Fuel Economy (CAFE) Standards (October 2008).

Table 4-3 Model Year 2015 Required Miles Per Gallon (mpg) by Alternative

No Action		25% Below Optimized	Optimized (Preferred)	25% Above Optimized	50% Above Optimized	Total Costs Equal Total Benefits	Technology Exhaustion
Cars	27.5	33.9	35.7	37.5	39.5	43.3	52.6
Trucks	23.5	27.5	28.6	29.8	30.9	33.1	34.7

Second, near zero carbon vehicles will come into the market during the design life of this project. According to a March 2008 report released by University of California Davis (UC Davis), Institute of Transportation Studies:

> "Large advancements have occurred in fuel cell vehicle and hydrogen infrastructure technology over the past 15 years. Fuel cell technology has progressed substantially resulting in power density, efficiency, range, cost, and durability all improving each year. In another sign of progress, automotive developers are now demonstrating over 100 fuel cell vehicles (FCVs) in California – several in the hands of the general public – with configurations designed to be attractive to buyers. Cold-weather operation and vehicle range challenges are close to being solved, although vehicle

> cost and durability improvements are required before a commercial vehicle can be successful without incentives. The pace of development is on track to approach pre-commercialization within the next decade.
>
> "A number of the U.S. DOE 2010 milestones for FCV development and commercialization are expected to be met by 2010. Accounting for a five to six year production development cycle, the scenarios developed by the U.S. DOE suggest that 10,000s of vehicles per year from 2015 to 2017 would be possible in a federal demonstration program, assuming large cost share grants by the government and industry are available to reduce the cost of production vehicles."[2]

Third and as previously stated, California has recently adopted a low-carbon transportation fuel standard. CARB is scheduled to come out with draft regulations for low carbon fuels in late 2008 with implementation of the standard to begin in 2010.

Fourth, driver behavior has been changing as the U.S. economy and oil prices have changed. In its January 2008 report, "Effects of Gasoline Prices on Driving Behavior and Vehicle Market," (http://www.cbo.gov/ftpdocs/88xx/doc8893/01-14-GasolinePrices.pdf) the Congressional Budget Office found the following results based on data collected from California: 1) freeway motorists have adjusted to higher gas prices by making fewer trips and driving more slowly; 2) the market share of sports utility vehicles is declining; and 3) the average prices for larger, less-fuel-efficient models have declined over the past five years as average prices for the most-fuel-efficient automobiles have risen, showing an increase in demand for the more fuel efficient vehicles.

Limitations and Uncertainties with Impact Assessment

Taken from p. 3-70 of the National Highway Traffic Safety Administration Final EIS for New CAFE Standards (October 2008), Figure 4-3 illustrates how the range of uncertainties in assessing greenhouse gas impacts grows with each step of the analysis:

"Cascade of uncertainties typical in impact assessments showing the "uncertainty explosion" as these ranges are multiplied to encompass a comprehensive range of

[2] Cunningham, Joshua, Sig Cronich, Michael A. Nicholas. March 2008. Why Hydrogen and Fuel Cells are Needed to Support California Climate Policy, UC Davis, Institute of Transportation Studies, pp. 9-10.

future consequences, including physical, economic, social, and political impacts and policy responses."

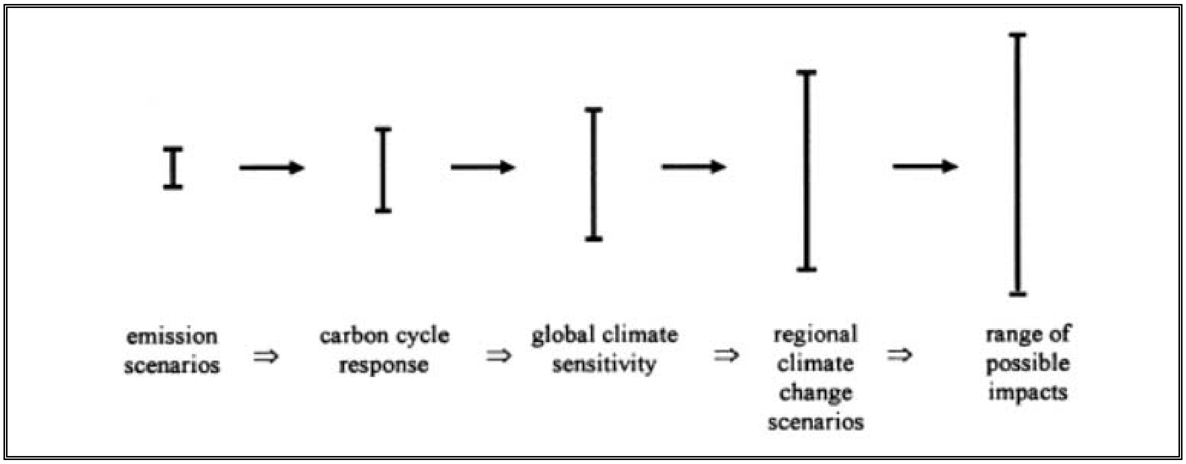


Figure 4-3 Cascade of Uncertainties

Much of the uncertainty in assessing an individual project's impact on climate change surrounds the global nature of the climate change. Even assuming that the target of meeting the 1990 levels of emissions is met, there is no regulatory or other framework in place that would allow for a ready assessment of what any modeled increase in CO_2 emissions would mean for climate change given the overall California greenhouse gas emissions inventory of approximately 430 million tons of CO_2 equivalent. This uncertainty only increases when viewed globally. The IPCC has created multiple scenarios to project potential future global greenhouse gas emissions as well as to evaluate potential changes in global temperature, other climate changes, and their effect on human and natural systems. These scenarios vary in terms of the type of economic development, the amount of overall growth, and the steps taken to reduce greenhouse gas emissions. Non-mitigation IPCC scenarios project an increase in global greenhouse gas emissions by 9.7 up to 36.7 billion metric tons CO_2 from 2000 to 2030, which represents an increase of between 25 and 90%.[3]

The assessment is further complicated by the fact that changes in greenhouse gas emissions can be difficult to attribute to a particular project because the projects often cause shifts in the locale for some type of greenhouse gas emissions, rather

[3] Intergovernmental Panel on Climate Change (IPCC). February 2007. Climate Change 2007: The Physical Science Basis: Summary for Policy Makers. http://www.ipcc.ch/SPM2feb07.pdf.

than causing “new” greenhouse gas emissions. It is difficult to assess the extent to which any project level increase in CO_2 emissions represents a net global increase, reduction, or no change; there are no models approved by regulatory agencies that operate at the global or even statewide scale.

The complexities and uncertainties associated with project level impact analysis are further borne out in the recently released Final EIS completed by the National Highway Traffic Safety Administration CAFE standards, October 2008. As the text quoted below shows, even when dealing with greenhouse gas emission scenarios on a national scale for the entire passenger car and light truck fleet, the numerical differences among alternatives is very small and well within the error sensitivity of the model.

> “In analyzing across the CAFE 30 alternatives, the mean change in the global mean surface temperature, as a ratio of the increase in warming between the B1 (low) to A1B (medium) scenarios, ranges from 0.5 percent to 1.1 percent. The resulting change in sea level rise (compared to the No Action Alternative) ranges, across the alternatives, from 0.04 centimeter to 0.07 centimeter. In summary, the impacts of the model year 2011-2015 CAFE alternatives on global mean surface temperature, sea level rise, and precipitation are relatively small in the context of the expected changes associated with the emission trajectories. This is due primarily to the global and multi-sectoral nature of the climate problem. Emissions of CO_2, the primary gas driving the climate effects, from the United States automobile and light truck fleet represented about 2.5 percent of total global emissions of all greenhouse gases in the year 2000 (EPA, 2008; CAIT, 2008). While a significant source, this is a still small percentage of global emissions, and the relative contribution of CO_2 emissions from the United States light vehicle fleet is expected to decline in the future, due primarily to rapid growth of emissions from developing economies (which are due in part to growth in global transportation sector emissions).” [NHTSA Draft EIS for New CAFE Standards, June 2008, pp.3-77 to 3-78]

CEQA Conclusion

As discussed above, both the future with project and future no build show increases in CO_2 emissions over the existing levels. As discussed above, there are limitations with EMFAC and with assessing what a given CO_2 emissions increase means for climate change. Therefore, it is Caltrans determination that in the absence of further regulatory or scientific information related to greenhouse gas emissions and CEQA significance, it is too speculative to make a determination regarding significance of the project's direct impact and its contribution on the cumulative scale to climate change. However, Caltrans is firmly committed to implementing measures to help reduce the potential effects of the project. These measures are outlined in the following section.

AB 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement the Governor's Executive Orders and help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a $222 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $107 in transportation funding during the next decade. As shown on Figure 4-4 below, the Strategic Growth Plan targets a significant decrease in traffic congestion below today's level and a corresponding reduction in greenhouse gas emissions. The Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that combined together yield the promised reduction in congestion. The Strategic Growth Plan relies on a complete systems approach of a variety of strategies: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements.

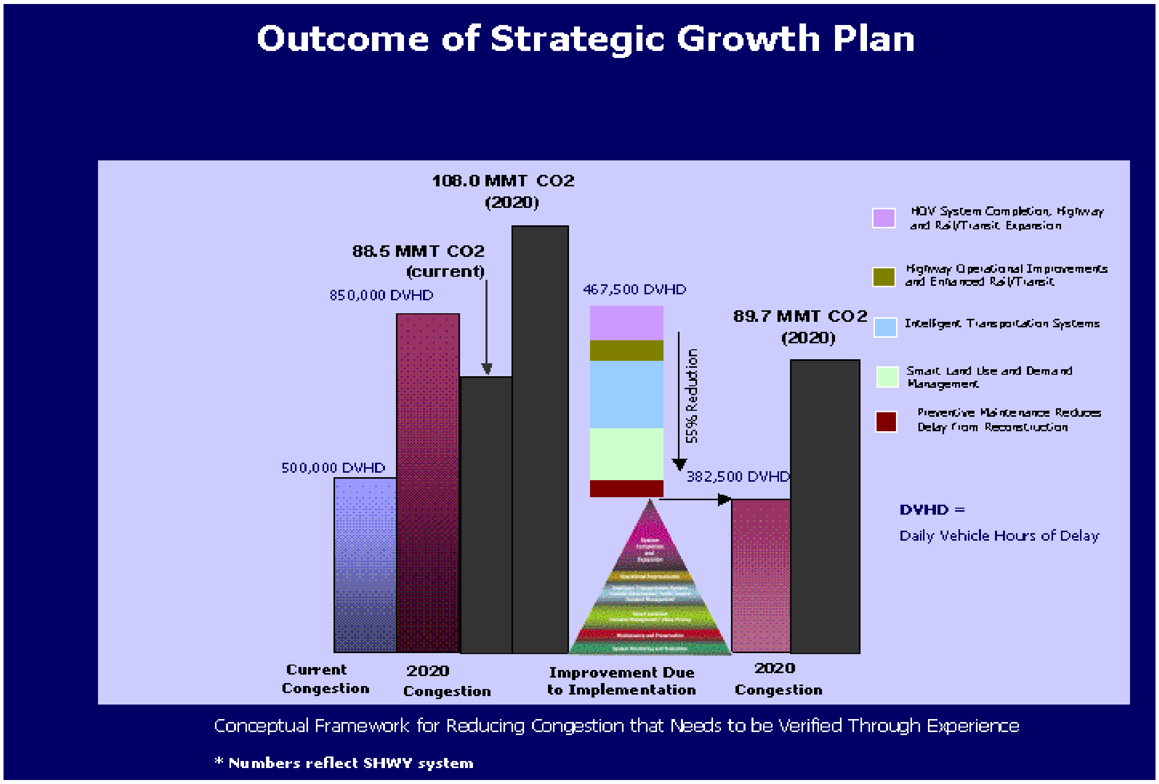


Figure 4-4 Outcome of Strategic Growth Plan

As part of the *Climate Action Program at Caltrans* (December 2006, http://www.dot.ca.gov/docs/ClimateReport.pdf), Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans is working closely with local jurisdictions on planning activities; however, Caltrans does not have local land use planning authority. Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; Caltrans is doing this by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note, however, that the control of the fuel economy standards is held by EPA and CARB. Lastly, the use of alternative fuels is also being considered; the Department is participating in funding for alternative fuel research at the UC Davis.

Table 4-4 summarizes efforts that Caltrans and other state agencies are implementing in order to reduce greenhouse gas emissions. For more detailed

Table 4-4 Climate Change Strategies

Strategy	Program	Partnership: Lead	Partnership: Agency	Method/Process	Estimated CO_2 Savings (MMT): 2010	Estimated CO_2 Savings (MMT): 2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies & other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements & Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	.007	2.17
Mainstream Energy & Greenhouse Gas into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, CalEPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	0.0045	0.0065 0.45 .0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	.34

Table 4-4 Climate Change Strategies

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	**Agency**		**2010**	**2020**
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 % limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 .36	3.6
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.67

information about each strategy, please see *Climate Action Program at Caltrans (December 2006);* it is available at http://www.dot.ca.gov/docs/ClimateReport.pdf.

To the extent that it is applicable or feasible for the MSN Project, the following measures can also help to reduce the GHG emissions and potential climate change impacts from the MSN Project:

1. Use of reclaimed water—currently 30 percent of the electricity used in California is used for the treatment and delivery of water. Use of reclaimed water helps conserve this energy, which reduces GHG emissions from electricity production.

2. Landscaping—reduces surface warming and through photosynthesis decreases CO_2.

3. Portland cement—use of lighter color surfaces such as Portland cement helps to reduce the albedo[4] effect and cool the surface. In addition, Caltrans has been a leader in the effort to add fly ash to Portland cement mixes. Adding fly ash reduces the GHG emissions associated with cement production—it also can make the pavement stronger.

4. Use of energy efficient lighting, such as LED traffic signals.

5. Idling restrictions for trucks and equipment.

4.3.7 Mandatory Findings of Significance

Does the project have impacts that are individually limited, but cumulatively considerable?

The project may contribute to cumulative impacts to the following resources: aesthetics, farmland/agriculture and cultural/archaeological. See Chapter 5 for more information.

[4]Albedo is defined as the ratio of diffusely reflected to incident electromagnetic radiation. It is a unitless measure indicative of a surface's or body's diffuse reflectivity. The classic example of albedo effect is the snow-temperature feedback. If a snow covered area warms and the snow melts, the albedo decreases, more sunlight is absorbed, and the temperature tends to increase. The converse is true: if snow forms, a cooling cycle happens (Wikipedia 9/18/08).

4.3.8 Mitigation Measures for Significant Impacts under CEQA

Table 4-5 summarizes mitigation measures for significant impacts under CEQA. For a complete summary of mitigation measures for all impacts under CEQA, please refer to Appendix J: Mitigation and Monitoring Reporting Form.

Table 4-5 Significant Impacts and Mitigation Measures

Potentially Significant Impacts	Mitigation Measures
Adverse effect from new soundwalls and accompanying tree and vegetation removal	Minimization of vegetation removal; replacement planting in combination with standard project landscaping; vine planting to cover walls on highway and community sides.
Adverse effect from new soundwalls and accompanying tree and vegetation removal.	Installation of lights underneath; architectural and landscape design determined with Policy Advisory Group.
Adverse impact from new interchanges, major grading, tree removal, and overcrossings.	Minimization of vegetation removal; replacement planting in combination with standard project landscaping; center median design treatments. All disturbed areas shall be provided with permanent erosion control grasses and appropriate locally native annual shrub and tree species. Areas of disturbed native vegetation shall be replaced at a 5 to 1 ratio wherever feasible. Where in-place planting is not practical, planting will be replaced, where feasible, off site in the visual foreground of the corridor.
Adverse impact from major landform alteration due to mainline realignment	Same as above. Also, contour grading and contour rounding shall be employed at slope transitions in all major grading activities, to minimize the artificial, engineered appearance of resulting slopes and to blend with the natural topography to the greatest extent feasible. Where the alignment of the freeway or ramps are to be superseded, existing pavement and roadbed shall be removed and contour graded to provide a natural appearance and blend with the adjacent landform, and graded areas re-vegetated. Trees and shrubs shall be planted at cut/fill transition areas to help screen or soften prominent grade transitions. Grading shall utilize techniques such as slope rounding, slope sculpting, and variable gradients to approximate the appearance of natural topography.
Adverse impact from new soundwalls, interchange ramp improvements, and auxiliary lane due to substantial decline in motorists' views and community character and to loss of tree hedgerows.	Minimization of artificial, engineered appearance of slopes to blend with natural topography; plantings and revegetation to screen slope transitions; revegetation of removed native vegetation at 5:1 ratio.

Chapter 5 Cumulative Impact Assessment

The purpose of this chapter is to assess the MSN Project's potential cumulative impacts to resources that the project may affect, even if project impacts are relatively small.

For this assessment Caltrans and FHWA used the *Guidance for Preparers of Cumulative Impact Assessment*. As recommended in the guidance, Caltrans and FHWA established geographic study areas for the resources under discussion. Where possible, Caltrans and FHWA gathered information to establish trends within the study areas concerning the present state of these resources, including whether a resource is subject to a cumulative impact.

For each resource, Caltrans and FHWA determined whether the Marin Sonoma Narrows would contribute to cumulative impacts associated with a specific resource. Finally general impacts to resources from other past, present, and foreseeable future projects are discussed.

Websites, documents, and other sources of information used for assessing cumulative impacts are identified in the discussion and listed under the reference section of this document.

5.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through different types of effects such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA, can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts, under NEPA, can be found in 40 CFR, Section 1508.7 of the CEQ Regulations.

5.2 Resources Discussed and Geographic Study Areas

The resources discussed in this cumulative impact assessment are water quality, biological resources, wetlands, farmlands, archaeological resources, visual/aesthetics, and air quality. The basis for assessing cumulative impacts depends upon the impact of the MSN Project and other projects within a closely related geographic area.

Since all the waterways located within the project limits (including Novato Creek, Lynch Creek, and San Antonio Creek), are tributaries of the Petaluma River , the Petaluma River watershed has been defined as the geographic study area for aquatic biological resources, wetlands, water quality resources.

The geographic context for salt marsh harvest mouse (SMHM) and California red-legged frog (CRLF) is the extent of the local population range of these species. Since the actual population ranges for these species are unknown, the Petaluma watershed is used to represent the area occupied by these species. While the southern portion of the project area is within the San Pablo Bay watershed, these species are not likely to occur in this area and therefore this watershed has not been included in their geographic context. Each of these species occupy distinct and separate niches and their respective suitable habitat does not exist over the entire watershed.

The geographic context for nesting birds may include trees, shrubs, grasslands, bridges, and some commercial and residential structures throughout the project area.

The geographic context for farmlands is northwestern Marin and southern Sonoma, counties in which it is a highly valued resource.

The geographic context for archaeological resources is the western shorelines of San Pablo Bay since multiple large shellmounds, an important archaeological site, are located between Mount Tamalpais, Mount Burdell and the shoreline.

For visual/aesthetics, the land uses adjacent to the US 101 right of way from the southern MSN Project limits up to Windsor River Road, Sonoma County, has been established as the study area for cumulative impacts.

The geographic context for air quality is the North Bay Area, including the eastern side of Marin County and the Petaluma Valley, as defined by the Bay Area Air Quality Management District. This geographic area includes distinct climatological subregions within the larger Bay Area. Hills to the west of these areas block the flow of marine air.

5.3 Resource Trends

Water Quality

The Petaluma River watershed the Petaluma River Watershed encompasses a 378-km^2 (146 $miles^2$) area, approximately 30 km (19 miles) long and 21 km (13 miles) wide with the City of Petaluma close to the center. The headwaters and tributaries of the river originate on Sonoma Mountain, Mecham Hill, Weigand's Hill and Mt. Burdell. The confluence of Willow Brook, Liberty Creek, and Weigand's Creek form the headwaters of the Petaluma. The Petaluma River itself flows across the Denman Flat area and through the City of Petaluma. Tidal influence extends upstream of the confluence with Lynch Creek. The lower 19 km (12 miles) of the Petaluma River flow through the Petaluma Marsh, the largest remaining salt marsh in San Pablo Bay. (SSCRCD 2009). The Petaluma River watershed supports beneficial uses for cold and warm freshwater habitat, fish migration, and preservation of rare and endangered species, fish spawning, wildlife habitat, and contact and non-contact recreation. The San Francisco Bay RWQCB Watershed Management Initiative Integrated Plan (October 2004), has described the water quality around the Bay Area. It is also relevant to the water quality in the Petaluma River. "The Bay Area is highly urbanized and is affected by all of the impacts associated with commercial, industrial, and residential development, including wastewater and industrial discharges, historic loss of wetlands through diking and filling, widespread stream modification projects for flood control and urban development, and contamination from pollutants such as industrial chemicals, hydrocarbons, pesticides, and legacy pollutants such as PCBs and mercury."

As previously stated in Section 3.2.2 Hydrology and Floodplains, the southern project segment is located in the San Pablo Bay watershed and the Central and Northern Segments are located in the Petaluma River watershed. Several waterways within the MSN Project Area are on the CWA Section 303(d) list of impaired water bodies. These are: Novato Creek, Petaluma River, San Antonio Creek, and San Pablo Bay. Each of these major water bodies already fail to meet the water quality standards of the San Francisco Bay Plan. Therefore, it can be assumed that the Petaluma River and San Pablo Bay watershed are already experiencing cumulative impacts from specific stressors.

Wetlands

United States Army Corps of Engineers (USACE) oversees wetland regulation through its Section 404 Nationwide Program to comply with the Clean Water Act. This permit-driven program implements a no-net-loss policy on Waters of the US (which includes wetlands) and furthermore requires impacts to be compensated based upon prescribed ratios, determined by USACE. Theoretically, fulfillment of permit requirements would tend to improve or sustain the overall health of wetlands and waters of the U.S. The *Status and Trends of Wetlands in the Conterminous United States 1998 to 2004* indicates that, nationally, gains during this period contrast with losses recorded during previous periods since 1950. However, the State, at this time, has no current assessment of no-net-loss for the Petaluma River Watershed and San Pablo Basin Watershed or elsewhere; therefore, precise trends cannot be established. (Josh Collins, San Francisco Estuary Institute, 7/17/06 email; see Table 6-3).

Farmlands

Marin County

According to the Marin Agricultural Land Trust (MALT), there are 80,000 acres of farmland at risk of conversion in western Marin County. These at risk areas are well outside the project area further east of these lands.

Marin's Countywide Plan states that "Overall milk production (in the county) has held constant since the early 1960s . . . Although the number of Marin dairies has dropped from about 200 in the 1950s to about 30 in 2002, the remaining dairies have larger herds and higher per cow production." This assessment indicates that dairy production is not on a downward trend in Marin County. The Countywide Plan also states that 82,157 acres (48.6 percent) of private agriculturally zoned land is under land conservation contracts (e.g., Williamson Act or MALT). This data indicates that farmland is a valued land use that is being successfully conserved in the County.

Sonoma County

In February 1990, Sonoma County voters approved Measures A and C to establish a Agricultural Preservation and Open Space District (District) and a sales tax to fund agricultural preservation and open space acquisition over a 20-year period. In *Preventing Sprawl: Farmers and Environmentalists Working Together*, the Greenbelt Alliance and the Sonoma County Farm Bureau state that "Fifty-nine percent of the county's land (606,500 acres) is dedicated to agriculture. Of this total, grazing land covers 430,000 acres, and farmland covers 175,000. . .One hundred sixty thousand acres are in Williamson Act contracts. . ."

Archaeology

Although the Petaluma River watershed and the San Pablo Bay margin has been subject to decades of archaeological research, the caliber of such studies remains highly variable and overall comparative consistency is difficult to achieve. Limitations in the previous studies make results of the present investigation especially important. It is possible that intact deposits remain below ground in many other locations, but quantifying the number of intact archaeological sites that remain within the watershed and the San Pablo Bay shoreline is difficult at this time.

Visual/Aesthetics in Highway Foreground

The Sonoma County segment of US 101 has historically been known as the "Redwood Highway," and Redwoods and other trees and landscaping were planted in Caltrans right-of-way in many portions of the corridor within Sonoma County. Redwoods are not necessarily native to all portions of the US 101 corridor within Sonoma County, and have thrived in some locations and not in others. Within the MSN segment of US 101 a substantial proportion, though not all, of planted redwood trees have exhibited stress and decline. Within the larger Sonoma County corridor many redwood plantings have in contrast thrived, forming an important part of the regional corridor visual identity and image.

Recent, current, and future widening projects have been planned or are underway for much of the US 101 corridor in Marin and Sonoma Counties. In that context, the regional trend is one of broad cumulative change in the corridor landscape toward an increasingly urban, road-dominated character with a corresponding cumulative decline in visual quality as elements of vividness and intactness, such as prominent redwood tree groupings, are eliminated and as land use within the highway visual corridor in general becomes increasingly urban.

Biological Resources

Salt Marsh Harvest Mouse (SMHM)

The salt marsh harvest mouse (*Reithrodontomys raviventris*) (SMHM) relies on dense cover of pickleweed to avoid predation (USFWS 1984). The value of pickleweed increases with depth, density, and degree of intermixing with fat hen (*Atriplex patula*) and alkali heath (*Frankenia salina*) (CDFG 2003). SMHM are seldom found in cordgrass (*Spartina* sp.) or alkali bulrush (*Scirpus maritimus*), and species such as salt grass (*Distichlis spicata*) and brass buttons (*Cotula coronopifolia*) are too low-growing to provide ample cover (USFWS 1984). SMHM, which are partly diurnal, use adjacent upland habitat (i.e. grasslands) during daily or seasonal tidal peaks (USFWS 1984).

The species is in decline throughout its range as a result of loss of habitat resulting from continuous development around San Francisco Bay. Historically, "…salt marsh harvest mice evolved with the creation of San Francisco Bay some 8,000 to 25,000 years ago. During the last two hundred years approximately 79 percent of the tidal marshes of the Bay 144,234 acres (58,370 hectares) to 181,448 acres (73,430 hectares) have been filled, flooded, or converted to other types of vegetation" (Jones and Stokes et al. 1979). "Approximately 32 percent of historical tidal marsh has been converted into diked wetland and is marginal or inappropriate habitat for SMHM. Most of the remaining tidal marshes are fragmented strips situated along outboard dikes and along sloughs often separated from one another by considerable distances" (USFWS 1984).

The SMHM is listed as endangered, both at the federal and state level, and is also listed by the state as a "fully protected" species. These designations under federal and state laws along with drastic range reduction and trends of habitat fragmentation indicate that this species and its habitat are undergoing cumulative impacts.

California Red-Legged Frog (CRLF)

The California red-legged frog (CRLF) (*Rana aurora draytonii*) is the largest native frog found in the western United States. The CRLF requires habitat that consists of both aquatic and riparian elements. Adults use dense, shrubby, or emergent vegetation closely associated with deepwater pools with fringes of cattails and dense stands of overhanging vegetation (USFWS 2002).

CRLF are found primarily in wetlands and streams in the coastal drainages of Central California. The CRLF is federally listed as threatened and is a state species of special concern. The status of CRLF under federal and state provisions indicate it is experiencing cumulative impacts.

The reasons for the decline of CRLF are multifaceted and include predation by the exotic bullfrog (*Rana catesbeiana*) and predatory fishes such as sunfish (*Lepomis* sp.), habitat alteration, the overharvest of frogs in the 19th century, air and water pollution, solar radiation, and pathogens and parasites (Cook 2007).

Fall run Central Valley Chinook Salmon

Chinook salmon (*Oncorhynchus tshawytscha*), also known as king salmon, are the largest species of all Pacific salmons. They are anadramous, living in the sea but reproducing in fresh water, and can travel up to 1,000 mi (1,609 km) to spawn. Chinook salmon range from Santa Barbara to Alaska and spawn in streams that are larger and deeper than those utilized by other salmon species (Pacific States Marine Fisheries Commission 1996).

In the California Central Valley there are four distinct runs of Chinook salmon that are distinguished by the season in which the adults return from the ocean to spawn. These are: fall, late-fall, spring and winter run Chinook salmon (Moyle, 2002). The fall run Central Valley Chinook salmon is a federal species of concern and habitats for Pacific salmon are covered under provisions for Essential Fish Habitat (EFH) by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

Chinook salmon in the Central Valley have been in decline for centuries. Unregulated fisheries, hydraulic mining, logging, levees, and dams caused steep population declines in the 19th century. In the late 20th century, salmon numbers, mostly fall-run Chinook, increased to nearly 500,000 fish per year on average, due to the introduction of hatcheries and special flow releases from dams. These numbers were higher than previous decades, but still were only approximately 10-25 percent of historic abundance. In 2006, numbers of spawners dropped to about 200,000, despite closure of the fishery. In 2007, the number of spawners fell further to about 90,000 fish, among the lowest numbers experienced in the past 60 years, with expectations of even lower numbers in fall 2008 (approximately <64,000 fish). The decline in recent years is due to a combination of natural ocean fluctuations and human-induced changes in Delta and ocean conditions (Moyle 2008).

Central California Coastal Steelhead (CCCS)

Steelhead (*Oncorhynchus mykiss*) are the anadromous form of the rainbow trout, a salmonid species, which is native to western North America and the Pacific Coast of Asia. In North America, steelhead can be found in Pacific Ocean drainages from southern California to Alaska (CDFG 2002). CCCS is a subspecies of steelhead found in watersheds from the Russian River in Sonoma County, to Soquel Creek in Santa Cruz County, and the San Francisco Bay and San Pablo Bay basins (CDFG 2002).

Reasons for their decline for steelhead are similar to those listed for Chinook salmon above, and include dams, logging, water diversions, decreased water quality and siltation, unregulated fisheries, hydraulic mining, levees.

Southern Distinct Population Segment (DPS) North American Green Sturgeon

The green sturgeon is the most widely distributed member of the sturgeon family (NMFS 2007b) in North America. There are two distinct population segments along the west coast of the U.S. and Canada: the northern and southern DPS North American green sturgeon. The National Marine Fisheries Service's Biological Review Team for green sturgeon has concluded that green sturgeon in the northern DPS are not in danger of extinction now or likely to become endangered in the foreseeable future throughout all of its range. The only spawning population from the southern DPS North American green sturgeon is in the Sacramento River. This DPS has the potential to occur in the project area. The southern DPS was listed as federal threatened effective July 6, 2006 (Federal Register 2006). Critical habitat for this species was proposed on September 8, 2008 (Federal Register 2008).

The green sturgeon is a long lived anadromous species that generally migrate upstream through the San Francisco and San Pablo Bays and into the freshwaters of the Sacramento River between late February and late July (CDFG 2002).

CDFG has estimated that the average population of green sturgeon in the Sacramento-San Joaquin River watershed between the years 1954 and 2001 was approximately 1,500 fish per year but these estimates may not be reliable. Based on salvage information of green sturgeon at the Federal and State Fish Protection facilities in the Delta, the abundance of green sturgeon has apparently declined substantially in recent decades (Federal Register 2006).

Nesting Birds

There is an abundance of potential nesting habitat within the project area. Trees, shrubs, grasslands, bridges, and some commercial and residential structures may provide nesting habitat for many species of birds.

Cliff swallow nests were observed beneath the Novato Creek Bridge structure and the San Antonio Creek Bridge structure along US 101. Similarly, nests were observed beneath the San Antonio Creek Freeway Historic Bridge along San Antonio Road. Several large nests were observed in a stand of eucalyptus trees located on private property adjacent to San Antonio Road. These large nests appeared to be vacant and thus were impossible to identify. Caltrans biologists speculate that they were most likely either raptor nests, such as red-shoulder red hawk or red-tailed hawk, great-blue heron, snowy egret or great egret nests. A snowy egret, great egret and great blue heron rookery is also present along Petaluma Boulevard.

Several unidentified nests were observed in the oak woodlands in Olompali SHP and on property belonging to the Silveira Dairy.

Air Quality

Air quality in the San Francisco Bay Area Basin and in the Marin/Petaluma Valley sub-area has been improving over time due to plans and programs implemented by the Bay Area Air Quality Management District and due to the replacement of older vehicles by newer vehicles that have greater fuel efficiency and lower air emissions. In particular, emissions of ozone precursors (NOx and ROG) and CO have been trending downward in the San Francisco Bay Area Air Basin since 1975. On-road motor vehicles are the largest contributors to CO, ROG, and NOx emissions in the air basin. The implementation of stricter mobile source (both on-road and other) emission standards will continue to decrease vehicle emissions in this air basin. Controls on stationary source solvent evaporation and fugitive emissions will also continue to reduce ROG emissions. Emissions of particulate matter (both PM_{10} and $PM_{2.5}$) are projected to continue increasing in the San Francisco Bay Area Air Basin through 2020. This increase is due to growth in emissions from area-wide sources, primarily fugitive dust. Emissions of PM_{10} and $PM_{2.5}$ from diesel motor vehicles have been decreasing since 1990 even though population and VMT are growing, due to adoption of more stringent emission standards. Based on these efforts, the Bay Area is in attainment of ambient air quality standards for criteria pollutants, except ozone and particulate matter at the state level and ozone at the federal level. (California Air Resources Board, California Almanac of Emissions and Air Quality 2006 Edition).

5.4 Past, Present and Foreseeable Future Projects

Caltrans researched projects in northern Marin and southern Sonoma Counties that underwent environmental review and approval between 2001 and 2006. Caltrans also included other transportation projects in northern Marin and Sonoma County along US 101. Also researched were environmental review documents submitted to Caltrans as a function of Intergovernmental Review provisions under CEQA. Caltrans also consulted planning offices in Marin County and Sonoma County and the cities of Novato and Petaluma and researched records obtained through these offices. Table 5-1 encompasses the projects which have potential impacts to resources analyzed within the defined geographic study areas for this cumulative impacts assessment. Project locations in the study area are indicated in Figures 5-1 and 5-2 which appear after the following table.

5.5 Cumulative Impacts Discussion

Wetlands

Table 5-1 lists approved and foreseeable future actions, some of which would impact wetlands in the project vicinity. As in the case of the MSN Project, other project proposals subject to USACE's review under the CWA Section 404 program would also be subject to avoidance, minimization, and compensatory measures that may offset impacts to wetlands.

Table 5-1 Past, Present, and Foreseeable Future Projects in the Study Area

Key	Project and Location	Project Type	Document Type	Project Status	Shared Resource Impact Areas
City of Novato					
1	Binford Road Storage Facility 8190 Binford Road	Commercial	ND	Under Review by Marin County	• Wetlands • Water Quality
2	Costco Expansion 300 Vintage Way	Commercial	MND	In Construction	• Unknown (not available)
3	Creekside Office (Novato Creek) 1744-1748 Novato Boulevard	Commercial	ND	Completed Construction	• Wetlands • Archaeology
4	Marion Heights 1750 Marion Avenue	Residential	MND	Completed Construction	• Wetlands • Archaeology
5	New Beginnings Next Key 1399 North Hamilton Parkway	Office/Industrial	MND	In Construction	• Water Quality
6	Oleander Lane Design Review 801 Oleander Lane	Residential	ND	Approved	• Wetlands • Archaeology • Water Quality
7	Olive Court 469 Olive Avenue	Residential	ND	In Construction	• Wetlands • Water Quality
8	San Pablo Subdivision San Pablo Avenue/Hangar Avenue	Residential	MND	Completed Construction	• Water Quality
9	Somerston Park (Marion Heights) Northside of Marion Avenue between Anna Court and Bryan Drive	Residential	MND	Completed Construction	• Water Quality
10	Oak Ridge Estates End of Shevelin Road	Residential	EIR	Updating EIR; Waiting on Approval	• Wetlands • Water Quality
11	Whole Foods/Mixed Use 790 Delong Avenue	Mixed Use	MND	In Construction	• Water Quality • Archaeology
12	Woodview Subdivision San Marin Drive/Dorothy Way	Residential	MND	In Construction	• Wetlands • Water Quality

Table 5-1 Past, Present, and Foreseeable Future Projects in the Study Area

Key	Project and Location	Project Type	Document Type	Project Status	Shared Resource Impact Areas
County of Sonoma					
13	Dutra Asphalt & Recycling Facility 3355 Petaluma Blvd. S.	Industrial	IS	Out for Public Comment	• Wetlands • Aesthetics • Water Quality • Archaeology • Steelhead, Chinook Salmon, California Clapper Rail • Nesting Habitat
14	Royal Petroleum 2645 & 2525 Petaluma Blvd. South	Commercial	MND	Approved	• Aesthetics
15	Shamrock 210 & 222 Landing Way	Industrial	MND	Completed Construction	• Wetlands
16	Novato Disposal 2543 Petaluma Blvd. South	Industrial	MND	Approved	• Aesthetics
City of Petaluma					
17	Intersection widening and signalization project Adobe Rd/Corona Rd IS	Traffic Improvement	MND	Approved	• Wetlands • Aesthetics
18	Boulevard Apartments 945 Petaluma Boulevard North	Residential	MND	Completed Construction	• Water Quality
19	Deer Creek Plaza NW side of N. McDowell/Rainier Avenue Intersection	Mixed Use	IS	Process of being revised to new General Plan of Mixed Use	• Wetlands • Water Quality
20	Lafferty Ranch Park 3.5 miles from Petaluma	Recreation	EIR	On Hold	• Wetlands • Water Quality • Archaeology
21	Magnolia Place Magnolia Avenue, near Cemetery	Residential	MND	Completed Construction	• Wetlands • Water Quality

Table 5-1 Past, Present, and Foreseeable Future Projects in the Study Area

Key	Project and Location	Project Type	Document Type	Project Status	Shared Resource Impact Areas
22	Marina Office Building 785 Baywood Drive	Office	MND	Approved	• Wetlands • Water Quality
23	McDowell/E. Washington	Traffic Improvement	MND	Completed	• Wetlands
24	Park Square Casa Grande Road at Lakeville Highway	Residential & Commercial	MND	Retail portion Under construction. Res. portion Completed	• Water Quality
25	Petaluma Theater District First and Second Streets at C and D Streets	Residential & Commercial	MND	Approved	• Archaeology
26	Recycled Water Pipeline Phase I Brown's Lane/Ely Road/Casa Grande Road	Utility	MND	EIR in Process	• Wetlands • Water Quality
27	Redwood Technology Center Old Redwood Highway and W. McDowell Blvd.	Office	EIR	Under Construction	• Wetlands • Water Quality
28	Riverview Subdivision Mission Drive near McNair Avenue	Residential	MND	Under Construction	• Wetlands • Water Quality
29	Sola Business Park 1490 Cader Lane (between Lakeville Hwy and South McDowell)	Office	MND	Completed Construction	• Water Quality
30	Technology Lane Commercial Center Technology Lane	Office	MND	Construction Completed	• Wetlands • Water Quality
31	Sweed School 331 Keller Street	Residential	MND	Construction Completed	• Water Quality
32	East Washington Place East Washington Street and Ellis Street	Office/Mixed Use	EIR	In Preparation	• Aesthetics • Water Quality • Wetlands
US 101 Projects					
Figure 5-2	East Washington Interchange IP	Transportation	IS/EA	Environmental studies underway	• Wetlands • Water Quality • Aesthetics

Table 5-1 Past, Present, and Foreseeable Future Projects in the Study Area

Key	Project and Location	Project Type	Document Type	Project Status	Shared Resource Impact Areas
Figure 5-2	Old Redwood to Rohnert Park Expressway HOV Project	Transportation	EIR/EA	Final environmental document being prepared	• Water Quality • Farmlands (temporary) • Aesthetics
Figure 5-2	Wilfred Avenue Interchange and HOV Project	Transportation	MND/EA	Final design	• Aesthetics
Figure 5-2	Highway 12 to Steele Lane HOV	Transportation	EIR/EA	Under construction	• Aesthetics
Figure 5-2	Steele Lane to Windsor River Road HOV	Transportation	EIR/EA	Final environmental document being prepared	• Aesthetics

ND = Negative Declaration
MND = Mitigated Negative Declaration
EIR = Environmental Impact Report
UNK = Unknown

Sources:
Marin County Development Agency, *Propdev 40 Semi-Annual Proposed Development Survey*, October 2005.
City of Novato Planning Department, November 2005, August 2006, and November 2008.
County of Marin, Community Development Agency, Current Planning, November 2008
City of Petaluma Community Development, Planning Division, December 2005 and November 2008.
County of Sonoma, Community Development Commission, April 2009.

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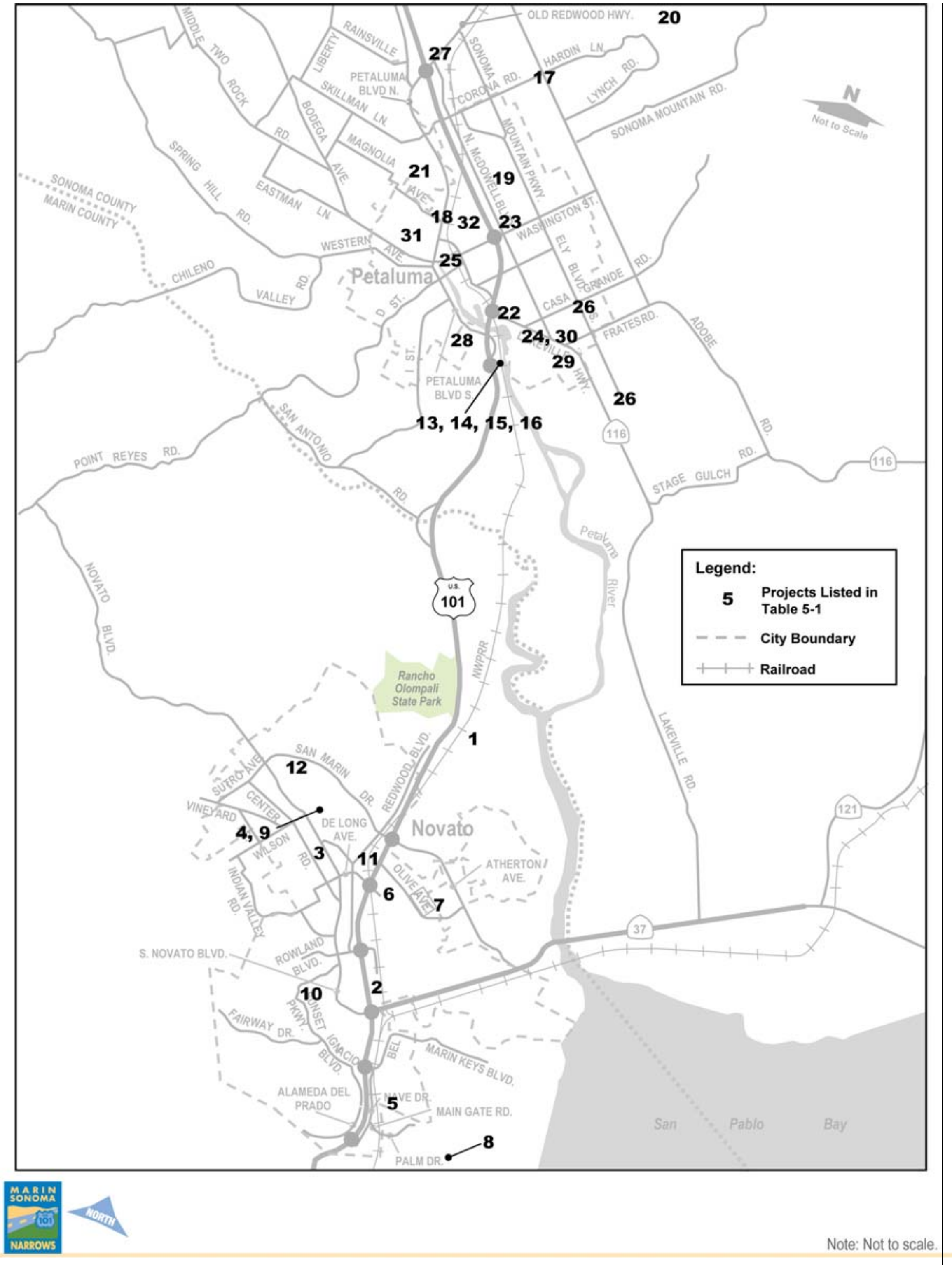
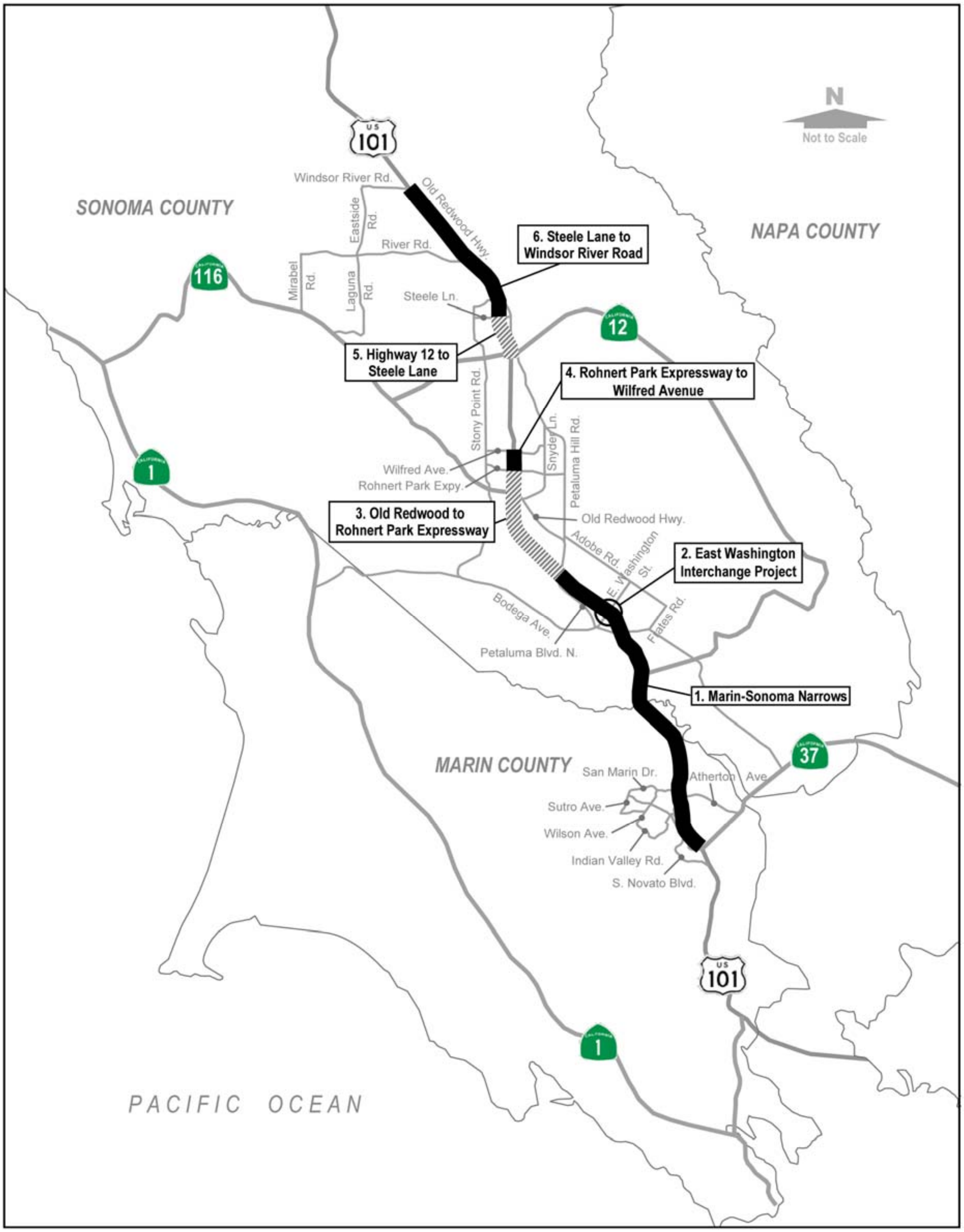
Figure 5-1 Projects within MSN Cumulative Impacts Assessment Study Area



332 Figure 5-2 MSN Visual/Aesthetics Cumulative Impacts Assessment Study Area



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Caltrans' wetland compensation related to the MSN Project would be determined in conjunction with state and federal regulatory agencies under the NEPA/404 process (see Section 6.3.1). It is expected, however, that the hectares (ha) (or acres [ac]) realized through compensation would result in a net increase over the amount of wetlands impacted under the Build Alternatives based upon FHWA's nationwide goal for replacing impacted wetlands at 1.5:1. In addition, Caltrans and FHWA would establish successful wetland compensation ahead of construction to compensate for impacts associated with project segments undertaken. Therefore, there would be no temporary impacts. Furthermore, the Build Alternative would not make remaining wetlands in the Central Segment vulnerable to future impacts. This is evidenced by the fact that the MSN Project conforms with local plans (see Section 3.1.2.), which contain policies toward the preservation of natural resources. Consequently, the MSN Project would not contribute toward cumulative wetland impacts.

Water Quality

There are numerous past, present, and foreseeable future residential, commercial, and transportation projects in the MSN Project study area (Table 5-1). These projects have direct and indirect impacts to water resources and water quality that could cumulatively impact downstream water resources. Direct and indirect impacts to water resources and water quality from these projects are similar to those identified for the MSN Project; namely, erosion and sedimentation, the addition of impervious areas that can alter the rate and pollutant characteristics of storm water runoff and discharge or filling of wetlands, and disturbance to Waters of the U.S. The pollutants in individual waterways in the Marin and Sonoma County watershed also migrate into the Petaluma River, San Antonio Creek, and Novato Creek, and eventually into the San Pablo Bay. As noted previously, each of these major water bodies already fail to meet the water quality standards of the San Francisco Bay Plan. Therefore, left unmitigated, the MSN Project could have cumulative water quality impacts in combination with other foreseeable projects.

Like the MSN Project, the majority of the other projects listed in Table 5-1 are subject to an NPDES permit that would require the preparation of Storm water Pollution Prevention Plans and the implementation of Best Management Practices. These plans adhere to permit program requirements developed under the CWA to achieve water quality goals for the major water bodies within the project study area. Also, the environmental documents for these projects indicate that water quality control strategies would be similar to those recommended for the MSN Project, outlined in Section 3.2.2.

In addition, Caltrans has a statewide NPDES Permit Order No. 99-06-DWQ, which governs the facility after construction. This permit requires Caltrans to implement BMPs, as necessary, to meet water quality standards. If water quality degrades, Caltrans would implement additional BMPs to achieve water quality standards. Consequently, it can be stated that Caltrans does and would continue to manage its facilities to mitigate for cumulative impacts in the Petaluma River and San Pablo Bay watersheds. Therefore, Caltrans' adherence to the RWQCB-approved statewide NPDES program would address cumulative impacts to storm water quality, pollutant loading, and drainage impacts from the MSN Project. Monitoring results and annual reports for the Petaluma River watershed may be viewed at: http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/index.htm#SWMP.

Farmlands

Farmland uses are concentrated along the Central Segment of the project limits, where the majority of farmland conversion impacts would occur under the MSN Build Alternative. The hectares (and acres) in Table 5-2 represent the area along nine linear miles that would be impacted due to the MSN Build Alternative.

Table 5-2 Farmland Impacts under the Build Alternative

County	APN#	Williamson Act Contract	Access Alternative 4b Hectares (Acres)	Access Alternative 12b Hectares (Acres)	Access Alternative 14b Hectares (Acres)	Access Alternative 14d Hectares (Acres)
Central Segment						
MRN	125-190-001	No	1.01 (2.50)	1.01 (2.50)	1.01 (2.50)	1.01 (2.50)
MRN	125-160-020*	No	10.40 (25.70)	7.24(17.90)	7.23(17.86)	3.76(9.30)
MRN	125-160-019*	No	1.57(3.88)	1.57(3.88)	0.02(0.04)	1.23 (3.03)
MRN	125-160-018*	Yes	5.05(12.48)	3.95(9.77)	3.02(7.46)	5.24 (12.95)
MRN	125-160-016	No	5.18 (12.80)	7.13 (17.62)	4.23 (10.45)	6.50 (16.06)
MRN	125-160-015*	Yes	0.29 (0.72)	1.15 (2.84)	0.03 (0.07)	0.26 (0.64)
MRN	125-160-012*	No	0.51 (1.26)	0.51 (1.26)	0.51 (1.26)	0.51 (1.26)
MRN	125-160-006*	No	1.93 (4.77)	1.93 (4.77)	1.93 (4.77)	1.93 (4.77)
MRN	125-130-035	No	0.45 (1.11)	0.45 (1.11)	0.45 (1.11)	0.45 (1.11)
MRN	125-130-032	No	0.05 (0.12)	0.05 (0.12)	0.05 (0.12)	0.05 (0.12)
MRN	125-130-024*	Yes	1.03 (2.55)	----	0.78 (1.93)	0.97 (2.40)
MRN	125-130-023*	No	4.41 (10.90)	3.72 (9.19)	3.66 (9.04)	10.90(26.93)
MRN	125-130-013	No	0.08 (0.21)	0.08 (0.21)	0.09 (0.21)	0.09 (0.21)
MRN	125-130-014	No	1.30 (3.21)	1.31 (3.23)	1.31 (3.23)	1.31 (3.23)

Table 5-2 Farmland Impacts under the Build Alternative

County	APN#	Williamson Act Contract	Access Alternative 4b Hectares (Acres)	Access Alternative 12b Hectares (Acres)	Access Alternative 14b Hectares (Acres)	Access Alternative 14d Hectares (Acres)
MRN	125-130-004*	Yes	0.04 (0.10)	0.36 (0.89)	7.03 (17.36)	7.03 (17.37)
Marin Subtotal			33.29 (82.27)	30.46 (75.27)	31.33 (77.42)	41.24 (101.91)
SON	019-340-001	Yes	0.12 (0.30)	0.51 (1.27)	0.12 (0.30)	0.12 (0.30)
SON	019-330-014	No	0.01 (0.03)	----	0.01 (0.03)	0.01 (0.02)
SON	019-280-008	No	----	----	----	0.00 (0.00)
SON	019-330-011	No	0.04 (0.10)	0.04 (0.10)	0.04 (0.10)	0.04 (0.10)
SON	019-320-003	No	0.14 (0.34)	0.14 (0.34)	0.14 (0.35)	0.14 (0.35)
SON	019-310-021	No	0.16 (0.39)	0.16 (0.39)	0.16 (0.40)	0.16 (0.40)
SON	019-300-012	No	2.03 (5.01)	2.03 (5.01)	2.03 (5.02)	2.03 (5.02)
SON	019-310-012	No	1.59 (3.92)	1.59 (3.92)	1.58 (3.90)	1.58 (3.90)
SON	019-310-005	No	0.72 (1.78)	0.72 (1.78)	0.72 (1.78)	0.72 (1.78)
SON	019-300-018	No	2.32 (5.74)	2.32 (5.74)	2.33 (5.76)	2.33 (5.76)
SON	019-300-017	No	3.72 (9.19)	3.72 (9.19)	3.72 (9.19)	3.72 (9.19)
SON	019-290-001	Yes	2.56 (6.32)	2.56 (6.32)	2.56 (6.33)	2.56 (6.33)
SON	019-280-003	No	3.89 (9.60)	3.89 (9.60)	3.89 (9.61)	3.89 (9.61)
SON	019-280-002	No	0.40 (0.98)	0.40 (0.98)	0.39 (0.96)	0.39 (0.96)
SON	019-280-001	No	2.53 (6.24)	2.53 (6.24)	2.45 (6.05)	2.45 (6.05)
SON	019-220-041	No	0.89 (2.20)	0.89 (2.20)	0.89 (2.20)	0.89 (2.20)
SON	019-330-007	No	0.34 (0.84)	0.33 (0.81)	0.33 (0.81)	0.33 (0.81)
SON	019-320-005	No	1.03 (2.55)	1.03 (2.55)	0.97 (2.40)	0.97 (2.40)
SON	019-320-022	No	0.97 (2.40)	0.97 (2.40)	1.00 (2.47)	1.00 (2.47)
SON	019-320-011	No	0.62 (1.53)	0.62 (1.53)	0.62 (1.53)	0.62 (1.53)
SON	019-320-012	No	0.06 (0.16)	0.07 (0.17)	0.07 (0.16)	0.07 (0.17)
SON	019-320-018	No	0.02 (0.04)	0.02 (0.04)	0.02 (0.04)	0.02 (0.04)
SON	019-320-016	No	6.93 (17.12)	6.93 (17.12)	6.93 (17.12)	6.93 (17.12)
SON	019-220-040	No	1.32 (3.25)	1.32 (3.25)	1.31 (3.25)	1.32 (3.25)
Sonoma Subtotal			32.38(80.00)	32.76 (80.96)	32.27 (79.75)	32.28 (79.77)
Segment B Total			65.67 (162.27)	63.22 (156.23)	63.61 (157.17)	73.52 (181.67)
Northern Segment						
SON	007-380-005	No	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)	0.03 (0.08)
SON	007-380-027	No	0.13 (0.32)	0.13 (0.32)	0.13 (0.32)	0.13 (0.32)
SON	136-010-025	No	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
SON	007-390-005	No	0.00	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Segment C Total			0.17 (0.41)	0.17 (0.41)	0.17 (0.41)	0.17 (0.41)
TOTAL			65.84 (162.69)	63.39 (156.64)	63.77 (157.58)	73.69 (182.09)

Source: Parsons Corporation, March 2006.
County of Marin, Countywide Plan Map Viewer website (http://gisprod1.co.marin.ca.us/CWP/Viewer/bottom/Viewer.asp).
Sonoma County Tax Assessor's Office, March 2006.

*Represents parcels owned by commercial dairies.

--- No impact.

Marin County

In Marin County, individual land conversions by parcel would range from 0.00 ha (0.01 ac) to 12.98 ha (32.07 ac). The largest land use conversions overall would occur under Access Option 14b (80.09 ha/141.42 ac). The smallest conversion would occur under Access Option 12b (70.87 ha/117.90 ac). However, out of 15 proposed land conversions most would be less than 1.2 ha (3 ac).

Conversions of land owned by commercial dairies would occur under all the Access Options. From smallest to largest they are 29.15 ha (72.02 ac) proposed under 12b; 36.17 ha (89.38 ac) proposed under 14d; 37.86 ha (93.56 ac) under 4b; and 38.68 ha (96.51 ac) proposed under 14b.

It is unknown at this time how much of this land is devoted to grazing and other commercial dairy activities. The remaining land proposed for conversion is residential, county owned, utility facilities, undeveloped lots, or other non-agricultural commercial facilities.

Several of the parcels are identified by Marin County as lands conserved under the Williamson Act. Under the Build Alternative, conversions of Williamson Act lands would take place in amounts of 32.68 ha (80.76 ac), 22.01 (54.4 ac), 34.44 ha (85.09 ac), and 29.66 ha (73.3 ac) under Access Options 4b, 12b, 14b, and 14d, respectively.

In Table 5-1, no other farmland impacts are noted among the past, present, and foreseeable future projects in the resource study area.

Based upon the stability of milk production and the amount of farmland under conservation contracts, the land conversions proposed under the MSN Build Alternatives would not alter the successful conservation trends Marin County is experiencing.

Sonoma County

In Sonoma County, individual land conversions by parcel would range from 0.01 ha (0.03 ac) to 3.89 ha (9.61 ac). The largest combined land use conversions would occur under Access Option 12b (80.39 ha/141.42 ac). However, out of 25 proposed land conversions most would be less than 2 ha (5 ac). Commercial dairy or other farmland activities on these parcels are not currently indicated.

Furthermore, some of the parcels identified in Table 5-2 are located in areas undergoing rapid development. It is unknown whether the Sonoma County Agricultural Preservation and Open Space District has identified any of the parcels in Table 5-2 for conservation. Of the proposed farmland conversions, two of the parcels are under Williamson Act preservation, which represent 2.68 ha (6.62 ac), under Access Options 4b, 14b, and 14d, and 3.07 ha (7.59 ac) under Access Option 12b.

The remaining land proposed for conversion is residential, county owned, utility facilities, undeveloped lots, or other non-agricultural commercial facilities. Within the resource study area, two projects are noted among past, present, and foreseeable future projects listed in Table 5-1. One is the US 101 Old Redwood Highway to Rohnert Park Expressway HOV Widening project, which would have only minor, temporary impacts to farmlands. The other is the Adobe Road/Corona Road intersection widening and signalization project in the city of Petaluma, which is currently on hold.

Land conversions proposed under Access Option 14d, the option that would impact the largest area of farmland, would total 73.69 ha (182.69 ac). This represents less than 0.03 percent of Sonoma County land dedicated to agriculture. Therefore land conversions proposed under the Build Alternative would be minor and would not have negative cumulative effect on farmland conservation efforts in Sonoma County.

Furthermore, the Build Alternative would not make remaining farmland in the Central Segment vulnerable to future impacts. This is evidenced by the MSN Project’s conformity with local plans (see Section 3.1.2), which contain policies toward the preservation of farmland and maintaining current low density land uses in the Central Segment. Consequently, the MSN Project would not contribute toward cumulative losses of farmland.

Archaeology

As discussed previously, several archaeological sites have been recorded within the Area of Potential Effect for the MSN Project. The prehistoric constituents of these sites are a contributing element to the sites’ National Register eligibility.

The removal of portions of the identified sites as a result of the MSN Build Alternative has an incremental impact on the preservation of archaeological sites within the Petaluma River watershed and San Pablo Bay vicinity. To determine if there would be cumulative impacts for cultural resources, multiple past, present, and future projects located within the geographic context for this study were considered. Related projects in the area and other development in the county could result in the progressive loss of as-yet unrecorded archaeological resources (see Table 5-1). None of the other projects in Table 5-1 were determined to directly or indirectly create or increase impacts within the project area from ground disturbance (i.e., road building or excavation), activities that would result in cumulatively and considerable impacts. However, cumulative impacts to the archaeological record are unavoidable and are anticipated as a result of the MSN Project and other projects within the project area and vicinity. Consequently, Caltrans and the FHWA have proposed mitigation based upon adverse effects to archaeological resources within the APE found eligible for the National Register. Similar measures may also be implemented for other related projects that have the potential to affect archaeological resources.

Visual Resources

Under CEQA, Cumulative visual impacts could accrue within the US 101 visual foreground in two ways: 1) from visual changes of two or more projects within the same viewshed (in the Northern Segment) combining to create a substantial adverse impact; and 2) within the visual impacts study area (Figure 5-2) from incremental impacts to the overall visual character and quality of the highway corridor by individual projects which, taken alone, may be minor but when taken together represent a substantial change in the corridor's overall visual quality.

As stated previously in Section 3.1.11.1, in its implementation of NEPA, FHWA directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

Because the basis for evaluating aesthetic impacts under NEPA and CEQA are substantively similar, the following discussion satisfies provisions in both of these laws.

Cumulative impacts could occur within the Northern Segment (City of Petaluma) due to potential visual effects of the East Washington Interchange Project (currently part of the No Build Alternative), which would take place within portions of the same viewshed as the MSN Project. Individual project effects of the MSN Project, notably removal of prominent tree hedgerows to make way for auxiliary lanes and soundwalls, are anticipated to contribute to similar impacts of the East Washington Project, resulting in substantial adverse cumulative impacts within the immediate project viewshed.

Potential cumulative impacts were also identified in the *US 101 from Steele Lane to Windsor River Road EA/EIR*, due to loss of Redwood trees among the US 101 corridor projects in Sonoma County. Such Redwood groupings are an important component of the visual image of the highway corridor (the “Redwood Highway”) and region. The prevalence of Redwood trees in the US 101 corridor is limited primarily to the area within Sonoma County and northward. The Petaluma portion of the MSN Project represents the southern limit of the area in which Redwoods constitute an important part of the landscape image. The loss of a large number of Redwood trees under the MSN Project would represent a substantial contribution to the cumulative regional loss of Redwood trees in the US 101 foreground visual corridor. This particular cumulative impact is specific to the northern, Petaluma segment of the MSN Project only.

The center widening of the entire corridor could be considered to have a potential cumulative region-wide effect of increasing the urban character of the corridor as a whole. The MSN Project proposes to implement individual project mitigation that would off-set much of that incremental change in corridor visual character, by enhancement of landscape vividness and intactness through re-vegetation and landscaping of the highway visual foreground, particularly in the Marin-Sonoma Narrows, over the long term. Although those measures would help to improve overall corridor visual quality, such measures could not be applied within the Petaluma segment of the MSN Project. In this segment the urbanizing effect of center widening under the MSN Project would be individually moderate, but would contribute to a substantial adverse effect within the geographic study area. In addition, due to the long period to maturation of re-vegetation and landscaping measures (10 to 20 years), substantial short-term cumulative visual impacts are anticipated as a result of the MSN Project in combination with the other US 101 projects.

Biological Resources

Salt Marsh Harvest Mouse (SMHM)

There would be no permanent direct impacts to SMHM habitat as a result of the MSN Project. Caltrans and FHWA will incorporate the measures stated in Section 3.3.6.4 to avoid "take."[1]

As stated in Section 3.3.6.4, there are patches of pickleweed on the east and west sides of the Petaluma River Bridge connected by a channel. Pickleweed on the west is sparse and of very low quality, while the quality of SMHM habitat is higher on the east side where pickleweed is dense and well established. The MSN Project would have permanent impacts to approximately 0.02 ha (0.05 ac) of potential SMHM habitat due to removal of pickleweed prior to construction. After construction, Caltrans and FHWA will revegetate and enhance the pickleweed areas by realigning the channel to maintain connectivity. The new channel will allow greater tidal influence and, thereby, enhance the quality of the pickleweed on the west side of the bridge.

Caltrans and FHWA find that there will be no cumulative impacts to SMHM as none of the projects listed in Table 5-1 indicate potential impacts to SMHM or SMHM habitat. Additionally, the restoration and enhancement measures on the west side of the Petaluma River Bridge after construction will improve the conditions of the pickleweed.

California Red-Legged Frog (CRLF)

Approximately 82.47 ha (203.79 ac) of potential CRLF dispersal habitat will be directly and permanently impacted. Approximately 1.34 ha (3.3.1 ac) of potential CRLF dispersal habitat will be directly and temporarily impacted. The highly disturbed upland areas along the margin of the roadway do not provide high-quality dispersal or foraging habitat due to existing development, the presence of disturbed areas and the paucity of vegetation in many areas. If CRLF occur within the affected areas, the primary use of the affected areas by CRLF would be by individuals dispersing away from breeding areas located within 3.2 km (2.0 mi) of the action area. No breeding habitat will be impacted.

[1]Section 9 of the Endangered Species Act defines "take" as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt such actions.

Caltrans and FHWA will implement avoidance measures stated in Section 3.3.6.4 during project construction. None of the projects listed in Table 5-1 indicate impacts to CRLF. For the reasons stated above, Caltrans and FHWA find that the MSN Project will not cause cumulative impacts to CRLF.

Central California Coastal Steelhead (CCCS) and Chinook salmon

Approximately 0.47 ha (1.16 ac) of CCCS and Chinook salmon habitat will be directly and permanently impacted in Novato Creek, San Antonio Creek, the Petaluma River and Lynch Creek. The impacts are due to tree removal, the placement of roads and freeway bridge structures, a permanent decrease in shading in the creeks, and the placement of falsework piles, trestle piles, and cofferdams in the creeks for longer than one year.

There are no known CCCS or Chinook salmon spawning sites in the project area, and no CCCS or Chinook salmon juveniles or adults were observed during the field surveys. There is a possibility that migrating adult CCCS could transit through the action area and/or juvenile CCCS or Chinook salmon could disperse and rear within the project area and project construction could affect them. However, with the implementation of avoidance and minimization measures stated in Sections 3.3.5.4 and 3.3.6.4, this is a discountable effect.

Caltrans and FHWA will implement avoidance measures, as stated above, during project construction. None of the projects listed in Table 5-1 indicate impacts to CCCS and Chinook salmon or their habitat. For the reasons stated above, Caltrans and FHWA find that the MSN Project will not cause cumulative impacts to CCCS and Chinook salmon.

Southern Distinct Population Segment (DPS) North American Green Sturgeon

Approximately 0.20 ha (0.49 ac) of green sturgeon habitat will be permanently impacted in the Petaluma River as a result of the replacement of the bridge, a permanent decrease in shading in the river and the placement of falsework piles, trestle piles, and cofferdams in the creeks for longer than one year.

There are no known green sturgeon spawning sites within the project area, and no green sturgeon juveniles or adults were observed during the field surveys. There is a possibility that in the rainy season, adult green sturgeon could transit and/or juvenile green sturgeon could transit and/or rear within the project area within the Petaluma River and project construction activities could affect them. However, with the implementation of avoidance and minimization measures stated in Section 3.3.6.4, this is a discountable effect.

Caltrans and FHWA will implement avoidance measures stated in Section 3.3.6.4 during project construction. None of the projects listed in Table 5-1 indicate impacts to green sturgeon. For the reasons stated above, Caltrans and FHWA find that the MSN Project will not cause cumulative impacts to green sturgeon.

Nesting Birds

Each of the Access Options would require tree and vegetation removal. Tree removal would vary between 1,401 trees under Access Option 4b and 1,706 trees under Access Option 12b. If no avoidance measures are taken, each of the four Access Options could affect nesting birds. The rookery of great egrets, snowy egrets and great blue herons east of Petaluma Road is directly within the project footprint and this rookery will be impacted.

Caltrans and FHWA will implement avoidance measures stated in Section 3.3.5 during project construction. Dutra Asphalt & Recycling Facility project, listed in Table 5-1, will also impact the rookery east of Petaluma Road. Therefore, there would be immediate direct and cumulative impacts on the rookery from these projects.

Caltrans made modifications under the Preferred Alternative to decrease the radius of the ramp along Petaluma Boulevard in order to minimized impacts to the rookery; however, it was not possible to avoid it completely. Although Caltrans cannot avoid impacts to the rookery, minimization measures will be employed, where feasible, to avoid further impacts from final design and during project construction.

In accordance with the Migratory Bird Treaty Act, the contractor will conduct tree trimming and removal first and foremost outside of the nesting bird season of February 15 through September 1. Trees may be identified for removal during the nesting season only if a qualified biologist has surveyed the trees and confirmed that there are no active nests present within the trees identified for removal or immediately adjacent. If any active nests are identified during this period, the trees cannot be disturbed for the duration of the nesting season. Although it is true that the project will impact a substantial number of trees under the Build Alternatives, many more trees will remain in the project area that can provide alternative nesting habitat. A tree replacement plan will also be implemented, particularly in Segment B wherever it is feasible, but plantings may take 10-20 years to reach maturity (see Appendix J).

Air Quality

The projects depicted in Figure 5-1 and 5-2 would all contribute air emissions into the San Francisco Bay Area Air Basin and into the smaller cumulative impact study area of east Marin and Petaluma Valley. Although air quality has improved over the years, the area continues to be in non-attainment of the state ozone and PM_{10} ambient air quality standards and in non-attainment of the federal ozone standard. The approved and pending land development projects, in combination with large transportation improvements that increase capacity, would continue to emit air pollutants that would contribute to cumulative air quality impact without the MSN Project.

The maximum AADT in the segment within the project boundaries with the highest 24-hour volume, would be 128,300 for the No Build Alternative and 135,200 for the Build Alternatives in the year 2030. As discussed in chapter 3.2.6, Air Quality, the Build Alternatives would not be much different from the No Build Alternative in terms of air emissions, for those pollutants for which the Bay Area is in non-attainment. Accordingly, the contribution of the MSN Project would be the same as the cumulative air quality impacts of the other past, present and foreseeable future projects in Table 5-1. However, while AADT and VMT increase over the No Build, the Build Alternatives would alleviate the vehicle hours of delay and the congestion that is particularly acute in Segment B, the Novato Narrows segment, of the project without substantially increasing vehicle miles traveled. As a result, it is reasonable to expect that emissions of carbon and ozone precursors would be reduced compared to No Build conditions. Furthermore, the Build Alternative would also pave the unpaved median outside shoulders, which is notable because one of the largest sources of particulate matter is from resuspended road dust.

As described in Chapter 3.2.6., Air Quality, under the 1990 Clean Air Act Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve Federal actions to support programs or projects that are not first found to conform to the SIP for achieving the goals of the Clean Air Act Requirements. Conformity with the Clean Air Act takes place at the regional level and at the project level. The MSN Project has been found to confirm at both levels (see Section 3.2.6 Air Quality).

Based upon the MSN Project's conformity to the SIP for achieving air quality goals and it's consistency with the Transportation Control Measures in the Clean Air Plan, it is reasonable to conclude that the MSN Project would contribute minimally to cumulative air quality impacts in the Bay Area, and even less in the Marin County and Petaluma Valley study area.

Chapter 6 Summary of Public/Agency Involvement Process/ Tribal Coordination

Introduction

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis, potential impacts and mitigation measures and related environmental requirements. Agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including: project development team meetings, interagency coordination meetings. This chapter summarized the results of Caltrans' efforts to fully identify, address and resolve project-related issues through early and continuing coordination.

6.1 Comment Period and Public Meetings on DEIR/S

The Draft Environmental Impact Report/Statement (DEIR/S) was released on October 16, 2007; distribution of the document and a public comment period of 60 days followed (ending December 14, 2007). The DEIR/S was available for viewing at the Transportation Authority of Marin (TAM), the Sonoma County Transportation Authority (SCTA), the Community Center at Lucchesi Park, and several city and regional libraries throughout the area. Caltrans received over 700 comments during the comment period (refer to Volume 3 for the Response to Comments Report).

Caltrans, TAM, and SCTA hosted two public meeting open houses to present the findings of the DEIR/S on the Marin-Sonoma Narrows Highway 101 High Occupancy Vehicle (HOV) Lane Widening Project. Pursuant to California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) guidelines, local residents, elected officials, interested property owners, local businesses, and other interested parties of the general public, were notified of the document release and the public meetings through local newspapers (see Figures 6-2 through 6-5) and letters of notification to people on the project mailing list. A Notice of Availability also appeared in the Federal Register on October 26, 2007 (see Figure 6-6). The two public meeting open houses were held on November 6, 2007 in Petaluma at the Beverly C. Wilson Hall located at the Sonoma-Marin Fairgrounds and November 14, 2007 in Novato at the Novato

Unified School District Board Room. During the meetings, a presentation was given on the overview of the project and the project schedule information. Fifty-five people signed in at the two meetings. A court reporter was also on hand to record comments and project staff was on hand to answer questions.

6.2 Scoping Meetings and Outreach Efforts Prior to DEIR/S

FHWA published a Notice of Intent (NOI) under NEPA to prepare an EIS in the Federal Register on May 2, 2001. Caltrans submitted a Notice of Preparation (NOP) to prepare an EIR under CEQA to the California State Clearinghouse on April 23, 2001. Caltrans held public scoping meetings on August 1, 2001 in Novato and Marin County, and August 22, 2001, in Petaluma and Sonoma County, following the NOI/NOP filings. The intent of these meetings was to solicit input from public agencies and the public about the scope of the environmental analysis. The meetings were advertised in local newspapers, including a Spanish language newspaper.

Invitations were also mailed to over 100 interested parties. These meetings were attended by 103 people. Caltrans project development team staff was available to answer questions. A court reporter and Spanish speaking translators were available at both locations, and comment cards were collected.

During the project's early scoping phase, local city and county officials and members of the public expressed concerned about the extent of the potential environmental impacts identified in the "Novato Narrows" Project Study Report associated with 28 acres of potential right-of-way acquisition. Concerns included impacts to wetlands, biological habitats, and growth inducement within the semi-rural setting of the Central Segment. Caltrans created a Policy Advisory Group (PAG) as a means of providing a public forum to discuss local issues of concern throughout the environmental and design process. The PAG is composed of local city and county officials. PAG meetings were open to the public and held on an as-needed basis in alternate locations in Novato and Petaluma.

Caltrans has also been meeting with local constituencies in Marin and Sonoma counties and state, federal, and local agencies, as illustrated in Figure 6-1. This coordination has helped Caltrans reduce or modify the footprint of project elements (e.g., bridges, service roads, mainline alignment, etc.) to effectively avoid and minimize potential environmental impacts.

Once the alignment of the proposed freeway facility within the project's Central Segment was determined, Caltrans held additional public meetings in Novato on November 18, 2002, and in Petaluma on November 19, 2002. These meetings were advertised in local newspapers. Invitations were also mailed to over 250 people on the interested parties' mailing list. This meeting was attended by 63 people. Caltrans project development team staff was available to answer questions, and comment cards were collected.

Several key opinions emerged from the session and are summarized below; responses to those comments are noted in parentheses following the comment.

Figure 6-1 Public Scoping Meetings and Attendees

- Support the proposed improvements, but wish they could happen sooner (the project approval and environmental documentation are the first steps toward implementing the proposed improvements);
- Support a No Build Alternative (the No Build Alternative is evaluated at an equal level of detail as the Build Alternatives);

- Provide continuous Class 1 and Class 2 (each of the Access Options proposes a continuous bicycle and pedestrian pathway);
- Improve safety at Kastania Road (each of the Access Options would rehabilitate this road, provide for a bicycle/pedestrian path, and make the roadway non-continuous to discourage through traffic movements);
- Minimize the frontage roads and interchanges (during the alternatives development phase, there was a deliberate effort to reduce footprint impacts while addressing the need to replace access. The Access Options that scored the highest in achieving this balance were evaluated in the FEIR/S; and
- Preserve scenic/rural quality (during the alternatives development phase, there was a deliberate effort to reduce footprint impacts and to discourage growth by minimizing the required right-of-way and designing the access roads to be non-continuous; the Access Options that scored highest in minimizing impacts to natural resources while balancing the need to replace access are evaluated in this FEIR/S).

The conversion of the expressway to a freeway and the Access Options in Segment B (the Central Segment) raised concerns over the fate of the existing bicycle and pedestrian connections along the shoulders of the expressway. As a result, Caltrans met with SMART and a coalition of bicycle/pedestrian interest groups to discuss plans to replace bicycle access within this segment.

A public outreach effort was specifically targeted towards residents in Petaluma who were concerned about noise. Caltrans met with the Payran/McKinley Neighborhood Action Committee to discuss the impacts and benefits of adjacent freeway soundwalls that were included in the scope of the MSN Project.

Ongoing coordination efforts throughout the environmental process also resulted in an alternatives evaluation process that was reviewed by Caltrans' local partners (TAM and SCTA) and the PAG. This evaluation process, that was critical to defining the Access Options identified in Chapter 2, is described in Appendix A and summarized here. A team of Caltrans design, engineering, and environmental specialists crafted a series of improvements that included various combinations of interchanges and frontage road configurations. In total, 15 different packages were identified. In order to screen the wide array of options for the most viable candidates for further study, the Caltrans team scored each of the options in terms of operational flexibility, access to private parcels, land acquisition, potential growth inducement, visual resource impacts, parkland impacts, biological resource impacts, cultural resource impacts, and costs. The combined scores were used to identify the four Access Options.

Public meetings were held June 15, 2005, in Novato, and June 16, 2005, in Petaluma, to preview the four interim Access Options within Segment B (the Central Segment) of the Build Alternative. This meeting was advertised in local newspapers. Invitations were also mailed to over 250 people on the interested parties' mailing list. This meeting was attended by 35 people. Caltrans project development team staff was available to answer questions, and comment cards were collected.

The meeting was a forum for individuals to preview express the Access Options. It was explained that each of the options would be considered at an equal level of detail in this DEIR/S, and that one Access Option would be combined with one of the Build Alternatives as the preferred alternative. A number of comments concerned the design of the bicycle paths, all of which would be constructed to the appropriate Caltrans standard for a Class 1 or Class 2 facility. Finally, participants indicated the need to maintain adequate water supplies, which could be interrupted by the proposed Access Options and mainline alternatives. Disruption of water supplies is generally addressed in Chapter 3.1.7, Utilities/ Emergency Services. Further consideration of water supplies will be examined during final design, following project approval and environmental documentation.

Caltrans has a website at http://www.dot.ca.gov/dist4/msn to provide the public with information on project alternatives, project schedule, public meetings, and PAG meetings. Visitors can submit comments or questions through this website. Caltrans also prepared and distributed newsletters summarizing project information. A comprehensive newsletter was distributed earlier that described the project history, identified the proposed project, and summarized the schedule and the environmental review process. Table 6-1 (at the end of this chapter) lists public meetings and other outreach efforts that Caltrans has undertaken since the NOI/NOP.

6.3 External Planning Agencies Coordination

Caltrans initiated a series of meetings with public agencies to ensure the MSN Project alternatives would be in conformity with planning efforts and not conflict with the provision of local needs and services. Specifically, Caltrans formulated an External Planning Team composed of city and county public works representatives, federal and state regulatory officials, county water agencies, California Highway Patrol, and other agencies to coordinate local planning efforts within the MSN Project area and to confer with federal and state agency officials who would have permitting authority over the MSN HOV widening project. In addition, Caltrans met with representatives of the GGBHTD, the major commuter transportation service provider, to see how their visions for improving existing and future transit hubs would coincide with the MSN Project.

Although the California State Lands Commission did not participate in the External Planning Team meetings, coordination with this agency is reflected in their letter dated January 6, 2006 (see Appendix C). Table 6-2 (at the end of this chapter) summarizes interagency meeting dates and discussion topics.

In addition, records of meetings with State Parks (Appendix C) reflect our coordination with Olompali SHP officials and their conceptual approval of a new Park entryway. As stated in Section 3.1.5, there would be no transfer in ownership of Park fight-of-way and the MSN Project meets the criteria for temporary occupancy. Therefore, 4(f) provisions under the Department of Transportation Act do not apply.

6.4 Regulatory Agency Coordination

Coordination was initiated under the following federal and state provisions.

6.4.1 NEPA/404

In April 2006, representatives from the USFWS, USACE, USEPA, NOAA Fisheries, FHWA, and Caltrans signed a Memorandum of Understanding (MOU) to integrate NEPA with the Clean Water Act. The goal of the MOU was to improve coordination and streamline the review of EIS projects that will likely require an Individual Permit.

In addition to Caltrans consultation with USFWS[1] and NOAA Fisheries under Section 7 of the Endangered Species Act (Section 6.3.2), NOAA Fisheries has also participated in the MSN NEPA/404 process, along with USEPA, USACE, FHWA, CDFG, and the RWQCB to review the project’s need and purpose and

[1] USFWS has participated in the NEPA/404 process on an information-only basis.

the range of alternatives. These meetings took place on February 28, 2002, January 31, 2006, February 28, 2006 and February 9, 2007.

Due to further design refinements since the start of NEPA/404 process, Caltrans conducted a revised wetland delineation. USACE approved the jurisdictional delineation on December 23, 2008. Wetland impacts based upon delineation are reported in Section 3.3.3. Appendix B contains correspondence from the USEPA, FHWA, and USACE that reflects coordination with these agencies.

One of the outcomes of the NEPA/404 permitting process has been the identification of the Preliminary Least Environmentally Damaging Preferred Alternative (LEDPA). The Preliminary LEDPA and conceptual mitigation, were discussed in NEPA/404 meetings held on May 7, 2008 and August 12, 2008, and concurrence was achieved among the attending agencies on the Preliminary LEDPA (see Appendix B).

6.4.2 Endangered Species Act

Table 6-3 (at the end of the chapter) summarizes the contacts and meetings conducted to coordinate field studies in compliance with the state and federal Endangered Species Acts.

Caltrans has prepared Biological Assessments to convey survey and assessment information, which was be reviewed by USFWS and NOAA Fisheries. The USFWS and NOAA Fisheries issued Biological Opinions (see Appendices N and O, respectively).

CDFG will also be reviewing survey and assessment information in connection with CDFG 1601 permit applications. Avoidance and minimization measures for Salt Marsh Harvest Mouse habitat were agreed to by CDFG in a letter, dated January 11, 2006 (see Appendix C). These measures are summarized in Section 3.3.6.

6.4.3 National Historic Preservation Act

FHWA and Caltrans consulted as early as August 2002 with the SHPO, during which a field visit of the project area was conducted. Caltrans cultural resources staff also conducted project specific meetings at least quarterly throughout the duration of project planning and fieldwork. Native American representatives from the Federated Indians of Graton Rancheria (FIGR) were involved in all aspects of archaeological fieldwork and post field analysis. FIGR was also afforded the opportunity to review technical documents and findings. Historical societies and museum groups were contacted for historic information about the project area (also referred to in the Historic Resources Evaluation Report).

Table 6-1 MSN DEIR/S Public Outreach Coordination

Public Meetings			
Representation	**Date**	**Topics Discussed or Agenda**	**How Advertised**
Caltrans, City of Petaluma and Novato residents, and elected officials	8/1/01, 8/22/01, 11/18/02, 11/19/02, 06/15/05, 06/16/05, 10/24/05	Public map display and information boards Questions and answers with Caltrans project development team Summary of comments and Caltrans handling of response in Section 6.1	Notices in local newspapers: Marin Independent Journal, La Oferta, and Petaluma Argus-Courier Invitation letters sent to elected officials Open house map display announcements mailed by Caltrans Public Affairs Press releases
DEIR/S Public Meetings	11/6/07, 11/14/07	Project Overview Public map display and information boards Questions and answers with Caltrans project development team Environmental and Technical Studies	Notices in local newspapers: Marin Independent Journal, La Voz, and Press Democrat Invitation letters sent to elected officials, County Clerks and Marin/Sonoma Libraries Open house map display announcements mailed by Caltrans Public Affairs Press releases
Policy Advisory Group Meetings			
Representation	**Date**	**Concerns**	**Resolution of Concerns**
Marin and Sonoma Counties, and the cities of Petaluma, Novato, and San Anselmo are represented on the PAG.	9/21/01, 01/18/02, 2/15/02, 4/19/02, 5/17/02, 9/20/02, 2/20/04, 4/21/04, 12/15/04, 3/16/05, 6/15/05, 12/21/05, 2/18/08	• Availability of Funding	Discussed in FEIR/S in Chapter 1
		• Inclusion of High Occupancy toll element	Included in FEIR/S as an alternative considered but withdrawn
		• Environmental and access impacts with upgrading of expressway to freeway in Segment B	Considered in development and evaluation of Access Options (see Appendix A)
		• Aesthetics of Redwood Landfill Overcrossing	Overcrossing was constructed with private funding; visual impacts Addressed in FEIR/S in Section 3.1.10
		• Impacts to Petaluma River and construction staging of Petaluma River Bridge	Coordinated with U.S. Coast Guard; biological impacts addressed in FEIR/S in Section 3.3.3.3 and Section 3.3.6.3
		• Frequent opportunities for public comments	Multiple meetings held with opportunities for public comment; see dates at left

Table 6-1 MSN DEIR/S Public Outreach Coordination

Name of Meeting or Group Contact	Date	Agenda Items (Caltrans Staff) Comments and Concerns	Resolution of Concerns
		• Provision of access to bus park-and-ride lots	Not included in project scope but future consideration is not precluded
		• Preferred Alternative and Access Option	Unanimously supported the Fixed HOV Lane Alternative with Access Option 12b
Other Mailings and Public Outreach			
Name of Meeting or Group Contact	Date	Agenda Items (Caltrans Staff) Comments and Concerns	Resolution of Concerns
Marin Conservation League Don Wilhelm	8/14/01	• Preview board displays • Answer questions • Concerns: minimize interchange impacts or environmental resources	Minimizing impacts of interchanges was considered in the Alternatives Evaluation (see Appendix A)
	11/16/01	• Overview of project design and schedule • Discussion: environmental study limits, environmental assessment status, findings to-date, and possible mitigation sites • Concerns: traffic studies and growth inducement	Technical studies for traffic and growth were completed and are summarized in the FEIR/S
Transportation Solutions Defense and Education Fund David Schonbrunn	9/5/01	• Preview board displays • Answer questions • Concerns: lack of transit alternative	Expansion of express bus service was considered and withdrawn as an alternative (see Section 2.4 in this FEIR/S
Golden Gate Transit	9/10/01, 5/2/02, 1/5/06	• Introduce project to transit community • Potential to enhance HOV lane design to increase convenience of bus transportation • Park and ride locations	More extensive transit improvements such as direct ramps to/from bus stations and park and ride care will be considered in a future project
Payran/McKinley Neighborhood Action Committee Jeff Cartwright, Chair	3/21/02	• Overview of project design • Overview of environmental process • Concerns: noise walls, landscaping, impacts to homes, and right-of- way take	All technical studies are complete. Build Alternatives include noise walls adjacent to residential area. Impacts and minimization efforts are explained in Sections 3.2.7, 3.1.10, and 3.1.5

Table 6-1 MSN DEIR/S Public Outreach Coordination

Name of Meeting or Group Contact	Date	Agenda Items (Caltrans Staff) Comments and Concerns	Resolution of Concerns
Marin and Sonoma Bicycle Communities and SMART	4/24/02	• Vision of a Class 1 path along Northwest Pacific Railroad (NWPRR) right-of-way	MSN Project provides bicycle/pedestrian access along the Central Segment. Some portions are proposed as Class 1. Proposed system would be compatible with SMART system
SMART Lillian Hames, Project Director	4/30/02	Update provided: • SMART preparing EIR for full 70 mile corridor (Cloverdale to San Rafael/Ferry Terminal) • Fifteen stations planned, 75 mph operating speed, and 55-minute travel time between Santa Rosa and San Rafael • SMART policy is to accommodate bike and pedestrians within rail corridor where feasible	No concerns raised

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Table 6-2 Interagency Coordination

Name of Meeting or Group Contact	Date	Agenda Items (Caltrans Staff) Comments and Concerns	Resolution of Concerns
U.S. Coast Guard	1/31/06	Petaluma Bridge Replacement	• Project designed to maintain navigation and boat safety. Advanced planning study prepared and shared with U.S. Coast Guard and SMART
State Parks Department	6/19/06, 1/29/08	Impacts to Olompali SHP	• Impacts to Olompali SHP discussed in Section 3.1.5. Letter from Park appears in Appendix C • Benefits of the new entrance to park operations
External Local Planning Agencies: Sonoma Marin Area Rail Transit; local public works departments; local water agencies; Olompali SHP; Golden Gate Transit; California Highway Patrol; California Department of Fish and Game; US Coast Guard; Regional Water Quality Control Board; Marin County Sheriff's Department; Sonoma County Transit Authority; Transportation Authority of Marin	3/19/02, 7/16/02, 10/15/02, 9/4/03, 11/29/05	• Access to Olompali SHP	• Chapter 2.3.2, Access Options, explains that all Access Options propose same entryway design generally accepted by Olompali SHP; Caltrans will propose de minimis findings as part of Section 4(f) conclusions
		• Compliance with NEPA/404	• See next part of Table 6-2 listing NEPA/404 meetings
		• Potential impacts to water agencies • Potential wetland impacts • Potential impacts to listed threatened, rare, and endangered species, including the salt marsh harvest mouse • Impacts to SMART • Impacts to transit agencies	• Chapter 3.1.7, Utilities, addresses potential relocation of utilities and identifies need to execute Utility Agreements • Chapter 3.3.3, Wetlands and Other Waters of the U.S., addresses wetland impacts; a Section 404 permit will be required from USACE • Chapter 3.3.6, Threatened and Endangered Species, addresses listed species; mitigation measures recommended to avoid "take" to salt marsh harvest mouse incorporate recommendations from California Department of Fish and Game • Chapter 3.1.8, Transit and Parking, addresses interferences with proposed commuter rail service • Chapter 3.1.8, Transit and Parking, addresses interferences with transit services.

Table 6-2 Interagency Coordination

Name of Meeting or Group Contact	Date	Agenda Items (Caltrans Staff) Comments and Concerns	Resolution of Concerns
		• Provision of bicycle and pedestrian facilities	• Chapter 2.3.2, Access Options, explains that all Access Options provide for a continuous north/south route, with connections to both east and west sides of US 101; further coordination will occur during the design phase
		• Impacts to local circulation	• Chapter 3.1.9, Traffic and Transportation, addresses delays, queues, and construction impacts; Transportation Management Plan, to be developed with locals, recommended to address circulation concerns
		• North Marin Water District Pipeline relocation and costs	• Email from Caltrans right-of-way agent dated 5/20/08 and response to comments on MSN Project DEIR/S and Section 3.1.7 address utility owners questions regarding relocation and cost provisions
NEPA 404 Process meetings/mailings			
Caltrans Federal Highway Administration National Oceanic Atmospheric Administration* U.S. Fish and Wildlife Service* U.S. Army Corps of Engineers U.S. Environmental Protection Agency Regional Water Quality Control Board California Department of Fish and Game Regional Water Quality Control Board California Department of Fish and Game	2/18/02, 1/31/06, 2/28/06, 2/22/06, 2/9/07, 05/07/08, 8/12/08, 12/23/08	• Project overview • Environmental study limits • NEPA/404 Integration Process • Interagency Tour of Marin-Sonoma Narrows project area • Purpose and Need for proposed project • Open discussion • Introduction to project alternatives • Project status updates • Project Alternatives • Resources in project area • Alternatives analysis and considerations • Alternatives and wetland impact avoidance strategies	Technical studies for their project show Build Alternatives would meet the purpose and need Additional analysis resulted in further impact reductions (see Section 3.3.3) Wetland delineation updated, results reported in Section 3.3.3 Consensus reached on purpose and need, range of alternatives, and Preliminary LEDPA (see Appendix B) Jurisdictional delineation approved by US Army Corps of Engineers (12/12/08).

Table 6-2 Interagency Coordination

Name of Meeting or Group Contact	Date	Agenda Items (Caltrans Staff) Comments and Concerns	Resolution of Concerns
		• Concern: Adequacy of project scope to meet purpose and need • Concern: Alternatives analysis for further avoidance of wetland resources needed • Concern: Overstatement of potential impacts to wetland resources • Preliminary LEDPA and Conceptual Mitigation Plan	

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Table 6-3 Summary of Personnel and Consultants Contacted for the MSN Project

Personnel	Agency	Title and Expertise*	Date
Fred Botti	CDFG	Wildlife Biologist CDFG Liaison *SMHM	07/31/01 04/16/02 10/24/02 (phone) 11/7/03 04/23/04 04/30/04 (email) 11/30/04
Bill Cox	CDFG	Fisheries Biologist *CCCS *Chinook salmon *Sacramento splittail *CFWS	05/29/02 (phone) 02/07/03 (phone)
Carl Wilcox	CDFG	Habitat Conservation Manager *SMHM	11/09/05 (phone) 01/13/06 (letter)
Jim Browning	USFWS	Fish and Wildlife Biologist *SMHM	05/14/02 01/08/04
Erik Schmidt	NOAA Fisheries	Fisheries Biologist *CCCS *Chinook salmon	05/14/02 02/25/03 (phone, with Mr. Hamaker, CH2M HILL)
John Yeakel	Caltrans	USACE Liaison *Wetlands	05/14/02 10/24/02 (phone)
Jeff Wilkinson	H.T. Harvey and Associates subcontracting through CH2M HILL	Staff Herpetologist *CRLF *CTS	01/22/03 02/11/03 02/25/03 02/27/03 03/05/03 03/13/03 03/25/03 03/26/03 04/03/03 04/09/03 04/14/03 09/09/05
Leslie Wood	Private Consultant (approved by Dan Buford [USFWS Branch Chief Coast Bay Delta])	Private Consultant *CRLF	02/07/02 01/09/03 01/22/03
Tim Hamaker	CH2M HILL	Fisheries Biologist *CCCS *Chinook salmon *Sacramento splittail	02/10/03 02/11/03 02/25/03 (phone) 02/19/08

Table 6-3 Summary of Personnel and Consultants Contacted for the MSN Project

Personnel	Agency	Title and Expertise*	Date
Larry Serpa	The Nature Conservancy	Area Ecologist *CFWS	08/26/02 (phone)
Jules Evans	Avocet Research Associates	Fish and Wildlife Biologist *Black rail *Clapper rail	06/17/02 (office)
Geoff Monk	Monk and Associates LLC	Principle Biologist *SMHM *CRLF *CTS	06/29/02 07/15/02 10/21/02 (email) 11/22/02 (phone) 17/08/02 (phone)
Lisa Kettley	CH2M HILL	Biologist *CCCS *Chinook salmon *Sacramento splittail	02/11/03
Josh Collins	San Francisco Estuary Institute	Senior Scientist	7/17/06 (email)
Melissa Escaron	CDFG	Caltrans Liaison	05/05/08
John Cleckler	USFWS	Caltrans Liaison	12/04/07 06/05/08 06/19/08
Chris Nagano	USFWS	Assist. Field Supervisor	12/04/07 06/05/08 06/19/08
Gary Fellers	Point Reyes Seashore	Biologist *CRLF	02/22/08
Dave Cook	Sonoma County Water Agency	Biologist *CRLF	02/21/08
Cay Goude	USFWS	Biologist	12/04/07
Maral Kasparian	USFWS	Biologist	12/04/07

Key:
CCCS- Central California Coastal steelhead
CFWS- California freshwater shrimp
CRLF- California red-legged frog
CTS- California tiger salamander
SMHM- Salt marsh harvest mouse

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DECLARATION

I am a resident of Los Angeles County, over the age of eighteen years and not a party to any or interested in the matter noticed.

The notice, of which the annexed is a printed copy appeared in the:

LA VOZ

On the following dates:

November 5, 2007

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated at Los Angeles, California, this 5th day of November 2007

Signature

1225356

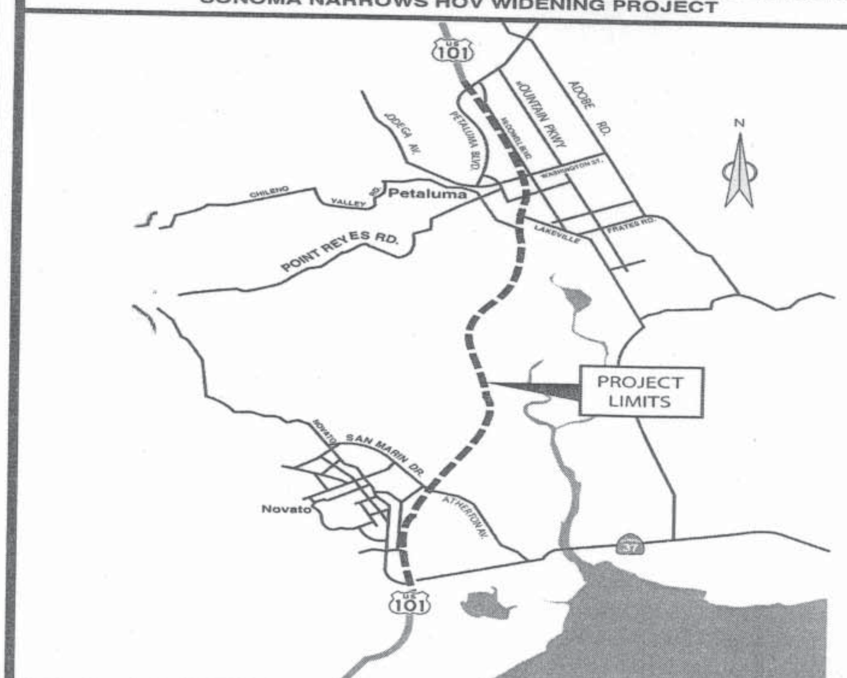
"The only Public Notice which is justifiable from the standpoint of true economy and the public interest, is that which reaches those who are affected by it"

Los Angeles, CA 90012

A000000311150

PUBLIC NOTICE

NOTICE OF AVAILABILITY (NOA) FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT AND ANNOUNCEMENT OF PUBLIC OPEN HOUSE FOR THE PROPOSED MARIN-SONOMA NARROWS HOV WIDENING PROJECT



WHAT'S BEING PLANNED

The California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA), propose to reduce traffic congestion and address physical deficiencies of the roadway on US 101 between Novato and Petaluma.

WHY THIS NOTICE

Pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), Caltrans has prepared a Draft Environmental Impact Report/Environmental Impact Statement (DEIR/S) to assess the environmental impacts of the proposed Marin-Sonoma Narrows Project. The DEIR/S is now available for public review. Comments are being accepted from October 16, 2007, through December 14, 2007.

WHERE YOU COME IN

Attend an Open House/Map Display: Caltrans will host two open house meetings with visual and map displays and provide the public with opportunities to discuss the project with staff. There will be a brief presentation at 6:30-6:45 p.m. at both meetings. Comments on the DEIR/S will be accepted in writing or individual verbal comments can be recorded at a court reporter station during the meetings. The meeting locations and dates are as follows:

When and Where

Location: Beverly C. Wilson Hall
Sonoma-Marin Fairgrounds
175 Fairgrounds Drive, Petaluma
Date: Tuesday, November 6, 2007
Time: 5:30 p.m. to 8:30 p.m.

and

Location: Novato Unified School Boardroom
1015 - 7th Street, Novato
Date: Wednesday, November 14, 2007
Time: 5:30 p.m. to 8:30 p.m.

WHAT'S AVAILABLE

How To Review The DEIR/S: The DEIR/S is available for review on the website listed below and at locations in Marin and Sonoma Counties. Digital and hardcopies include Volume 1, the main environmental document, Volume 2, the project mapping, and the Appendices.

On the Web:
•MSN Project Web site* at www.dot.ca.gov/dist4/msn

Document available to review at:
- Civic Center Library at 3501 Civic Center Drive, #427, San Rafael;
- Novato Library at 1720 Novato Boulevard, Novato;
- South Novato Library at 6 Hamilton Landing, Suite 140A, Novato;
- Transportation Authority of Marin, 70 San Pablo Avenue, San Rafael;
- Petaluma Community Center at 320 N. McDowell Boulevard, Petaluma;
- Petaluma Regional Library at 100 Fairgrounds Drive, Petaluma;
- Central Santa Rosa Library, 3rd & E Streets, Santa Rosa; and
- Sonoma County Transportation Authority, 490 Mendocino Avenue, S-206, Santa Rosa

Ways To Comment On The DEIR/S: Comment period is October 16, 2007 through December 14, 2007. You can submit written comments using the MSN Comment Form (download at www.dot.ca.gov/dist4/msn) or using your own materials. You can also obtain a pre-addressed comment form at one of the public meetings. To submit your comments, mail to:

Melanie Brent
Caltrans District 4
111 Grand Avenue
Oakland, CA 94612-3717

E-Mail* comments to:
melanie.brent@dot.ca.gov

Record verbal comments at the court reporter station during one of the scheduled public meetings.

CONTACT

For more information about the MSN Project, please contact Jit Pandher, Project Manager, (510) 286-6425, Jit_S_Pandher@dot.ca.gov.

SPECIAL ACCOMMODATIONS
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Figure 6-2
English Language
Public Notice Advertisement
La Voz

California Newspaper Service Bureau®
Public Notice Advertising Since 1934
Tel 1-800-788-7840 ▫ Fax 1-800-540-1089
Local Offices and Representatives in:
Los Angeles, Santa Ana, San Diego, Riverside/San Bernardino, Palmdale, Ventura, San Francisco, Oakland, San Jose, Santa Rosa, San Rafael, Sacramento
Special Services Available in Phoenix, Las Vegas, Denver and Seattle

DECLARATION

I am a resident of Los Angeles County, over the age of eighteen years and not a party to any or interested in the matter noticed.

The notice, of which the annexed is a printed copy appeared in the:

LA VOZ

On the following dates:

November 5, 2007

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated at Los Angeles, California, this 5th day of November 2007

Signature

1225406

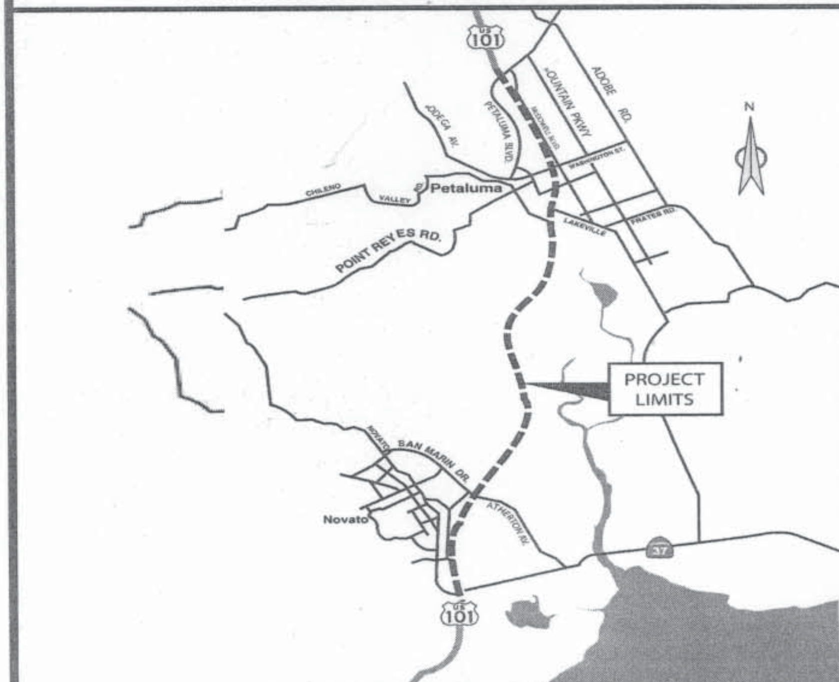
"The only Public Notice which is justifiable from the standpoint of true economy and the public interest, is that which reaches those who are affected by it"

...t Street, Los Angeles, CA 90012

A000000311155

ANUNCIO PUBLICO

NOTICIA DE DISPONIBILIDADPOR UNA VERSION PRELIMINAR DE UN INFORME/DECLARACION DE IMPACTO AMBIENTAL (DEIS/R) Y REUNION ABIERTA AL PUBLICO PARA UN PROYECTO EN LA RUTA 101 ENTRE LA RUTA 37 EN EL CONDADO DE MARIN Y LA PUENTE DE LA AVENIDA CORONA EN EL CONDADO DE SONOMA



LO QUE SE PLANIFICA

En la propuesta se estudia la posibilidad de extender hacia el norte el sistema de carriles de alto uso vehicular (HOV) del Condado de Marín, hasta llegar al sur del Condado de Sonoma. El propósito de este proyecto es aliviar la congestión y disminuir los retrasos de los usuarios de los carriles HOV.

PORQUE ESTA NOTICIA

El Departamento de Transporte de California (Caltrans) en colaboración con la Dirección Federal de Carreteras (FHWA), va a elaborar una Versión Preliminar de un Informe/Declaración de Impacto Ambiental (DEIS/R) para un tramo de aproximadamente 16 millas de la Ruta 101, entre la Ruta 37 en el Condado de Marín y el entronque de la Old Redwood Highway en el Condado de Sonoma. Comentos se aceptan entre el 16 de octubre y 14 de deciembre de 2007.

SU PARTICIPACION

Se le invita a asistir a una reunión para evaluar la propuesta y aportar sus comentarios respecto al proyecto. Se pondrán a su disposición mapas generales y se expondrán elementos de recursos ambientales para que usted exprese su parecer. Caltrans y los miembros del equipo del proyecto contestarán sus preguntas. Tambien se aceptan comentarios por escrito sobre la propuesta del proyecto de la Ruta 101 durante el reunión.

DONDE Y CUANDO:

Lugar: Novato School District Boardroom
1015-7th Street
Novato
Fecha: Martes, 6 de noviembre de 2007
Hora: De 5:30 P.M. a 8:30 p.m.

Y

Lugar: Petaluma Community Center
320 N. McDowell Boulevard
Petaluma
Fecha: Jueves, 14 de noviembre de 2005
Hora: De 5:30 P.M. a 8:30 P.M.

QUE ESTA DISPONIBLE

COMO REVISAR EL DEIR/S: Se puede reviser el DEIR/S en el internet: www.dot.ca.gov/dist4/msn

Tambien en los siguientes lugares:

- Civic Center Library at 3501 Civic Center Drive,
- Novato Library at 1720 Novato Boulevard,
- South Novato Library at 6 Hamilton Landing,
- Transportation Authority of Marin, 70 San Pablo
- Petaluma Community Center at 320 N. McDowell
- Petaluma Regional Library at 100 Fairgrounds
- Central Santa Rosa Library, 3rd & E Streets, Santa
- Sonoma County Transportation Authority, 490

COMO COMENTAR EN EL DEIR/S: Se puede escribir sus comentos y se pueden dar durante el reunión u deben enviarse a:

Melanie Brent, Caltrans District 4,
111 Grand Avenue, Oakland, CA 94612-3717
Email: Melanie_brent@dot.ca.gov
Oakland, CA 94623-0660

CONVENIOS ESPECIALES: Las personas que necesiten documentos en otros formatos o servicios de traducion favor llame a Melanie Brent, teléfono (510) 286-5321. Los usuarios de TDD pueden comunicarse con la linea California Relay Service TDD en el 711.

CONTACTO

Para mayor información acerca de este proyecto u otro asunto de transporte favor llame a o escribe a

Bijan Sartipi
Director del Distrito
Departmento de Transporte
P.O. Box 23660
Oakland CA 94623-0660

Caltrans
MARIN SONOMA 101 NARROWS

Figure 6-3
Spanish Language
Public Notice Advertisement
La Voz

PROOF OF PUBLICATION
(2015.5 C.C.P.)

CALIFORNIA NEWSPAPER
CNS 1228500
MARIN SONOMA NARROWS

STATE OF CALIFORNIA
County of Marin } SS

I am a citizen of the United States and a resident of the County aforesaid: I am over the age of eighteen years, and not a party to or interested in the above matter. I am the principal clerk of the printer of the MARIN INDEPENDENT JOURNAL, a newspaper of general circulation, printed and published daily in the County of Marin, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under date of FEBRUARY 7, 1955, CASE NUMBER 25568; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

NOV. 9

all in the year 2007.

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Donna Lazarus
Signature

Dated this 9 day of NOVEMBER 2007

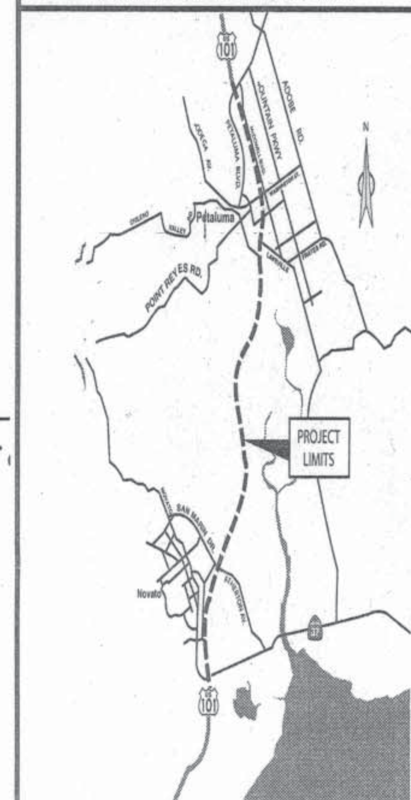
PROOF OF PUBLICATION

A000000322659

Proof

PUBLIC NOTICE

NOTICE OF AVAILABILITY (NOA) FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT AND ANNOUNCEMENT OF PUBLIC OPEN HOUSE FOR THE PROPOSED MARIN-SONOMA NARROWS HOV WIDENING PROJECT



WHAT S BEING PLANNED

The California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA), propose to reduce traffic congestion and address physical deficiencies of the roadway on US 101 between Novato and Petaluma.

WHY THIS NOTICE

Pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), Caltrans has prepared a Draft Environmental Impact Report/Environmental Impact Statement (DEIR/S) to assess the environmental impacts of the proposed Marin-Sonoma Narrows Project. The DEIR/S is now available for public review. Comments are being accepted from October 16, 2007, through December 14, 2007.

WHERE YOU COME IN

Attend an Open House/Map Display: Caltrans will host two open house meetings with visual and map displays and provide the public with opportunities to discuss the project with staff. There will be a brief presentation at 6:30-6:45 p.m. at both meetings. Comments on the DEIR/S will be accepted in writing or individual verbal comments can be recorded at a court reporter station during the meetings. The meeting locations and dates are as follows:

When and Where

Location: Beverly C. Wilson Hall
Sonoma-Marin Fairgrounds
175 Fairgrounds Drive, Petaluma
Date: Tuesday, November 6, 2007
Time: 5:30 p.m. to 8:30 p.m.

and

Location: Novato Unified School Boardroom
1015 - 7th Street, Novato
Date: Wednesday, November 14, 2007
Time: 5:30 p.m. to 8:30 p.m.

WHAT S AVAILABLE

How To Review The DEIR/S: The DEIR/S is available for review on the website listed below and at locations in Marin and Sonoma Counties. Digital and hardcopies include Volume 1, the main environmental document, Volume 2, the project mapping, and the Appendices.

On the Web:
-MSN Project Web site* at www.dot.ca.gov/dist4/msn

Document available to review at:
- Civic Center Library at 3501 Civic Center Drive, #427, San Rafael;
- Novato Library at 1720 Novato Boulevard, Novato;
- South Novato Library at 6 Hamilton Landing, Suite 140A, Novato;
- Transportation Authority of Marin, 70 San Pablo Avenue, San Rafael;
- Petaluma Community Center at 320 N. McDowell Boulevard, Petaluma;
- Petaluma Regional Library at 100 Fairgrounds Drive, Petaluma;
- Central Santa Rosa Library, 3rd & E Streets, Santa Rosa; and
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Figure 6-4
Public Notice Advertisement
Marin Independent Journal

PROOF OF PUBLICATION

(2015.5 C.C.P.)

STATE OF CALIFORNIA

County of Sonoma

I am a citizen of the United States and a resident of the county aforesaid: I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of The Press Democrat, a newspaper of general circulation, printed and published DAILY IN THE City of Santa Rosa, County of Sonoma; and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sonoma, State of California, under the date of November 29, 1951, Case number 34831, that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

The Press Democrat
11/2 1x - 11/02/2007

I certify (or declare) under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct.

Dated at Santa Rosa, California, on

11/02/2007

D Khaliqa

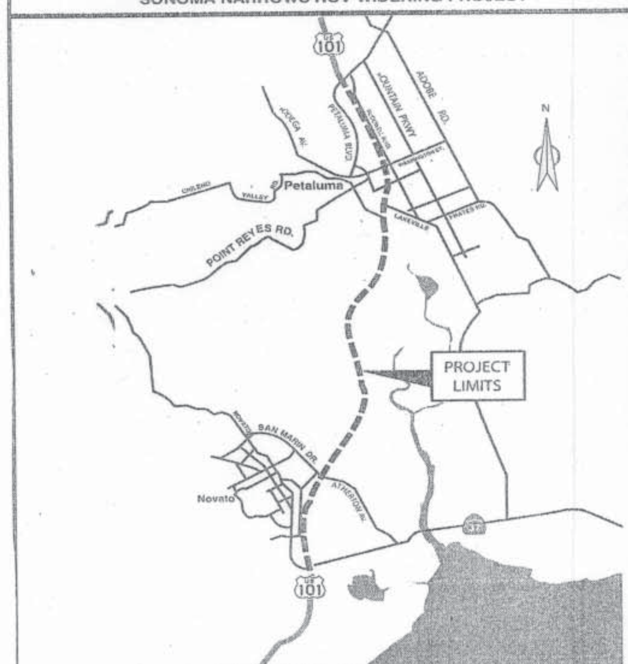
SIGNATURE

This space for County Clerk's Filing Stamp

Proof of Publication of

PUBLIC NOTICE

NOTICE OF AVAILABILITY (NOA) FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT AND ANNOUNCEMENT OF PUBLIC OPEN HOUSE FOR THE PROPOSED MARIN-SONOMA NARROWS HOV WIDENING PROJECT



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2204779 - Pub. Nov. 2, 2007 1li.

Figure 6-5
Public Notice Advertisement
Press Democrat

Figure 6-6 Federal Register Notice of Availability Posting
(see page 2 of 2)

Page 1 of 2

[Federal Register: October 26, 2007 (Volume 72, Number 207)]
[**Notices**]
[Page 60846-60847]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr26oc07-64]

ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-6692-3]

Environmental Impacts Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564-7167 or http://www.epa.gov/compliance/nepa/.

Weekly receipt of Environmental Impact Statements
Filed 10/15/2007 through 10/19/2007.
Pursuant to 40 CFR 1506.9.

EIS No. 20070435, Draft EIS, BLM, UT, Richfield Field Office Resource Management Plan, Implementation, Future Management of the Public Lands and Resource, Glen Canyon National Recreation Area, Capitol Reef and Canyonlands National Parks, Sanpete, Sevier, Piute, Wayne and Garfield Counties, UT. Comment Period Ends: 01/24/2008. Contact: Wayne Wetzel, 435-896-1500.
EIS No. 20070436, Draft EIS, FHW, ME, Wiscasset Route 1 Corridor Study Project, To Relieve Traffic Congestion and Improve Safety, U.S. Army COE section 404 Permit, Wiscasset and Edgecomb Counties, ME. Comment Period Ends: 12/21/2007. Contact: Mark Asselmann, 207622-8350.
EIS No. 20070437, Draft EIS, NPS, HI, PROGRAMMATIC EIS--Ala Kahakai National Historic Trail Comprehensive Management Plan, To Provide Long-Term Direction for Natural and Cultural Resource, Island of Hawii, HI. Comment Period Ends: 12/26/2007. Contact: Aric Arakaki 808-326-6012.
EIS No. 20070438, Final Supplement, NOA, NC, Atlantic Sea Scallop Fishery Management Plan (FMP), Amendment 11, Implementation to Control Capacity and Mortality in the General Category Scallop Fishery, Gulf of Maine, Georges Bank, NC. Wait Period Ends: 11/26/2007. Contact: Patricia A. Kurkal, 978-281-9250.
EIS No. 20070439, Draft EIS, BOP, AL, Aliceville, Alabama Area, Proposed

[[Page 60847]]

Federal Correctional Complex, To Address the Growing Federal Inmate Population, Pickens County, AL. Comment Period Ends: 12/10/2007. Contact: Pamela J. Candler, 202-514-6470.
EIS No. 20070440, Draft EIS, FHW, UT, Mountain View Corridor (MVC) Project, Proposed Transportation Improvement 2030 Travel Demand in Western Salt Lake County south of I-80 and west of Bangerter Highway and in northwestern Utah County of I-15, south of the Salt Lake County Line, and north of Utah Lake, Salt Lake and Utah County, UT. Comment Period Ends: 12/24/2007. Contact: Edward Woolford, P.E. 801-963-0182.
EIS No. 20070441, Draft Supplement, IBR, CA, PROGRAMMATIC--Environmental Water Account (EWA) Project, Updated Information to Provide an Evaluation of 2004 Final EIS/EIR Environmental Water Account (EWA) and Effects Associated with Extending the Current EWA's through 2011, CALFED Bay-Delta Programs, Endangered Species Act section 7 and

(See next page)

Figure 6-6 (continued)

U.S. Army COE Section 10 Permit, CA. Comment Period Ends: 12/10/2007. Contact: Ms. Sammie Cervantes, 916-978-5104.
EIS No. 20070442, Final EIS, FHW, CA, Interstate 5/Cosumnes River Boulevard Interchange Project, Extension of Cosumnes River Boulevard from Franklin Boulevard to Freeport Boulevard with an Interchange at Interstate 5, South of the Pocket/Meadowview Road Interchange and North of the Laguna Boulevard Interchange, City of Sacramento, Sacramento County, CA. Wait Period Ends: 11/26/2007. Contact: Cesar E. Perez, 916-498-5065.
EIS No. 20070443, Draft Supplement, FTA, CA, Third Street Light Rail Phase 2, Updated Information on the Central Subway Project Area, Funding, San Francisco Municipal Transportation Agency, in the City and County San Francisco, CA. Comment Period Ends: 12/10/2007. Contact: Ray Sukys, 415-744-3133.
EIS No. 20070444, Final EIS, USA, GA, Fort Benning U.S. Army Infantry Center, Base Realignment and Closure (BRAC) 2005 and Transformation Actions, Implementation, Chattahoochee and Muscogee Counties, GA. Wait Period Ends: 11/26/2007. Contact: John Brent, 706-545-2180.
EIS No. 20070445, Draft EIS, USN, 00, Shock Trail of the MESA VERDE (LPD 19), San Antonio (LPD 17) Class Ship designated as the Shock Ship for Proposed Shock Trail, Possible Offshore Locations are Naval Station Norfolk, VA; Naval Station Mayport, FL; and Naval Air Station Pensacola, FL. Comment Period Ends: 12/10/2007. Contact: Donald Shaver, 703-412-7521.
EIS No. 20070446, Final EIS, FHW, IN, I-69 Evansville to Indianapolis Project, I-69 Tier 2 Section 1: Evansville to Oakland City, from 1-64 to IN-64, Preferred Alternative is 4, Gibson and Warrick Counties, IN. Wait Period Ends: 11/26/2007. Contact: Anthony DeSimone, 317-226-5307.
EIS No. 20070447, Draft EIS, FHW, CA, **Marin-Sonoma Narrows** (MSN) HOV Widening Project, Propose to Relieve Recurrent Congestion along U.S. 101 south of the Route 37 Interchange in the City of Novato (**Marin** County) and ends north of the Corona Road Overcrossing in the City of Petaluma (**Sonoma** County), **Marin** and **Sonoma** Counties, CA. Comment Period Ends: 12/14/2007. Contact: Cesar E. Perez, 916-498-5065.
EIS No. 20070448, Final EIS, USA, 00, PROGRAMMATIC--Army Growth and Force Structure Realignment, Implementation, Nationwide. Wait Period Ends: 11/26/2007. Contact: Mike Ackerman, 410-436-2522.
EIS No. 20070449, Final EIS, BLM, ID, Smoky Canyon Mine Panels F & G, Proposed Mine Expansion, Caribou County, ID. Wait Period Ends: 11/26/2007. Contact: Bill Stout 208-478-6367.
EIS No. 20070450, Draft Supplement, WPA, 00, Big Stone II Power Plant and Transmission Project, Addresses the Impacts of Changes to the Proposed Action relative to Cooling Alternatives and the Use of Groundwater as Backup Water Source, U.S. Army COE Section 10 and 404 Permits, Grant County, SD and Big Stone County, MN. Comment Period Ends: 12/10/2007. Contact: Nancy Werdel, 720-962-7251.
EIS No. 20070451, Draft EIS, AFS, UT, Indian Springs Road Realignment, Reducing Adverse Impacts to Watershed and Fisheries, U.S. Army COE Section 404 Permit, Uinta National Forest, Heber Ranger District, Wasatch County, UT. Comment Period Ends: 12/10/2007. Contact: Jim Percy, 435-654-0470.

Dated: October 23, 2007.
Robert W. Hargrove,
Director, NEPA Compliance Division, Office of Federal Activities.
[FR Doc. E7-21102 Filed 10-25-07; 8:45 am]
BILLING CODE 6560-50-P

Chapter 7 List of Contributors

Federal Highway Administration

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Principal Planner and Preparer

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Chief, Office of Environmental Analysis
Environmental Project Manager

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Branch Chief
Project Report

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Technical Reviewer

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Project Manager
Project Manager

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Preliminary Drainage Report

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Sam Shiow
Environmental Engineer
Air Quality

Ethan Tzeng
Transportation Engineer
Highway Operations Report

Derek Mann
Transportation Engineer
Traffic Forecasting

John Yeakel
Senior Biologist
Natural Environment Study

Kelley Nelson Biologist ***Natural Environment Study***	**Joseph Mihelarakis** Senior Environmental Planner ***Peer Review***
Glenn Kinoshita District Branch Chief ***Air Quality and Noise***	**Susan Burke** Landscape Architect ***Visual Impact Assessment***
David Eng Senior Landscape Architect ***Visual Simulations***	**Jennifer Darcangelo** Senior Environmental Planner (Cultural Resources) ***Principle Archaeologist***
Alicia Langford Associate Environmental Planner (Cultural Resources) ***Historic Property Survey Report***	**Brett Rushing** Associate Environmental Planner (Cultural Resources) ***Cultural Resources Assessment*** ***Cumulative Impacts Assessment***
Trang Hoang P.E. Transportation Engineer District Storm Water Coordinator ***Water Quality Report***	**Cristin Hallissy** Associate Environmental Planner ***Research***
Karin Bouler Environmental Planner ***Document Writing***	**Parker Bowman** Environmental Planner ***Document Writing***
Patricia Maurice Senior Environmental Planner ***Document Writing***	**Adlah Christi** Environmental Planner ***Document Writing***
Grant Wilcox Senior Geotechnical Engineer ***Geotechnical***	

PBS&J

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Graphics Support

CH2M HILL

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Project Manager
Air Toxics/Hazmat Coordination

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Publications Specialist
Editor/Document Coordinator

Clarice Ericsson
Document Designer
Document Processing

Lisa Ho
Graphics Artist
Graphics Support

Ana Demorest
Civil Engineer
Hazardous Waste/Materials

Greta Kirshenbaum
Project Planner
Public Meetings (Comments)

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Project Biologist
Public Meetings (Comments)

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Staff Scientist
Research

Mieke Sheffield
Environmental Planner
Technical Writing

Annette Baker
Document Designer
Document Processing

Dash Antel
Graphics Supervisor
Graphics Support

Bryan Bell
Editor
Public Comments

Loretta Meyer
Environmental Task Manager
Public Meetings (Comments)

Circle Point

Jennifer Allen
Senior Project Manager
Public Outreach Coordinator

Andrea Nocito
Project Coordinator
Public Outreach Coordination

Tracy Cook
Project Coordinator
Public Outreach Coordination

Nick Zubel
Project Coordinator
Document Processing

William Kanemoto & Associates

William Kanemoto
Principal Investigator
Visual Resources Technical Report/ Visual Assessment

Parsons Transportation Group

Karla Nicholas
Principal Planner
Community Impact Assessment

Craig Richey
Environmental Planner
Community Impact Assessment

Pat Gelb
Planning Department Head
Project Manager

GANDA

Ferdinand Oberle
Paleontologist
Paleontological Identification Report (PIR)

Chapter 8 Distribution List

Elected Federal Officials

The Honorable Barbara Boxer
United States Senator
1700 Montgomery Street, Suite 240
San Francisco, CA 94111

The Honorable Dianne Feinstein
United States Senator
525 Market Street, Suite 3670
San Francisco, CA 94105

The Honorable Nancy Pelosi
United States Representative
450 Golden Gate Avenue, 14th Floor
San Francisco, CA 94102

The Honorable Mike Thompson
United States Representative
1040 Main Street, Suite 101
Napa, CA 94559

The Honorable Lynn Woolsey
United States Representative
1101 College Avenue, Suite 200
Santa Rosa, CA 95404

1050 Northgate Drive, Suite 354
San Rafael, CA 94903

Elected State Officials

The Honorable Wesley Chesbro
California State Assembly
50 D Street, Suite 450
Santa Rosa, CA 95404

The Honorable Noreen Evans
California State Assembly
50 D Street, Suite 301
Santa Rosa, CA 95404

The Honorable Jared Huffman
California State Assembly
3501 Civic Center Drive, Room 412
San Rafael, CA 94903

The Honorable Mark Leno
California State Senator
3501 Civic Center Drive, Room 425
San Rafael, CA 94903

The Honorable Pat Wiggins
California State Senator District 2
50 D Street, Suite 120A
Santa Rosa, CA 95404

Elected Local Officials

Susan Adams, Supervisor District 1
County of Marin
3501 Civic Center Drive, Room 329
San Rafael, CA 94901

Councilmember Paul Albritton
City of Sausalito
420 Litho Street
Sausalito, CA 94965

Judy Arnold, Supervisor District 5
County of Marin
3501 Civic Center Drive, Room 329
San Rafael, CA 94903

Honorable Andrew Berman
Mayor, City of Mill Valley
26 Corte Madera Avenue
Mill Valley, CA 94941

The Honorable Bob Blanchard
Mayor, City of Santa Rosa
Post Office Box 1678
Santa Rosa, CA 95402

The Honorable Al Boro
Mayor, City of San Rafael
1400 Fifth Avenue
San Rafael, CA 94901-1943

Councilmember Peter Breen
Town of San Anselmo
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