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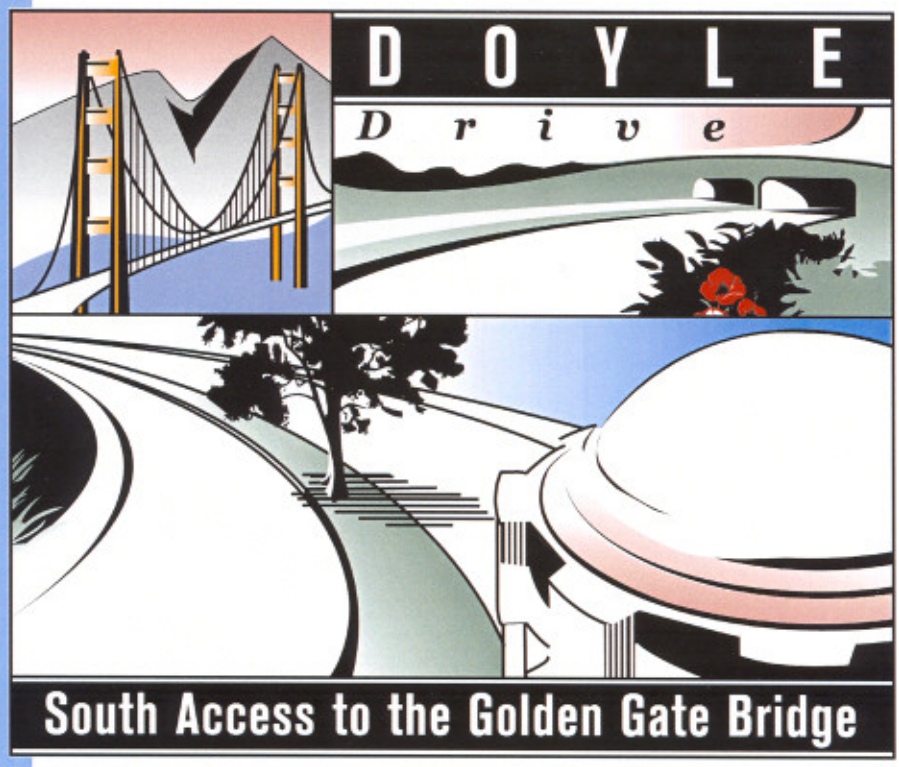

FINAL
AIR QUALITY STUDY
November 2004

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EXECUTIVE SUMMARY

This report presents the results of the air quality study conducted for the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project). This report is one of several technical reports prepared in support of the Draft Environmental Impact Report (DEIS/DEIR). The information from this report will be summarized in the DEIS/DEIR. The study considered the potential for construction and operational phase impacts. The air quality analysis was conducted following methodologies that are consistent with the California Environmental Quality Act (CEQA), including CEQA requirements established by the Bay Area Air Quality Management District (BAAQMD). In addition, the air quality analysis was conducted consistent with National Environmental Policy Act (NEPA) requirements.

Doyle Drive is located in the Presidio of San Francisco (the Presidio), in the northern part of the City of San Francisco at the southern approach to the Golden Gate Bridge. The purpose of the project is to replace Doyle Drive to improve the seismic, structural, and traffic safety of the roadway within the setting and context of the Presidio and its purpose as a National Park. The following alternatives were considered:

- Alternative 1: No-Build Alternative,
- Alternative 2: Replace and Widen Alternative, and
- Alternative 5. Presidio Parkway Alternative

Construction activities associated with the project would generate short-term emissions of criteria pollutants from diesel equipment exhaust, as well as suspended and inhalable particulate matter from grading and soil handling. If not mitigated, these emissions could result in temporary significant impacts under CEQA. The BAAQMD's approach to analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures, and a project's construction related impacts would be less than significant if the required dust-control measures are implemented. Odors from diesel exhaust construction equipment may be perceived on occasion by nearby residents or park users, but these impacts would be temporary.

During operations, changes in traffic operations from the various alternatives in the future year (2030) were compared with the No-Build Alternative in 2030 and with existing conditions in 2000 to determine if the changes could cause impacts to air quality. However, project emissions are already included in the 2003 Transportation Improvement Program (TIP) as developed by the Metropolitan Transportation Commission (MTC); therefore, the Project conforms with the Regional Clean Air Plan.

When comparing the Replace and Widen Alternative and the Presidio Parkway Alternative with the No-Build Alternative in 2030, there would be little or no change in daily traffic and emissions. The impacts of all of the alternatives on regional emissions and on air quality would therefore be less than significant.

Local air quality impacts from carbon monoxide (CO) emissions were evaluated for the worst-case intersection using the Project-Level CO Analysis Protocol developed jointly by the California Department of Transportation (Caltrans) and the Institute of Transportation Studies, University of California at Davis and approved by the U.S. Environmental Protection Agency for use in the Bay Area. The worst-case CO concentrations for all alternatives were determined to be well below the 1-hour and 8-hour standards. Concentrations at sensitive receptors which are farther away from the emission sources would be lower than those at the worst-case receptors, and the impacts would be less than significant.

The Presidio Parkway Alternative proposes to use tunnels as part of the project. Although detailed design of the tunnels has not been conducted yet, the design will have to incorporate ventilation systems that limit CO concentrations within the tunnels to acceptable levels. CO concentrations in tunnels would be higher than in the open air. However, ventilation systems would be expected to reduce concentrations to near normal levels and the impacts would be less than significant.

SECTION 1: INTRODUCTION

This report presents results of the air quality study conducted for the South Access to the Golden Gate Bridge – Doyle Drive Project (Doyle Drive Project). The report addresses potential air quality impacts from the Doyle Drive Project. The findings of this study will be incorporated into the environmental document prepared for the Doyle Drive Project, as required to meet National Environmental Policy Act of 1969 (NEPA) and California Environmental Quality Act of 1970 (CEQA) standards.

1.1 PROJECT DESCRIPTION

Doyle Drive is located in the Presidio of San Francisco (the Presidio), in the northern part of the City of San Francisco at the southern approach to the Golden Gate Bridge (see Figure 1-1). In 1994, when the US Army transferred jurisdiction of the Presidio to the National Park Service (NPS), it became part of the National Park system and Golden Gate National Recreation Area (GGNRA). In 1998, management of the Presidio was divided between two federal agencies: The Presidio Trust (the Trust), the agency responsible for oversight of 80 percent of the Presidio delineated as Area B; and the NPS, which is responsible for management of the coastal portions of the park (the remaining 20 percent) that are delineated as Area A. Doyle Drive lies predominately within the Area B lands managed by the Trust with a small portion at the western end located in Area A on land operated by the Golden Gate Bridge, Highway and Transportation District (GGBHTD). The Presidio has also been designated a National Historic Landmark District (NHLD) since 1962 with the Doyle Drive roadway determined to be a contributing element to that landmark.

Doyle Drive, the southern approach of US 101 to the Golden Gate Bridge, is 2.4 kilometers (1.5 miles) long with six traffic lanes. There are three San Francisco approach ramps which connect to Doyle Drive: one beginning at the intersection of Marina Boulevard and Lyon Street; one at the intersection of Richardson Avenue and Lyon Street; and one where Park Presidio Boulevard (State Route 1) merges into Doyle Drive approximately 1.6 kilometers (one mile) west of the Marina Boulevard approach (see Figure 1-1). Doyle Drive passes through the Presidio on an elevated concrete viaduct (low-viaduct) and transitions to a high steel truss viaduct (high-viaduct) as it approaches the Golden Gate Bridge Toll Plaza.

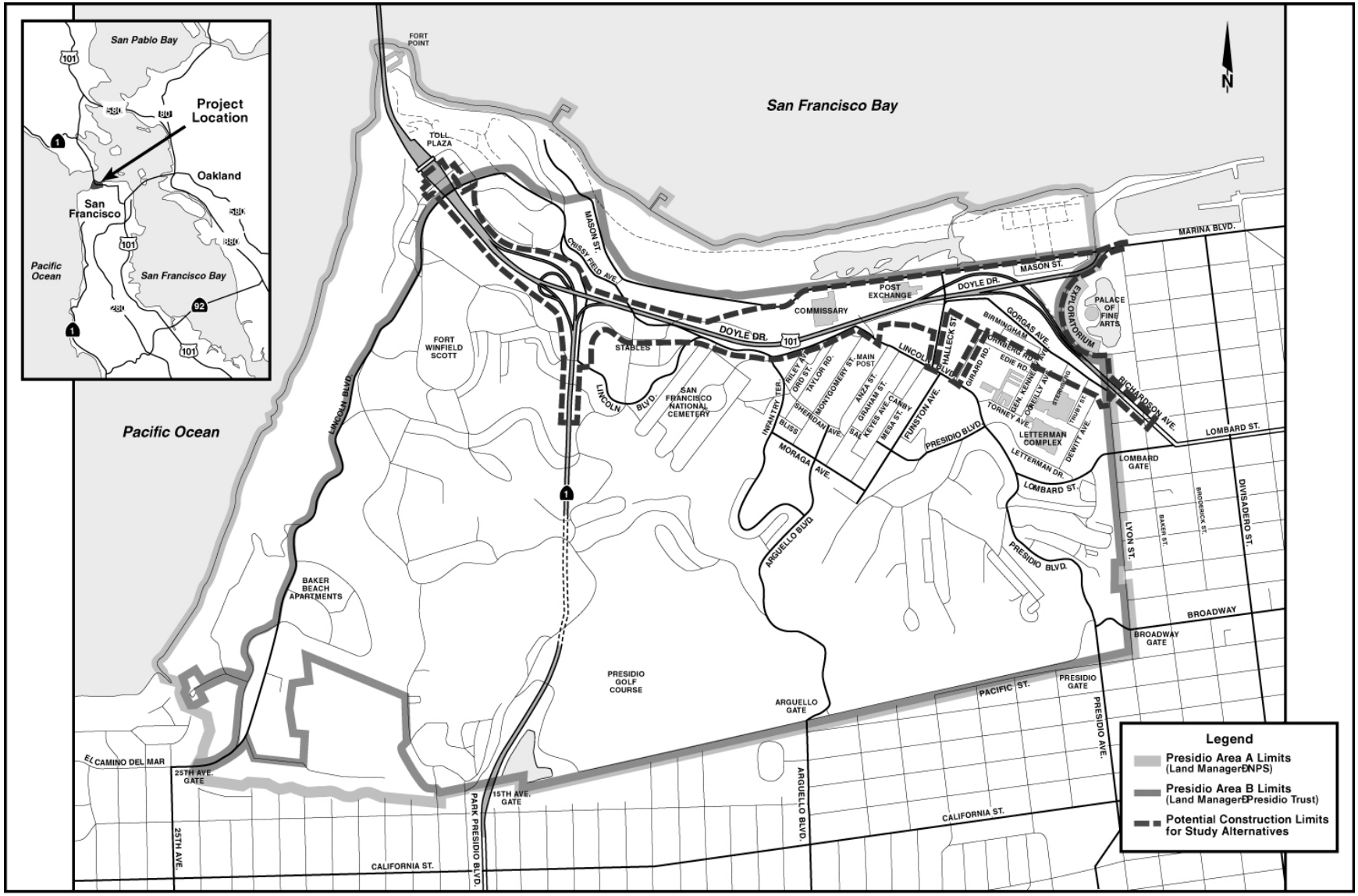
Doyle Drive is nearly 70 years old and it is approaching the end of its useful life, although regular maintenance, seismic retrofit, and partial rehabilitation activities are keeping the structure safe in the short term. However, further structural degradation caused by age and the effects of heavy traffic and exposure to salt air will cause the structures to become seismically and structurally unsafe in the coming years. In addition, the eastern portion of the aging facility is located in a potential liquefaction zone identified on the State of California Seismic Hazard Zones map dated August 2000.

Currently, Doyle Drive has nonstandard design elements, including travel lanes from 2.9 to 3.0 meters (9.5 to 10.0 feet) in width, no fixed median barrier, no shoulders and exit ramps that have tight turning radii. During peak traffic hours, plastic pylons are manually moved to provide a median lane as well as to reverse the direction of traffic flow of several lanes (Project Study Report: Doyle Drive Reconstruction, 1993).

1.1.1 Project Purpose

The purpose of the South Access to the Golden Gate Bridge - Doyle Drive Project is to replace Doyle Drive in order to improve the seismic, structural, and traffic safety of the roadway within the setting and context of the Presidio of San Francisco and its purpose as a National Park.

FIGURE 1-1
PROJECT LOCATION



1.1.2 Project Alternatives

This section describes the build alternatives in terms of physical and operating characteristics and a No-Build Alternative. During the screening process, all alternatives were evaluated for their ability to meet the project's Purpose and Need. Detailed drawings showing the plan and profile of each alternative in addition to the various design options can be found in Appendix A.

1.1.2.1 Alternative 1: No-Build Alternative

The No-Build Alternative represents the future year conditions if no other actions are taken in the study area beyond what is already programmed by the year 2020. The No-Build Alternative provides the baseline for existing environmental conditions and future travel conditions against which all other alternatives are compared.

Doyle Drive would remain in its current configuration, with six traffic lanes ranging in width from 2.9 to 3.0 meters (9.5 to 10 feet) and an overall facility width of 20.4 meters (67 feet) (see Figure 1-2). There are no fixed median barriers or shoulders. The lane configuration is changed by manually moving plastic pylons to increase the number of lanes in the peak direction of traffic. The facility passes through the Presidio on a high steel truss viaduct and a low elevated concrete viaduct with lengths of 463 meters (1,519 feet) and 1,137 meters (3,730 feet), respectively. This alternative does not improve the seismic, structural, or traffic safety of the roadway.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. At the eastern end of Doyle Drive, Presidio access would be provided by the slip ramp from westbound Richardson Avenue to Gorgas Avenue, which is currently under construction.

1.1.2.2 Alternative 2: Replace and Widen Alternative

The Replace and Widen Alternative would replace the 463-meter (1,520-foot) high-viaduct and the 1,137-meter (3,730-foot) low-viaduct with wider structures that meet the most current seismic and structural design standards (see Figure 1-3). The new facility would be replaced on the existing alignment and widened to incorporate improvements for increased traffic safety.

This alternative would include either six 3.6-meter (12-foot) lanes and a 3.6-meter (12-foot) eastbound auxiliary lane with a fixed median barrier or six 3.6-meter (12-foot) lanes with a moveable median barrier. The new facility would have an overall width of 38.0 meters (124 feet). The fixed median barrier option would require localized lane width reduction to 3.3 meters (11 feet) to avoid impacts to the historic batteries and Lincoln Boulevard, reducing the facility width to 32.4 meters (106 feet). Both options would include continuous outside shoulders along the facility. At the Park Presidio interchange, the two ramps connecting eastbound Doyle Drive to Park Presidio Boulevard and the ramp connecting westbound Doyle Drive to southbound Park Presidio Boulevard would be reconfigured to accommodate the wider facility. The Replace and Widen Alternative would operate similar to the existing facility except that there would be a median barrier and shoulders to accommodate disabled vehicles.

The Replace and Widen Alternative includes two options for the construction staging:

No Detour Option – The widened portion of the new facility would be constructed on both sides and above the existing low-viaduct and would maintain traffic on the existing structure. Traffic would be incrementally shifted to the new facility as it is widened over the top of the existing structure. Once all traffic is on the new structure, the existing structure would be demolished and the new portions of the facility would be connected. To allow for the construction staging using the existing facility, the new low-viaduct would be constructed two meters (six feet) higher than the existing low-viaduct structure.

FIGURE 1-2
ALTERNATIVE 1: NO-BUILD

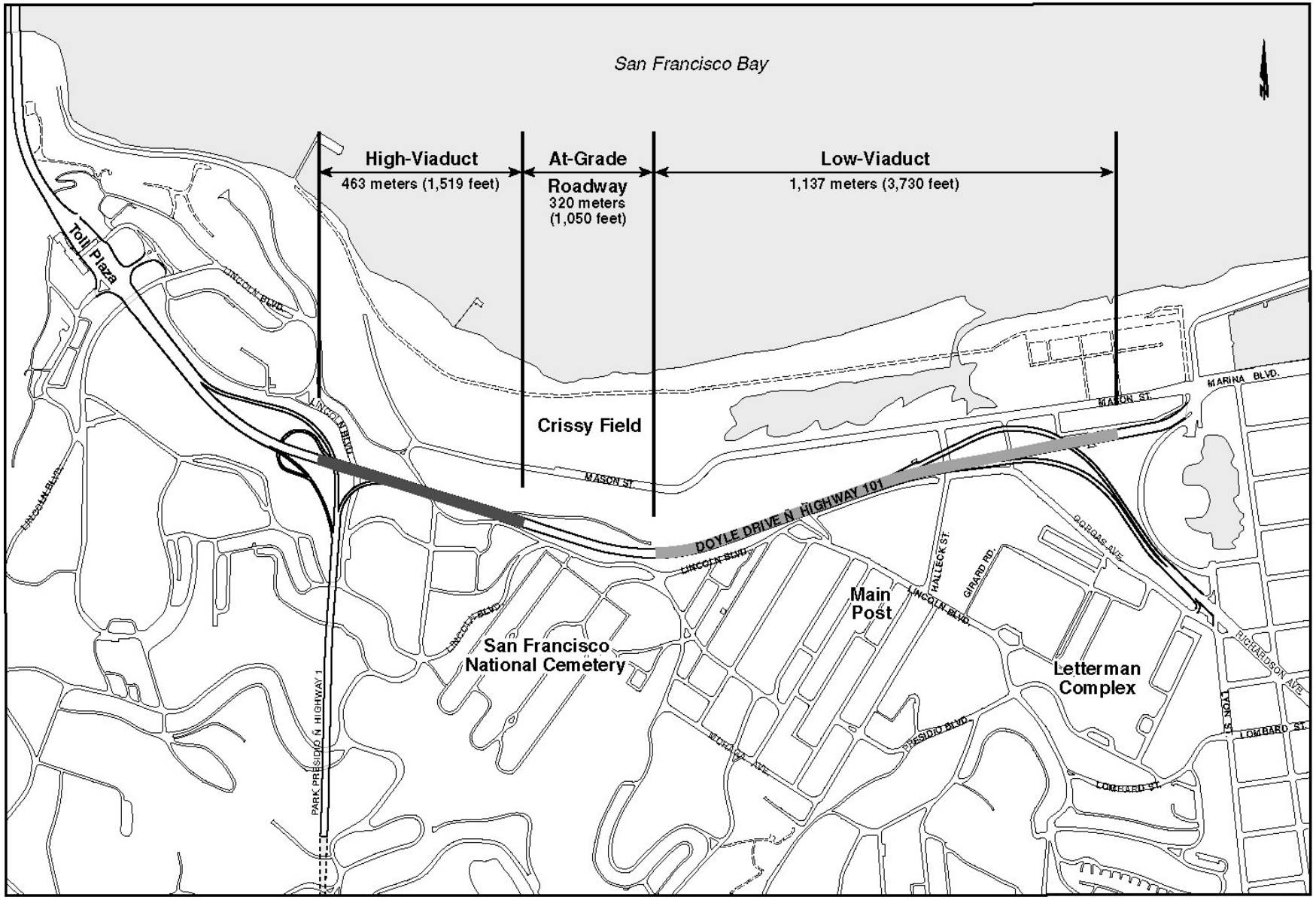
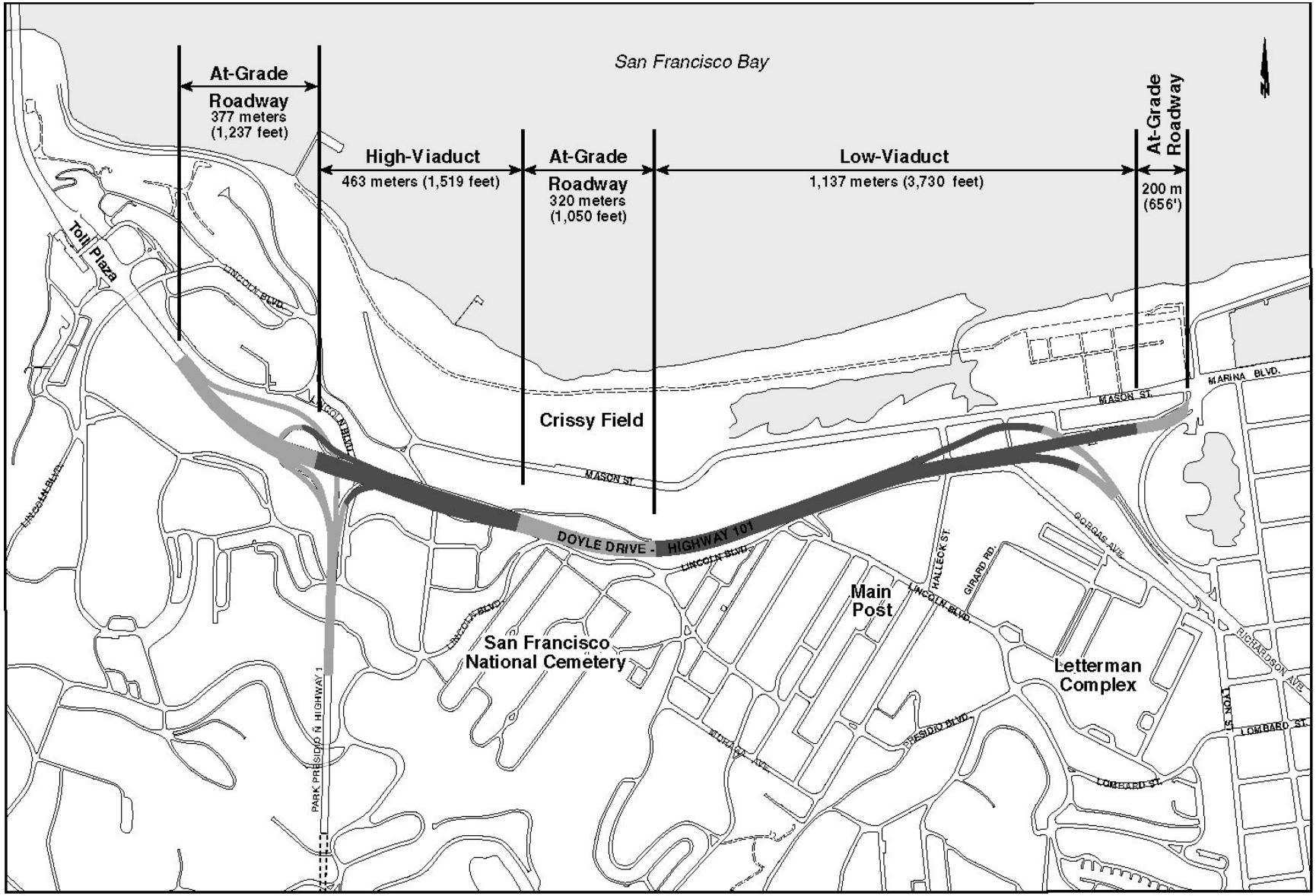


FIGURE 1-3
ALTERNATIVE 2: REPLACE AND WIDEN



With Detour Option - A 20.4-meter (67-foot) wide temporary detour facility would be constructed to the north of the existing Doyle Drive to maintain traffic through the construction period. Access to Marina Boulevard during construction would be maintained on an elevated temporary structure south of Mason Street. On and off ramps to the mainline detour facility would be located near the Post Exchange (PX) building.

Vehicular access to the Presidio is available from Doyle Drive via the off-ramp to Merchant Road at the Golden Gate Bridge Toll Plaza. There would be no Presidio access at the east end of Doyle Drive due to geometric constraints and concerns for traffic safety.

1.1.2.3 Alternative 5: Presidio Parkway Alternative

The Presidio Parkway Alternative would replace the existing facility with a new six-lane facility and an eastbound auxiliary lane between the Park Presidio interchange and the new Presidio access at Girard Road (see Figure 1-4). The new facility would have an overall width of up to 45 meters (148 feet), and would incorporate wide landscaped medians and continuous shoulders. To minimize impacts to the park, the footprint of the new facility would include a large portion of the existing facility's footprint east of the Park Presidio interchange. A 450-meter (1,476-foot) high-viaduct would be constructed between the Park Presidio interchange and the San Francisco National Cemetery. Shallow cut-and-cover tunnels would extend 240 meters (787 feet) past the cemetery to east of Battery Blaney. The facility would then continue towards the Main Post in an open depressed roadway with a wide, heavily landscaped median. From Building 106 (Band Barracks) cut-and-cover tunnels up to 310 meters long (984 feet) would extend to east of Halleck Street. The facility would then rise slightly on a low level causeway 160 meters (525 feet) long over the site of the proposed Tennessee Hollow restoration and a depressed Girard Road. East of Girard Road the facility would return to existing grade north of the Gorgas warehouses and connect to Richardson Avenue.

The Presidio Parkway Alternative would include an underground parking facility at the eastern end of the project corridor between the Mason Street Warehouses, Gorgas Street Warehouses and Palace of Fine Arts. The parking garage would supply approximately 500 spaces to maintain the existing parking supply in the area and improve pedestrian and vehicular access between the Presidio and the Palace of Fine Arts.

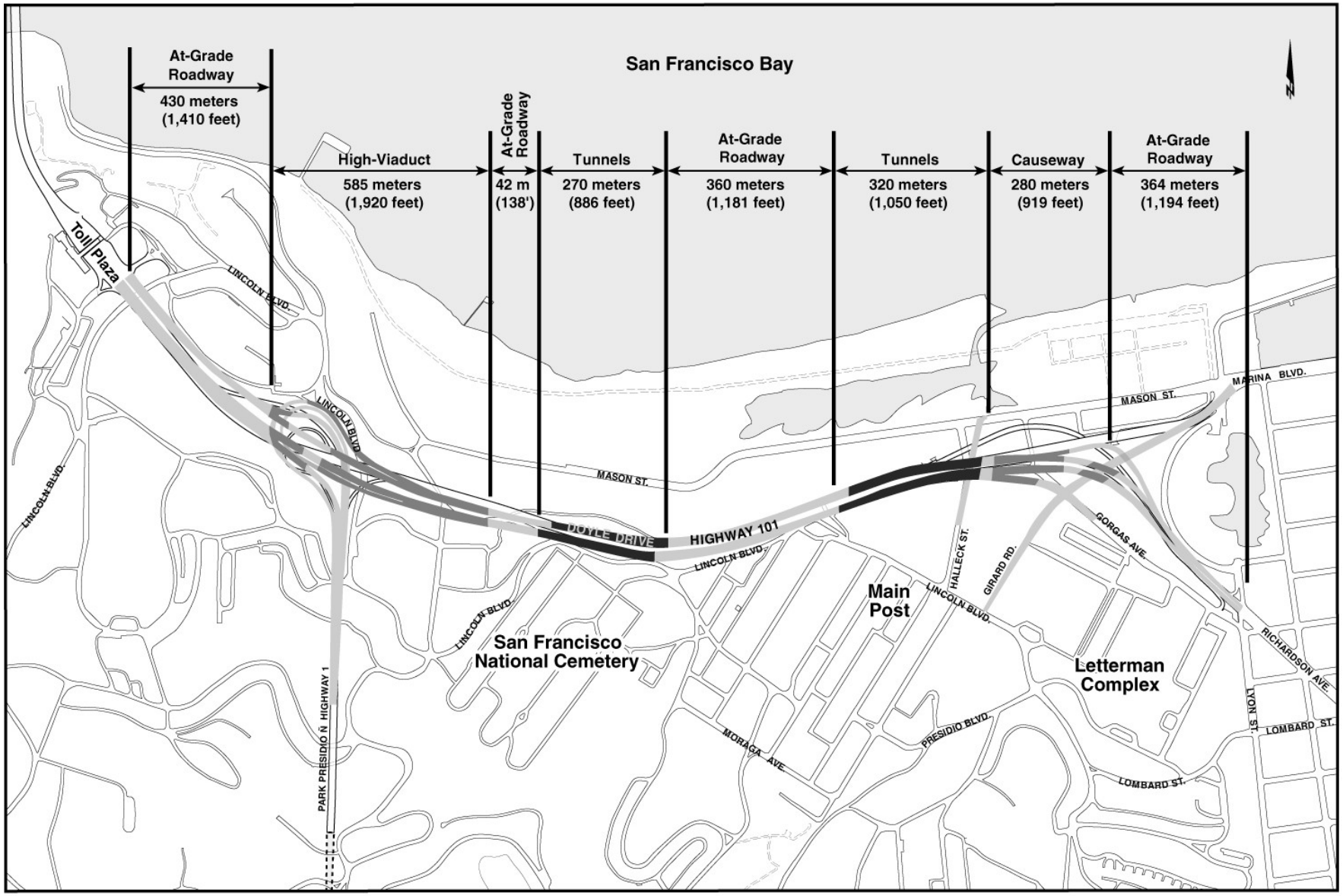
At the intersection with Merchant Road, just east of the toll plaza, a design option has been developed for a Merchant Road slip ramp. This option would provide an additional new connection from westbound Doyle Drive to Merchant Road. This ramp would provide direct access to the Golden Gate Visitors' Center and alleviate the congested weaving section where northbound Park Presidio Boulevard merges into Doyle Drive.

The Park Presidio interchange would be reconfigured due to the realignment of Doyle Drive to the south. The exit ramp from eastbound Doyle Drive to southbound Park Presidio Boulevard would be replaced with standard exit ramp geometry and widened to two lanes. The loop of the westbound Doyle Drive exit ramp to southbound Park Presidio Boulevard would be improved to provide standard exit ramp geometry. The northbound Park Presidio Boulevard connection to westbound Doyle Drive would be realigned to provide standard entrance ramp geometry. There are two options for the northbound Park Presidio Boulevard ramp to an eastbound Doyle Drive connection:

Option 1: Loop Ramp - Replace the existing ramp with a loop ramp to the left to reduce construction close to the Calvary Stables and provide standard entrance and exit ramp geometry.

Option 2: Hook Ramp - Rebuild the ramp with a similar configuration as the existing ramp with a curve to the right and improved exit and entrance geometry.

FIGURE 1-4
ALTERNATIVE 5: PRESIDIO PARKWAY



The Presidio Parkway Alternative includes two options for direct access to the Presidio and Marina Boulevard at the eastern end of the project:

Diamond Option – Direct access to the Presidio and Marina Boulevard in both directions is provided by the access ramps from Doyle Drive connecting to a grade-separated interchange at Girard Road. East of the new Letterman garage, Gorgas Avenue is a one-way street and connects to Richardson Avenue with access to Palace Drive via a signalized intersection at Lyon Street.

Circle Drive Option – The Circle Drive Option provides direct access to the Presidio and Marina Boulevard for eastbound traffic by access ramps connecting to a grade-separated interchange of Girard Road. Westbound traffic from Richardson Avenue would access the Presidio and Palace Drive through a jug handle intersection with Gorgas Avenue.

SECTION 2: REGULATORY CONTEXT AND METHODOLOGY

2.1 REGULATORY CONTEXT

Regulation of air pollution is achieved through both national and state ambient air quality standards and emissions limits for individual sources of air pollutants. The federal Clean Air Act requires the U.S. Environmental Protection Agency (U.S. EPA) to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM-10 and PM-2.5), and lead. These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria. California has adopted more stringent ambient air quality standards for most of the criteria air pollutants (referred to as State Ambient Air Quality Standards or state standards). Table 2-1 presents both sets of ambient air quality standards (i.e., national and state) and provides a brief discussion of the related heath effects and principal sources for each pollutant.

2.1.1 Attainment / Nonattainment Designations

Under amendments to the federal Clean Air Act, U.S. EPA has classified air basins, or portions thereof, as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. In 1988, the State Legislature passed the California Clean Air Act, which is patterned after the federal Clean Air Act to the extent that areas are required to be designated as attainment or nonattainment, but, under the California Clean Air Act, the designations relate to the state standards, rather than the national standards. Thus, areas in California have two sets of designations: one set with respect to the national standards and one set with respect to the state standards.

2.1.1.1 National Standards

Based on monitoring data from the 1970's and 1980's, U.S. EPA designated the Bay Area as a nonattainment area for the national (one-hour) ozone standard. In 1995, U.S. EPA re-designated the Bay Area to attainment based on monitoring data from the early 1990's which had indicated that the standard had been achieved (U.S. EPA, 1995). However, in 1998, U.S. EPA re-designated the Bay Area back to nonattainment based on exceedances of the standard measured in 1995 and 1996 (U.S. EPA, 1998b). Although most ozone nonattainment areas are also given a subclassification such as "moderate," "serious," "severe," or "extreme," U.S. EPA did not identify such a subclassification for the Bay Area when it redesignated the Bay Area as an ozone nonattainment area in 1998. On April 22, 2004, the U.S. EPA declared the San Francisco Bay Area as attainment for the national one-hour ozone standard. It will not officially be reclassified until the BAAQMD submits a plan for demonstrating how the area will maintain the standard for the next ten years. However, in June 2004 the Bay Area was designated as a marginal nonattainment area for the newly adopted national 8-hour ozone standard.

In 1998, U.S. EPA redesignated a subregion of the Bay Area, referred to as the urbanized area, from nonattainment to attainment for the national carbon monoxide standard (U.S. EPA, 1998a). At the same time, U.S. EPA approved a "maintenance" plan, which shows how the subregion will continue to maintain the standard now that it has been achieved. Thus, the subregion is now known as a "maintenance area" for the national carbon monoxide standard. Once an area is designated as a maintenance area that status lasts for 20 years.

The Bay Area is in attainment of the national annual average PM-10 standard and is unclassified for the national 24-hour PM-10 standard. With regard to the newly adopted national PM-2.5 standards, the Bay Area is unclassified for both the annual average and 24-hour average standards. It should be noted the new national PM-2.5 standards are being implemented in the Bay Area.

TABLE 2-1
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour 8 hours	0.09 ppm ---	0.12 ppm 0.08 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when volatile organic compounds (VOC) and nitrogen oxides (NO_X) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
Carbon Monoxide	1 hour 8 hours	20 ppm 9.0 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1 hour Annual Avg.	0.25 ppm ---	--- 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 hour 3 hours 24 hours Annual Avg.	0.25 ppm --- 0.04 ppm ---	--- 0.5 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM-10)	24 hours Annual Avg.	50 $\mu g/m^3$ 20 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$	May irritate eyes and respiratory tract. Decreases in lung capacity. Increased cancer and mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
Fine Particulate Matter (PM-2.5)	24 hours Annual Avg.	--- 12 $\mu g/m^3$	65 $\mu g/m^3$ 15 $\mu g/m^3$	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
Lead	Monthly Quarterly	1.5 $\mu g/m^3$	--- 1.5 $\mu g/m^3$	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.

Source: California Air Resources Board

Note: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

2.1.1.2 State Standards

The Bay Area is currently designated as nonattainment for state standards for ozone, PM-2.5 and PM-10 and is attainment or unclassified for the other state standards (CARB, 1999). As with national PM 2.5 standards, the new State PM-2.5 standards are being implemented in the Bay Area.

2.1.2 Air Quality Plans

The federal Clean Air Act requires nonattainment and maintenance areas to prepare air quality plans that include strategies for attaining and maintaining the national standards. The state California Clean Air Act also requires plans for nonattainment areas (not including state PM-10 nonattainment areas); however, these state-mandated plans include strategies to attain the state standards, rather than the national standards. Thus, just as areas in California have two sets of designations, many – including the Bay Area - also have two sets of air quality plans: one to meet federal requirements relative to the national standards and another to meet state requirements relative to the state standards.

Regional air quality plans developed under the federal Clean Air Act are included in an overall program referred to as State Implementation Plans (SIPs). Plans have been prepared for the Bay Area to address nonattainment and maintenance issues related to the national (one-hour) ozone standard and the national carbon monoxide standard.

The current Bay Area ozone SIP is the *Ozone Maintenance Plan* (Association of Bay Area Governments, 1994a). The *Ozone Maintenance Plan* was developed in anticipation of U.S. EPA's redesignation of the Bay Area from nonattainment to attainment for the national ozone standard. U.S. EPA approved the redesignation request and *Ozone Maintenance Plan* in 1995. However, U.S. EPA required the development of a new plan in 1998 when it redesignated the Bay Area back to nonattainment. A new Bay Area ozone SIP, the *Ozone Attainment Plan* (Association of Bay Area Governments, 1999), was prepared to replace the current Bay Area ozone SIP (i.e., the *Ozone Maintenance Plan*). Because of partial disapproval of this 1999 Plan, it was updated in September 2001 as the San Francisco Bay Area 2001 Ozone Attainment Plan.

The Bay Area 2001 Ozone Attainment Plan included two components for further planning: (1) a commitment to conduct a mid-course review of progress toward attaining the national 1-hour standard by December 2003, and (2) a commitment to provide a revised ozone attainment strategy to U.S. EPA by April 2004. In April 2004, U.S. EPA made a final finding that the Bay Area has attained the national standard. Because of this finding, the previous planning commitments in the 2001 Ozone Attainment Plan are no longer required. The finding of attainment does not mean the Bay Area has been reclassified as an attainment area for the 1-hour standard. The region must submit a redesignation request to U.S. EPA in order to be reclassified as an attainment area. Therefore, the portion of the 2004 Ozone Strategy addressing national ozone planning requirements will include: (1) a redesignation request, and (2) a maintenance plan to show the region will continue to meet the 1-hour standard.

These federally-mandated ozone plans identify strategies to attain and maintain the national ozone standard. Strategies include stationary-source control programs, area-source control programs (e.g., consumer product emissions standards), mobile source control programs, and Transportation Control Measures (TCMs). In general, TCMs are any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. For new or modified highway projects, potentially relevant TCMs include a Regional High Occupancy Vehicle (HOV) System Plan, Regional Transit Coordination), and Incident Management on Bay Area Freeways. None of these TCMs apply specifically to the Doyle Drive Replacement Project. Nonetheless, all of the project alternatives (except the No-Build Alternative) share an element, i.e., changeable or variable message signs, that would contribute to regional efforts to improve incident management on Bay Area freeways, and all of the project alternatives (except the No-Build Alternative) would share an element, i.e., a new multi-modal transit center, that would provide an opportunity to improve regional transit coordination.

The *Carbon Monoxide Maintenance Plan* (Association of Bay Area Governments, 1994b) was developed to ensure continued attainment of the national carbon monoxide standard in the Bay Area. The Bay Area carbon monoxide SIP relies heavily on mobile source control programs, including vehicle emissions standards, the oxygenated/reformulated fuel program, and the motor vehicle inspection and maintenance program (also known as the smog check program). The *Carbon Monoxide Maintenance Plan* establishes an emissions budget for the region. Similar to VOC emissions, the projected emissions of carbon monoxide would be reduced by over 30 percent between 2000 and 2006.

2.1.3 Regulatory Agencies

U.S. EPA is responsible for implementing the myriad programs established under the federal Clean Air Act, such as establishing and reviewing the national ambient air quality standards and judging the adequacy of SIPs, but has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented. U.S. EPA also has developed criteria and procedures for determining the conformity of federal actions to the applicable SIPs.

For the purposes of determining conformity with a SIP, the federal Clean Air Act (and the related U.S. EPA regulations) distinguish between transportation-related plans, programs, and projects that are funded, approved, or sanctioned by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) under Title 23 of the United States Code (USC) and all other federally funded, approved, or sanctioned plans, programs, and projects. Different criteria and procedures (for determining conformity) have been established for these two broad categories of actions; the first is referred to as “Transportation Conformity” and the latter is referred to as “General Conformity.” Since this project would be funded (at least, in part) and approved by FHWA, the transportation conformity regulation, referred to as the Transportation Conformity Rule, would apply. A version of U.S. EPA's Transportation Conformity Rule has been incorporated into the Bay Area portion of the California SIP (Metropolitan Transportation Commission, 1998a).

For a transportation project, such as the Doyle Drive Project, to satisfy transportation conformity requirements, it must not interfere with the implementation of any TCMs in the applicable SIP, must demonstrate through a “hot spot” analysis that it would not cause or contribute to new violations of the carbon monoxide standard, and must be consistent with the motor vehicle emissions budgets in the applicable SIP. In addition, there must be a currently conforming transportation plan and transportation improvement program in effect at the time of project approval. The Doyle Drive Project meets all of these requirements, and its design concept and scope are consistent with the assumptions used in the regional conformity analysis.

For the Bay Area, the Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (TIP) are the subjects of a conformity analysis, which is the determination whether transportation activities will not produce new air quality violations or delay timely attainment of national ambient air quality standards. The Metropolitan Transportation Commission (MTC) prepares and adopts the TIP every two years, and the 2003 TIP was adopted in January 2003. The Doyle Drive Project is included in the 2003 TIP, and it has been determined that the Project conforms to the state air quality implementation plan.

CARB, the State’s air quality management agency, is responsible for establishing and reviewing the state ambient air quality standards, compiling the California SIP and securing approval of that plan from U.S. EPA. CARB also oversees the activities of air quality management districts, which are organized at the county or regional level. As a general matter, U.S. EPA and CARB regulate emissions from mobile sources, and the air districts regulate emissions from stationary sources associated with industrial and commercial facilities. Generally, U.S. EPA and the CARB do not regulate mobile sources of air pollutants through individual permits but rather through emissions standards enforced on engine and vehicle manufacturers, through fuel specifications, and through vehicle inspection and maintenance programs.

In the Bay Area, the Bay Area Air Quality Management District (BAAQMD) is the regional agency empowered to regulate air pollutant emissions from stationary sources. BAAQMD regulates air quality

through its permit authority over most types of stationary emission sources and through its planning and review activities. BAAQMD's permit authority, however, does not extend to on-road motor vehicles, such as automobiles and trucks. BAAQMD also does not require permits for ventilation shafts associated with tunnels used for transportation purposes.

The National Park Service (NPS) and the Presidio Trust have a desire to provide additional emphasis on air quality. While there are no existing national or state air quality standards that are specific to the Presidio or national parks, the following presents existing NPS policies set forth in its Director's Orders and Executive Orders which promote cleaner air quality:

- *Director's Order 13A - Environmental Management Systems*: . . . NPS stewardship is defined by the resource protection ethic of employing the most effective concepts, techniques, equipment, and technology to prevent, avoid, or mitigate impacts that would compromise the integrity of park resources. It requires that park managers demonstrate environmental leadership by implementing sustainable practices in all aspects of management, and the active communication of these practices-along with their purposes and values-to park employees, visitors, partners, and stakeholders.

- *Executive Order No 13031 – Federal Alternative Fueled Vehicle Leadership*: Section 1. Federal Leadership and Goals. (a) The purpose of this order is to ensure that the Federal Government exercise leadership in the use of alternative fueled vehicles (AFVs) . . . (b) To the extent practicable, agencies shall use alternative fuels in all vehicles capable of using them. . .

- *Executive Order No. 13123 - Greening the Government through Efficient Energy Management*: Section 101. Federal Leadership. . . . As a major consumer that spends $200 billion annually on products and services, the Federal Government can promote energy efficiency, water conservation, and the use of renewable energy products, and help foster markets for emerging technologies. . .

- *Executive Order No. 13148 - Greening the Government through Leadership in Environmental Management*: Section 101. Federal Environmental Leadership. The head of each Federal agency is responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes, across all agency missions, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of Federal Government policies, operations, planning, and management. . .

- *Executive Order No. 13149 - Greening the Government through Federal Fleet and Transport Efficiency:* Section 101. Federal Leadership. The purpose of this order is to ensure that the Federal Government exercises leadership in the reduction of petroleum consumption through improvements in fleet fuel efficiency and the use of alternative fuel vehicles (AFVs) and alternative fuels. . .

2.2 METHODOLOGY

2.2.1 Construction Phase

The construction-related air quality impact analysis follows the methodology recommended by BAAQMD in their CEQA Guidelines. The Guidelines recommend a qualitative approach to evaluating construction-phase impacts with the emphasis placed on identifying and implementing an adequate dust abatement program rather than on quantification of related emissions or ambient air concentrations. BAAQMD provides a recommended list of measures to minimize emissions during construction activities, and the air quality analysis relies on the list to develop measures appropriate for this project.

2.2.2 Operational Phase

The air quality impact analysis for operations addresses changes in regional emissions and changes in local air pollutant concentrations of CO. With respect to regional emissions, the San Francisco Bay Area is a nonattainment area for the state and national ozone standard and a nonattainment area for the state PM-10 standard. However, future emissions from the Doyle Drive Project have already been incorporated by MTC into the 2003 TIP, and the Project is in conformity. Consequently, regional emissions from the Doyle Drive Project will not contribute to exceedances of the national ozone standard.

With regard to local impacts of CO, a “hot spot” analysis was conducted to determine if the Project would cause or contribute to any localized CO violations near key intersections. The analysis utilizes the Project-Level Protocol developed jointly by Caltrans and the Institute of Transportation Studies, University of California at Davis and approved by the U.S. EPA for use in the Bay Area. A top-down approach was followed, in which the intersection with the worst-case traffic levels and congestion was first analyzed. If, from the worst-case analysis, it is determined that CO concentrations do not exceed the ambient air standards, then it can be assumed that other intersections affected by the project, but with lower traffic counts and less congestion would also result in worst-case concentrations that are well below the standards and would not have to be analyzed.

An analysis was conducted for the tunnel portals, similar to the approach taken by Caltrans for the Devil’s Slide Project, in which maximum concentrations of CO in the tunnel ventilation system were considered to determine impacts. These maximum concentrations exiting the portals were modeled using the EPA dispersion model SCREEN3 to estimate downwind concentrations. The SCREEN3 model uses the same algorithms for characterizing dispersion as the EPA model ISC3, except that hypothetical worst-case meteorology is assumed in the calculations.

SECTION 3: REGIONAL AND SAN FRANCISCO AIR QUALITY CONDITIONS

The project area lies within the City and County of San Francisco, which lies at the northern end of the peninsula climatological sub-region of the San Francisco Bay Area Air Basin (Bay Area). The peninsula climatological sub-region extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains extend through the center of the peninsula, with elevations exceeding 610 meters (2,000 feet) at the southern end, decreasing to 150 meters (500 feet) in South San Francisco. Because most of San Francisco's topography is below 61 meters (200 feet), marine air is able to flow easily across most of the city, making its climate cool and windy. Pollutant emissions in San Francisco are high, especially from motor vehicle congestion. Localized pollutants, such as carbon monoxide, can build up in "urban canyons;" however, winds are generally strong enough to carry the pollutants away before they can accumulate (BAAQMD, 1999). Within San Francisco, winds are generally from the west, although wind patterns are often influenced greatly by local topographic features. In spring and summer, the Presidio can experience strong prevailing winds that blow out of the west/northwest through the Golden Gate, usually in the afternoon and in excess of 31 kilometers per hour (19 miles per hour) (U.S. Department of the Interior, 1994).

BAAQMD operates a regional air quality monitoring network that provides information on ambient concentrations of criteria air pollutants, including ozone, CO, and PM-10, which are the three pollutants of most concern in the Bay Area. Monitored ambient air pollutant concentrations reflect the number and strength of emissions sources and the influence of topographical and meteorological factors. The nearest ambient air monitoring station to the project site is the Arkansas Street monitoring station in San Francisco. Table 3-1 is a summary of monitoring data collected at this monitoring station over the past four years for those pollutants for which the Bay Area is, or has been, designated nonattainment in the past few years.

3.1 OZONE

Some criteria pollutants are considered regional in nature, some are considered local, and some have characteristics that are both regional and local. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving volatile organic compounds (VOC) and nitrogen oxides (NO_X). VOC and NO_X, which are emitted directly to the atmosphere, are known as precursor compounds for ozone. Substantial ozone production generally requires the presence of ozone precursor compounds for approximately 3 hours in a stable atmosphere with strong sunlight. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production.

As shown in Table-3-1, the local monitor has not recorded exceedances of the state ozone standard over the past four years. Coastal monitoring stations, such as those in San Francisco, Oakland, and San Rafael, generally record the fewest violations while inland valley stations, such as those in Livermore, Concord, and Gilroy, record the most violations. However, emissions of ozone precursors generated within San Francisco can contribute incrementally to exceedances in downwind areas within the region.

Ambient carbon monoxide concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Carbon monoxide concentrations also are influenced by wind speed and atmospheric mixing. Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area out to some distance from vehicular sources. Table 3-1 shows that no exceedances of carbon monoxide standards have been recorded over the past four years. Carbon monoxide emissions are expected to decrease by approximately 33 percent from 2000 to 2010 (BAAQMD, 1999) and thus background carbon monoxide concentrations are expected to continue to be less than the corresponding standards for the foreseeable future.

TABLE 3-1
SUMMARY OF MONITORING DATA FOR SAN FRANCISCO
(ARKANSAS STREET MONITORING STATION), 2000–2003

Pollutant	State Standard	National Standard	Pollutant Concentration Year			
			2000	2001	2002	2003
Ozone						
Highest 1-hour average, ppm [a]	0.09	0.12	0.06	0.08	0.05	0.08
Days over State Standard			0	0	0	0
Days over National Standard			0	0	0	0
Highest 8-hour average, ppm	NA	0.08	0.04	0.05	0.05	0.06
Days over National Standard			0	0	0	0
Carbon Monoxide						
Highest 8-hour average, ppm	9.0	9	3.2	3.3	2.6	2.8
Days over Standard			0	0	0	0
Respirable Particulate Matter (PM-10)						
Highest 24-hour average, $\mu g/m^3$ [a]	50	150	63	70	74	52
Number of samples [b]			61	61	61	61
Days over State Standard			2	8	4	1
Days over National Standard			0	0	0	0
Annual average, $\mu g/m^3$	30	50	22	26	25	22
Fine Particulate Matter (PM-2.5)						
Highest 24-hour average, $\mu g/m^3$	-	65		77	70	42
Days over National Standard				2	4	0
Annual Average, $\mu g/m^3$	12	15		12	13	10

Source: California Air Resources Board, *Summary of Air Quality Data, Gaseous and Particulate Pollutants*, 2000–2003.

Notes: **Bold** values are in excess of applicable standard. NA = Not Applicable or Not Available.

[a] ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

[b] PM-10 is not measured every day of the year. The number of samples refers to the number of days in a given year during which PM-10 was measured at Arkansas Street monitoring station.

3.2 PARTICULATE MATTER (PM-10 AND PM-2.5)

Respirable particulate matter (PM-10) and fine particulate matter (PM-2.5) consist of particulates 10 microns (a micron is one one-millionth of a meter) or less in diameter and 2.5 microns or less in diameter, respectively. PM-2.5 can be inhaled deeply into the lungs and cause adverse health effects. Particulate matter in the atmosphere result from many kinds of dust- and fume-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, primarily contribute to increases in local particulate concentrations, while others, such as vehicular traffic, affect regional particulate matter concentrations.

The station nearest the project site (Arkansas Street) monitors PM-10, and ambient air concentrations from 2000-2003 are reported in Table 3-1. The data show that there were no exceedances of the Federal PM-10 standard, and approximately 5 percent of the time, the more stringent state standard is exceeded. The Arkansas Street station is in an urban setting, and is between two freeways (U.S. 101 and I-280). These measured levels are consistent to the regional monitoring network which is representative of urban areas. There are no monitors in the Presidio area, but levels in the project area would be lower than the Arkansas Street location, because it is not downwind of major sources of pollution. A monitoring network for PM-2.5 in the Bay Area was established in late 2000, and data are reported in Table 3-1 for 2001-2003.

The trend in regional PM-10 concentrations is difficult to predict because the concentrations reflect both primary sources of PM-10 (e.g., dust entrainment from roads and PM-10 directly emitted from combustion sources) as well as secondary sources of PM-10 and of PM-2.5, i.e., primary sources of VOC, NO_x, and sulfur oxides, which are precursors to particulate matter. Primary PM-10 emissions in the Bay Area are expected to increase by approximately 11 percent between 2000 and 2010 (BAAQMD, 1999), but the SIP for ozone indicates that some of the secondary emissions of PM-10 and PM-2.5 (such as VOC and NO_x) are expected to decline over that same period, thus reducing the formation of secondary aerosols.

SECTION 4: SENSITIVE RECEPTORS

Under the Clean Air Act, ambient air quality must meet the standards for criteria pollutants in all locations generally accessible to the public sector; however, some land uses are considered more sensitive than others to air pollution. Schools, parks, hospitals and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people or the infirm may frequent these areas and are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are sensitive to poor air quality because people usually stay home for extended periods of time.

4.1 DOYLE DRIVE CORRIDOR

Sensitive receptors within the Doyle Drive corridor include the open spaces of the Presidio which extends along the length of the corridor, as well as residential areas along and in the vicinity of Armistead Road (northwest of the junction of Highway 1 and Doyle Drive); Storey Avenue (north of Ruckman Avenue), Riley Avenue, General Kennedy Avenue, and Girard Road. In some cases, these residential areas are in active use. Other residential areas appear to be vacant but are designated as residential and are not slated for removal under the *Presidio's General Management Plan Amendment* (GMPA) and thus are presumed to be available for residential purposes in the future. An additional sensitive use within the Doyle Drive corridor is the recreation area known as Crissy Field. In addition, while the residential uses along Sibert Loop (west of Arguello Boulevard) and Sumner Street (west of Presidio Boulevard) are not strictly located within the Doyle Drive corridor, they could experience changes in air quality due to the redistribution of traffic within the Presidio that would be caused by providing access within the Presidio to Doyle Drive (e.g., with an extension of Girard Road).

4.2 PARK PRESIDIO BOULEVARD (HIGHWAY 1) CORRIDOR

Sensitive receptors within the Park Presidio Boulevard (Highway 1) corridor include the Ruckman Avenue residential area, a residential area along Hitchcock Street (immediately west of Highway 1), a residential area along Amatury Loop (east of Park Boulevard), and a residential area along Wyman Avenue (near the southern boundary of the Presidio).

4.3 EAST OF THE PRESIDIO

Sensitive receptors east of the Presidio include the residences immediately east of the Palace of Fine Arts and along the south side of Marina Boulevard, along the east side of Lyon Street north of Lombard, and along both sides of Richardson Avenue.

4.4 SOUTH OF THE PRESIDIO

Sensitive receptors south of the Presidio include the residences along both sides of California Street, the residences along the east side of Funston Avenue, and West of 14th Avenue. (South of the Presidio, Highway 1 extends through the middle of a one-block-wide open space corridor.) In addition, some residential uses are located on the upper stories of certain buildings along Geary Boulevard. Also, residences are located along Arguello Boulevard and Presidio Avenue, which are two roads that could experience changes in roadside air quality due to redistributed traffic volumes.

SECTION 5: IMPACTS AND MITIGATION MEASURES

The analysis and evaluation of the impacts of the proposed project are based on the traffic study that was prepared for the project alternatives. In that study, an extensive analysis was carried out to determine the change in traffic operations and transportation circulation for the various alternatives in the year 2030.

5.1 SIGNIFICANCE THRESHOLDS

A transportation project would have a significant effect on air quality under CEQA if it would:

- conflict with or obstruct implementation of the applicable air quality plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

5.2 CONSTRUCTION IMPACTS

Review of the detour plans indicate that the construction period for the Doyle Drive Project would be approximately four to five years for all build alternatives. During this time, a series of construction phases would occur. All build alternatives would involve standard construction techniques and require large-scale construction equipment and labor intensive activities. General site activities would include:

- site preparation and mobilization of equipment to the staging areas;
- clearing and grubbing, utility relocation, grading and dewatering;
- excavation, foundation construction, and pile installation;
- roadway construction, placement of reinforced concrete and precast concrete, installation of steelwork, and landscaping; and
- removal of existing facilities and demobilization.

Equipment would include drill rigs, pile and pneumatic hammers, backhoes, sheet piling, cranes, bentonite mixing and processing, and on-site concrete batching plant, concrete trucks, and delivery trucks.

Construction activities associated with the project would generate emissions of criteria pollutants over the construction duration (including suspended and inhalable particulate matter and equipment exhaust emissions), and disruption of traffic routes. While construction related emissions would be limited to the construction period, it could still cause adverse effects on the local air quality during this duration. If not mitigated, this could result in a temporary significant impact under CEQA.

Dust emissions from construction would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. In the absence of mitigation, construction activities could result in substantial quantities of dust, and as a result, local visibility and PM-10 concentrations could be adversely affected on a temporary and intermittent basis during the construction period. In addition, the fugitive dust generated by construction would include not only PM-10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

BAAQMD's approach to analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions. BAAQMD considers any project's construction related impacts to be less than significant if the required dust-control measures are

implemented. Without these measures, the impact could be significant, particularly if sensitive land uses are located in the project vicinity.

Construction activities would also result in the emission of other criteria pollutants from equipment exhaust, construction-related vehicular activity and construction worker automobile trips. Emission levels for construction activities would vary depending on the number and type of equipment, duration of use, operation schedules, and the number of construction workers. Although these emissions, in combination with other existing sources, would contribute to local air quality degradation in the area, the impact would be minor and temporary and would therefore be less than significant.

During construction, the construction contractor would be required to implement BAAQMD's basic dust control procedures, to maintain project construction-related impacts at acceptable levels; this would mitigate the potential impact to less than significant. These mitigation measures are identified in the BAAQMD CEQA Guidelines (BAAQMD, 1999), and they are based on many field studies reported by U.S. EPA and CARB in the past 15 years. Elements of the dust abatement program for this project could include, but may not be limited to the following:

- Water all active construction areas at least twice daily. Watering could be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 24 kilometers per hour (15 miles per hour). Reclaimed water should be used whenever possible.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 0.6 meter (two feet) of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.

Construction activities would also result in emissions of other criteria pollutants and toxic air contaminants from equipment exhaust, construction-related vehicular activity, and construction worker automobile trips. Exhaust emissions from construction engines would vary depending on the number and type of equipment, duration of use, and number of construction workers. Criteria pollutant emissions of VOC and NOx from these sources would incrementally add to the regional atmospheric loading of ozone precursors during project construction. BAAQMD CEQA Guidelines recognize that construction equipment emit ozone precursors, but indicate that such emissions are included in the emission inventory that is the basis for regional air quality plans. Therefore, construction emissions are not expected to impede attainment or maintenance of ozone standards in the Bay Area (BAAQMD, 1999).

It should be noted that on May 11, 2004, the EPA signed the final rule introducing Tier 4 emission standards, which are to be phased-in over the period of 2008-2015 *[69 FR 38957-39273, 29 Jun 2004]*. The Tier 4 standards require that emissions of PM and NOx be further reduced by about 90%. Such emission reductions are to be achieved through the use of control technologies — including advanced exhaust gas aftertreatment—similar to those required by the 2007-2010 standards for highway engines. To enable sulfur-sensitive control technologies in Tier 4 engines—such as catalytic particulate filters and NOx adsorbers—the EPA mandated reductions in sulfur content in nonroad diesel fuels, as follows:

- 500 ppm effective June 2007 for nonroad (construction), locomotive and marine (NRLM) diesel fuels, and
- 15 ppm (ultra-low sulfur diesel) effective June 2010 for nonroad fuels.

Implementation of this regulation will serve to reduce NOx, VOC, and toxic PM-10 emissions.

5.3 OPERATIONS IMPACTS

5.3.1 Regional Air Quality

During project operations, changes in traffic in future years (2030) are compared with the future No-Build Alternative in 2030 and with existing baseline conditions (2000) to determine if emissions would change and cause impacts on air quality. Table 5-1 summarizes the peak-hour vehicle miles traveled (VMT) for the various alternatives. The table shows that, although traffic volumes would increase in the buildout year as compared with existing conditions, VMT for the No Build, Replace and Widen and Presidio Parkway Alternatives would be very similar, with minimal change. Differences in VMT are attributable to the minor variations in alternative roadway configurations. Therefore, the air quality impacts for all of the alternatives when compared with the future No-Build alternative are less than significant. Although VMT for future years are greater than existing conditions for all of the alternatives, any emissions changes associated with the increased VMT have already been included in the 2003 TIP, and those emissions conform with the Regional Clean Air Plan. Consequently, the impacts compared to existing conditions are also less than significant.

TABLE 5-1
ESTIMATED VEHICLE MILES TRAVELLED AT PEAK TIMES

	Vehicle Miles Travelled	
Scenario	**AM Peak**	**PM Peak**
2000 Base	61,500	69,600
2030 No Build	69,500	77,400
2030 Replace and Widen	69,600	78,800
2030 Presidio Parkway Diamond Option	70,400	79,500
2030 Presidio Parkway Circle Option	70,200	79,400

Source: DKS, 2004

5.3.2 Local Air Quality Analysis

In addition to the regional contribution to the total pollution burden, project-related traffic could result in localized “hot spots” or areas with high CO concentrations around stagnation points such as major intersections and heavily traveled and congested highways and roadways. Although the Project is not expected to add more vehicles, the change in routes could cause CO impacts to increase at key receptors.

The intersection and associated linkages that were shown to have the greatest amount of peak traffic is on the main line of Doyle Drive. A microscale “hot spot” screening impact analysis was conducted along this corridor. It was assumed that, if the relatively higher volumes of project-generated traffic at these intersections would not result in adverse impacts, then other nearby intersections would experience similar or less substantial effects. For this analysis, local carbon monoxide concentrations were calculated using the CO Protocol described in the Methodology Section. Since the Bay Area was designated an attainment area for CO on June 1, 1998, the protocol indicates that an analysis by comparison is appropriate. This involves a comparison of the proposed project with similar existing roadways within the region where monitoring has indicated that the standards have not been exceeded.

This analysis relies on the similar methodology used by Caltrans for a study of the I-880 / State Route 260/61 project between Oak Street On-Ramp and Central Avenue in Oakland. In that Caltrans study, a comparison was made to the worst-case traffic conditions on U.S. 101 in Santa Clara County between Story Road and Tully Road. The air quality study for the Doyle Drive project relies on the same comparison U.S. 101 corridor in Santa Clara County. Both the Doyle Drive corridor and the comparison U.S. 101 corridor in Santa Clara

County involve similar meteorology under worst-case conditions, and differences in traffic volumes would proportionately change ambient air CO concentrations. For the U.S. 101 corridor in Santa Clara County, daily traffic volumes were reported under existing conditions to be 224,000 vehicles per day. For the Doyle Drive Project, daily traffic volumes at some of the key links under the project alternatives are reported in Table 5-2. The table shows that the link with the highest traffic volume is U.S. 101 between Merchant Drive Ramps and Park Presidio Boulevard (83,000 vehicles per day). The proposed project would result in traffic volumes much smaller than the comparison location in Santa Clara County. Since this and other comparable locations in the air basin meet air quality standards, the Project would also meet air quality requirements and would therefore have no significant impacts on local air quality or cause exceedances of state or federal CO standards. Therefore, the CO impacts at key intersections would be less than significant.

TABLE 5-2
ESTIMATED AVERAGE DAILY TRAFFIC AT KEY LOCATIONS

No.	Location	Direction	2000 (000s)	2030 (000s)			
				1 No Build	2 Replace and Widen	5a Presidio Parkway Diamond	5b Presidio Parkway Circle
1	U.S. 101 From the Merchant Drive Ramps to Park Presidio Blvd	SB	63	79	81	83	83
2	U.S. 101 From Park Presidio Blvd to the Merchant Drive Ramps	NB	60	77	78	80	79
3	U.S. 101 From Park Presidio to the Marina Blvd Access Ramps	SB	53	58	60	60	59
4	U.S. 101 From the Marina Blvd Access Ramps to Park Presidio	NB	46	54	54	55	54
5	Richardson From the Marina Blvd Access Ramps to Lyon St	SB	37	40	41	39	40
6	Richardson From Lyon St to the Marina Blvd Access Ramps	NB	30	37	36	43	41
7	Marina Blvd From the Doyle Drive Merger to Lyon St	EB	16	18	19	18	14
8	Marina Blvd From Lyon St to the Doyle Drive merger	WB	17	19	18	13	10
9	Park Presidio From the U.S. 101 Ramps to the Park Presidio Tunnel (actually to Lake Street)	SB	32	37	38	39	39
10	Park Presidio From (Lake Street) the Park Presidio Tunnel to the U.S. 101 Ramps	NB	35	41	41	40	40
11	U.S. 101 between Park Presidio on and off-ramps	SB	41	50	51	51	51
12	U.S. 101 between Park Presidio off and on-ramps	NB	36	46	46	48	47

Source: DKS, 2004

5.3.3 Park Presidio Alternative Tunnels

The Park Presidio Alternative proposes to use two tunnels with lengths of approximately 270 meters and 1,320 meters (885 and 4,331 feet), respectively. FHWA requires that tunnels be designed to limit CO concentrations to certain levels in order to protect public health (Caltrans, 2000). These requirements are accepted by EPA. CO concentrations are allowed to approach a maximum 15-minute average concentration of 120 ppm or 35 ppm for a one-hour average within a tunnel, provided there are no pedestrians or bicycles allowed; otherwise, the 15-minute average limit is 60 ppm. If the Park Presidio Alternative is selected, ventilation systems that limit concentrations within the tunnel to acceptable levels would be included in final design. Ventilation of a tunnel is based on meeting acceptable levels in tunnels during normal and congested traffic operation. The system must provide air to dilute air pollution in the tunnel. Above a certain threshold of vehicle volumes and vehicle speed, a tunnel will be self-ventilating due to the piston-effect of vehicles for certain tunnel variations. Ventilation fans are needed to provide dilution air during congestion events.

The ventilation system will consist of a series of jet-fans or semi-transverse ventilation fans that are designed to not only limit CO concentrations under heavy traffic conditions, but to also minimize air pollutant concentrations in case of a fire in a tunnel. The capacity of the ventilation system is therefore much greater than the requirement for traffic only, since emissions from a fire could be considerably greater than from high density traffic.

The greatest impacts outside the tunnels would be from emissions at the portals. A modeling analysis of emissions from the tunnel portals was carried out (similar to the analysis conducted for the Caltrans Devil's Slide Study) to estimate maximum downwind concentrations. As stated above, the maximum one-hour CO concentrations exiting the portals would be no greater 35 ppm. A screening modeling analysis was carried out to determine expected maximum CO concentrations at receptors near the portals if the concentrations at the portals were equal to the maximum allowed one-hour average.

Ambient air concentrations were calculated at downwind receptors using the U.S. EPA dispersion model SCREEN3. Emissions were assumed to occur as a volume source at the tunnel portal. The model run is reported in Appendix B. The model predicts that, assuming the maximum one-hour CO concentration exiting the portal to be 35 ppm, maximum one hour concentrations at downwind locations would be no greater than 11 ppm. This level is well below the state and federal one-hour standards. Thus, the impact would be less than significant.

SECTION 6.0: REFERENCES

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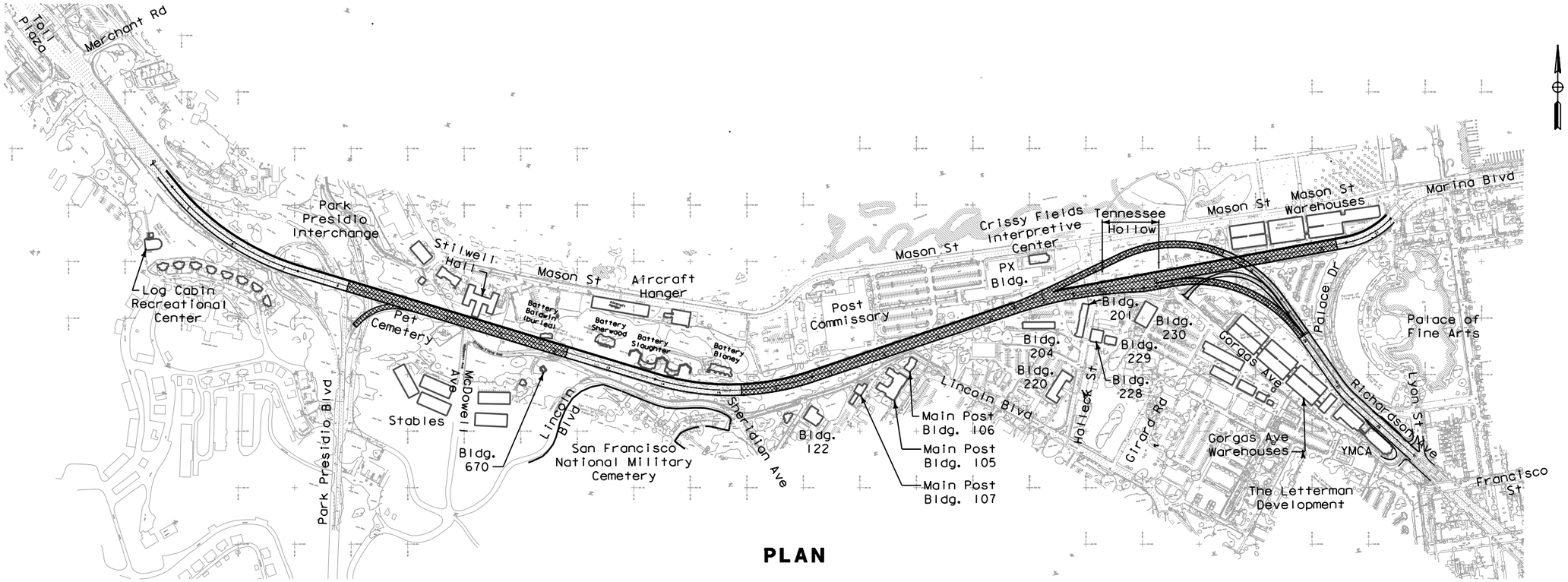
APPENDIX A

DETAILED ALTERNATIVE AND DESIGN OPTION DRAWINGS

1. No Build



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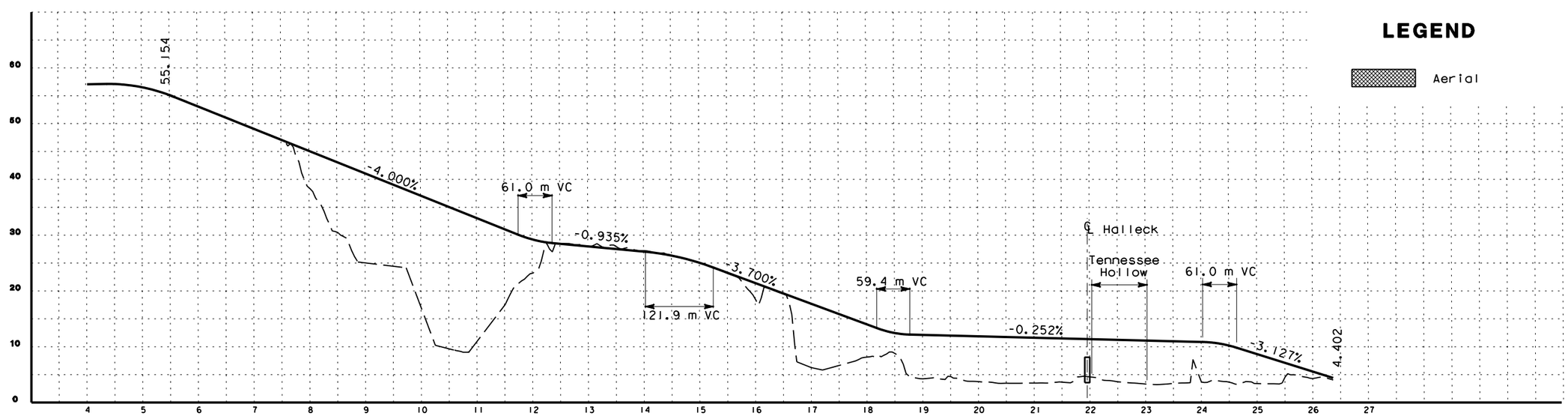

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LEGEND

Aerial

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arsham
8/5/2004
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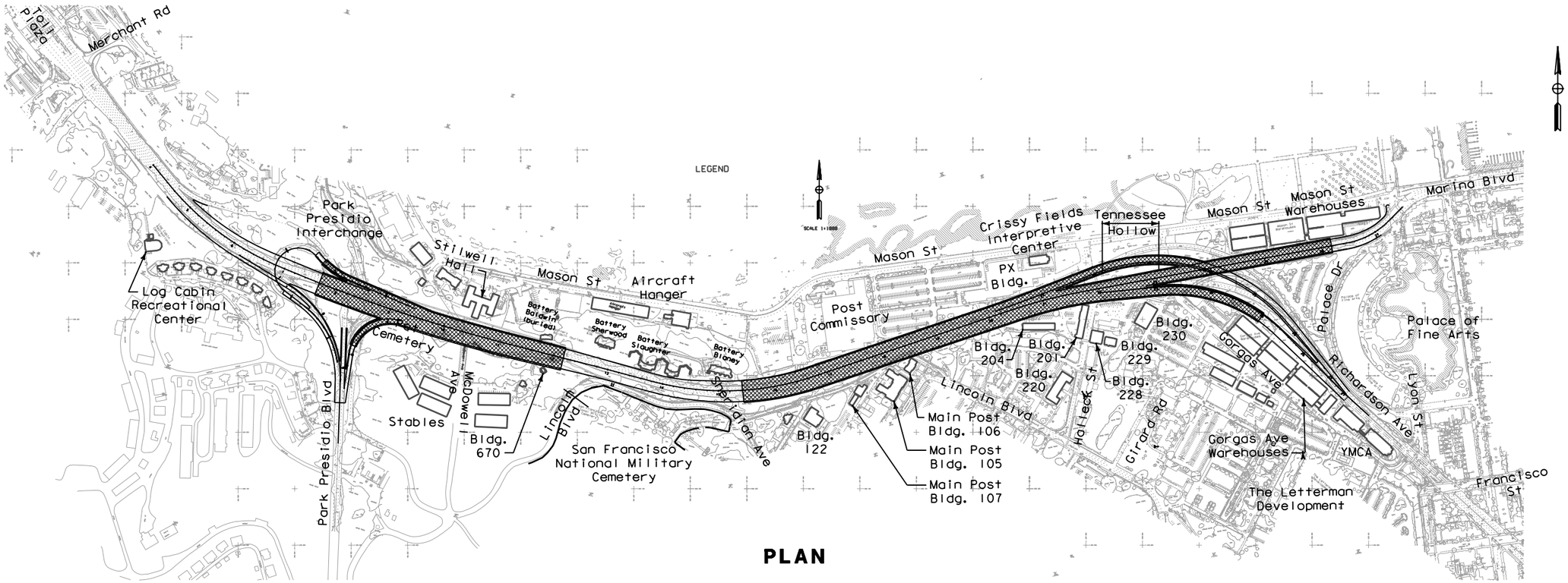

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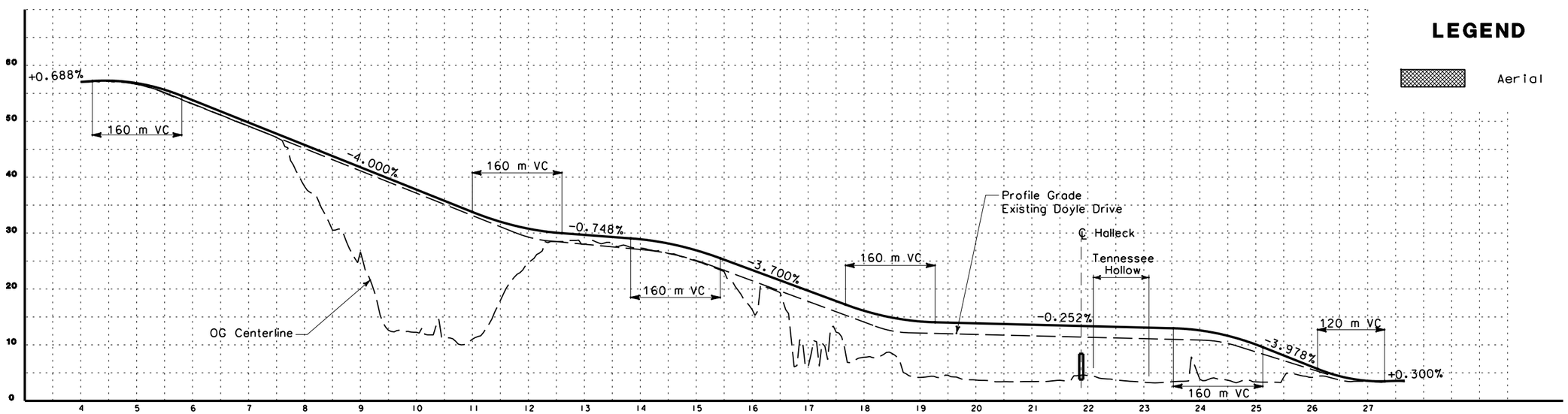

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Aerial

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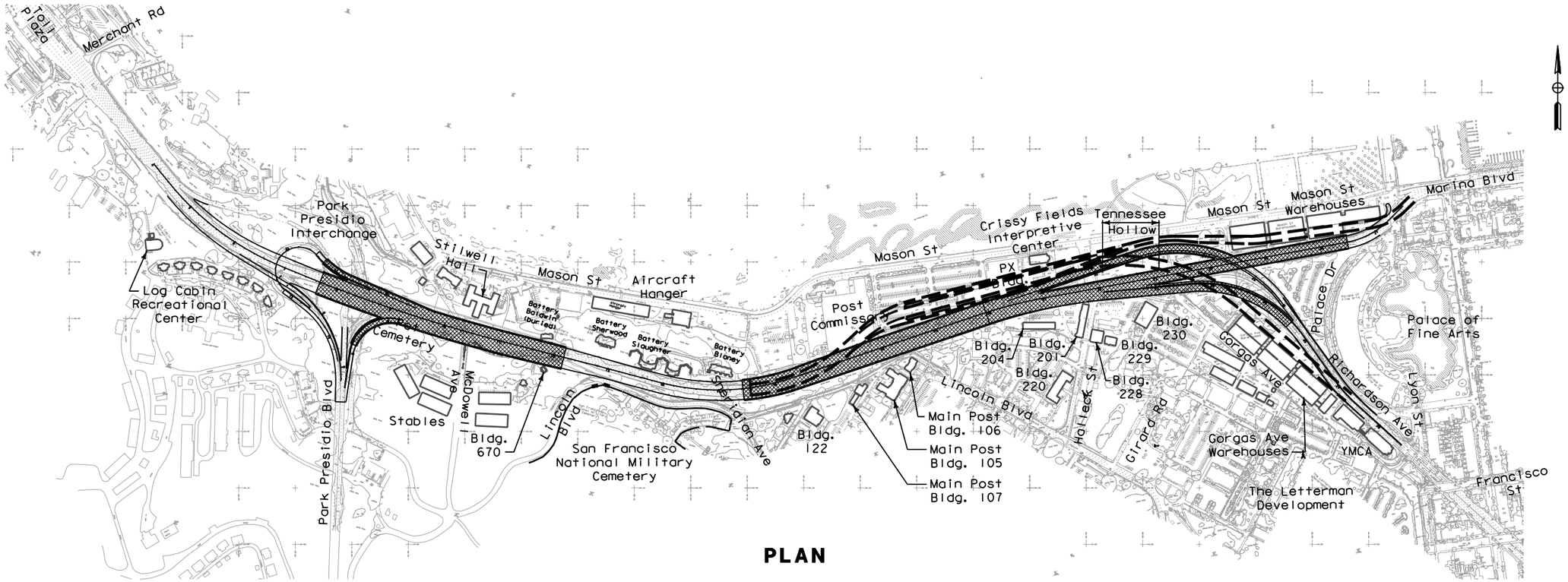

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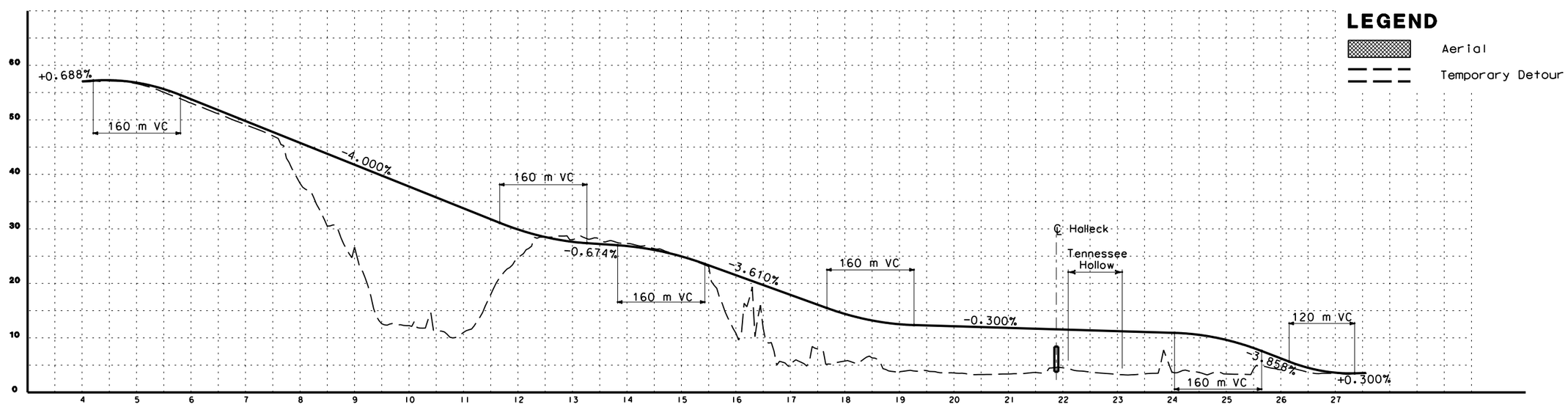

PROFILE

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arsham
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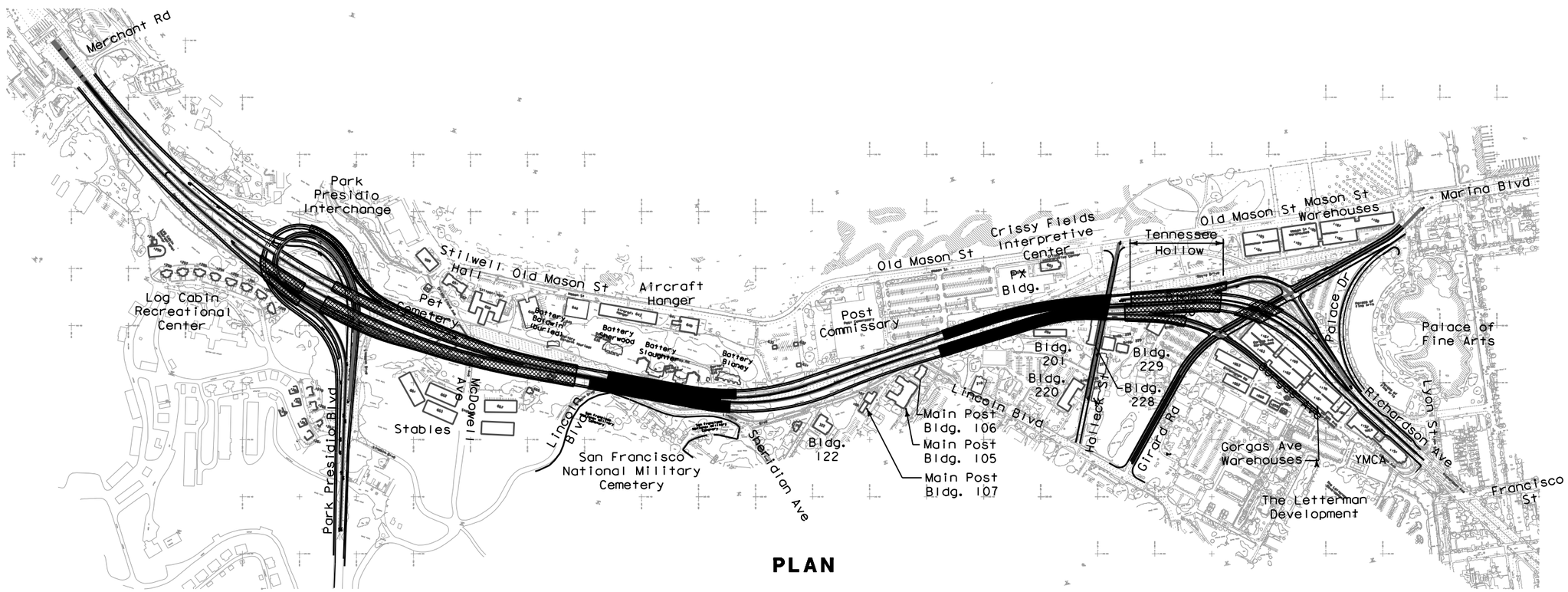
5. Presidio Parkway



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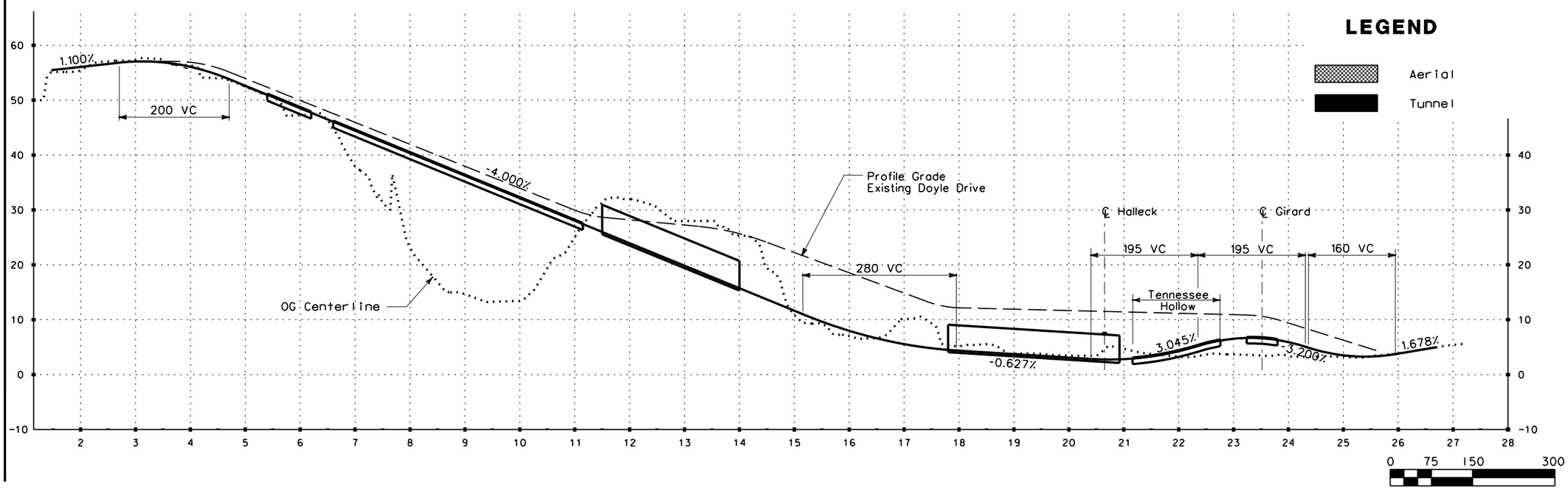

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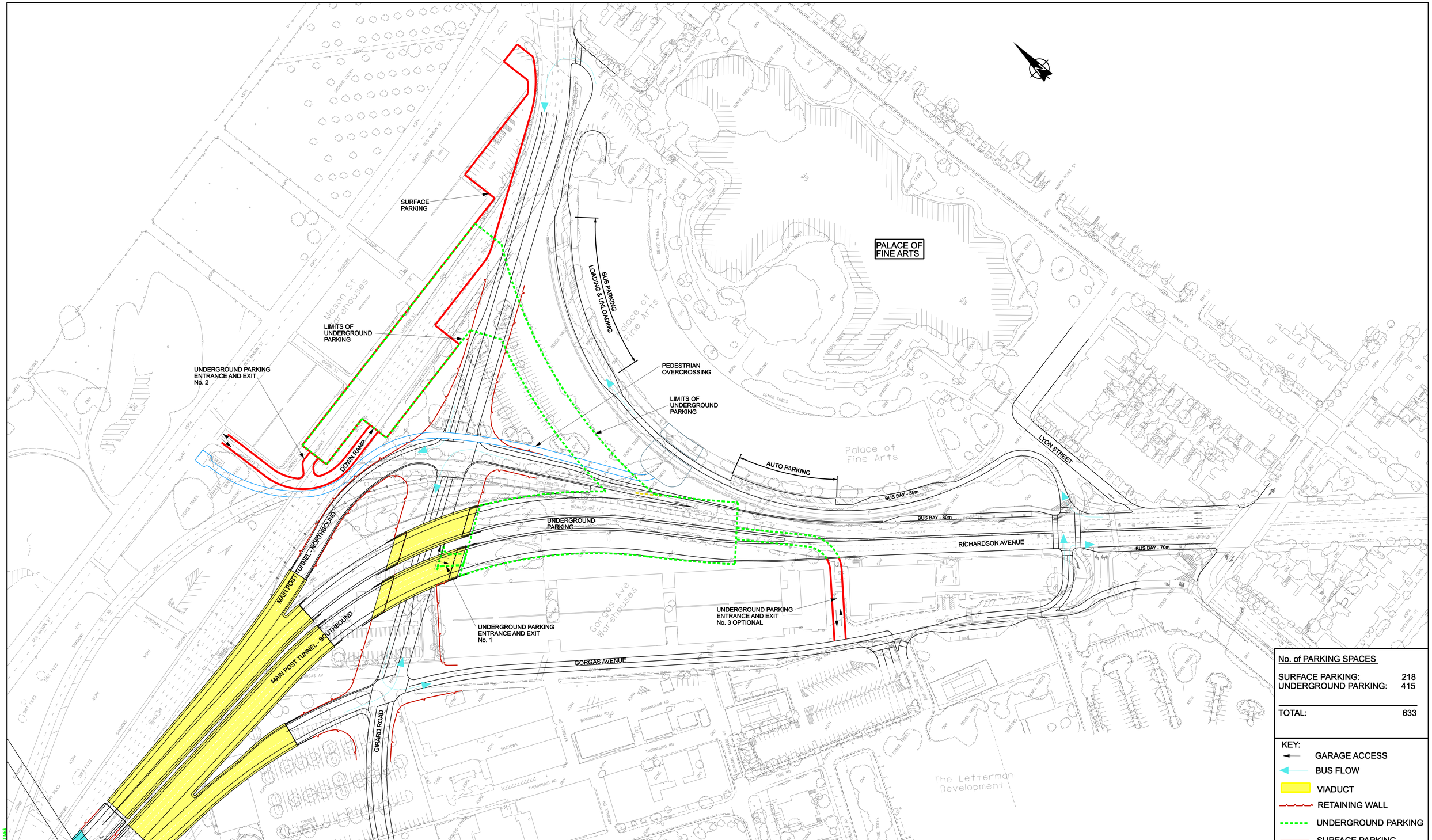

No. of PARKING SPACES

SURFACE PARKING:	218
UNDERGROUND PARKING:	415
TOTAL:	633

KEY:

- GARAGE ACCESS
- BUS FLOW
- VIADUCT
- RETAINING WALL
- UNDERGROUND PARKING
- SURFACE PARKING

NOTES.

1. AUTO PARKING ESTIMATE IS BASED ON THE GUIDLINE OF 32.5 m2 per VEHICLE.
2. VEHICLE CLEARANCE:

1m Structure

3m Min

Issue	Date	By	Chkd	Appd

Job Title: ALTERNATIVE 5 PRESIDIO PARKWAY

Drawing Title: LAYOUT PLAN DIAMOND OPTION EAST END PARKING & CIRCULATION

Scale: 1:1000

File Name: SFSK-052.DGN

Drawing Status: DRAFT

Job No	Drawing No	Issue
130168-00	SFSK-052	-

19/64 Ove Arup Partnership Ltd

...\sketches\sfsk-052.dgn 09/10/2004 05:39:58 PM

SURFACE PARKING

LIMITS OF UNDERGROUND PARKING

UNDERGROUND PARKING ENTRANCE AND EXIT No. 2

DOWN RAMP

BUS PARKING LOADING & UNLOADING

PEDESTRIAN OVERCROSSING

LIMITS OF UNDERGROUND PARKING

AUTO PARKING

PALACE OF FINE ARTS

LYON STREET

BUS BAY - 35m

BUS BAY - 80m

PARKING LANE

RICHARDSON AVENUE

BUS BAY - 80m

UNDERGROUND PARKING

MAIN POST TUNNEL - NORTHBOUND

MAIN POST TUNNEL - SOUTHBOUND

UNDERGROUND PARKING ENTRANCE AND EXIT No. 1

UNDERGROUND PARKING ENTRANCE AND EXIT No. 3 OPTIONAL

GORGAS AVENUE

GIRARD ROAD

No. of PARKING SPACES	
SURFACE PARKING:	218
UNDERGROUND PARKING:	415
TOTAL:	633

KEY:

- GARAGE ACCESS
- BUS FLOW
- VIADUCT
- RETAINING WALL
- UNDERGROUND PARKING
- SURFACE PARKING

NOTES.

1. AUTO PARKING ESTIMATE IS BASED ON THE GUIDLINE OF 32.5 m2 per VEHICLE.
2. VEHICLE CLEARANCE:

1m Structure

3m Min

Issue	Date	By	Chkd	Appd

Job Title

ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title

LAYOUT PLAN
CIRCLE DRIVE
EAST END
PARKING & CIRCULATION

Scale: 1:1000

File Name: SFSK-051.DGN

Drawing Status: DRAFT

Job No	Drawing No	Issue
130168-00	SFSK-051	-

19/84 Ove Arup Partnership Ltd

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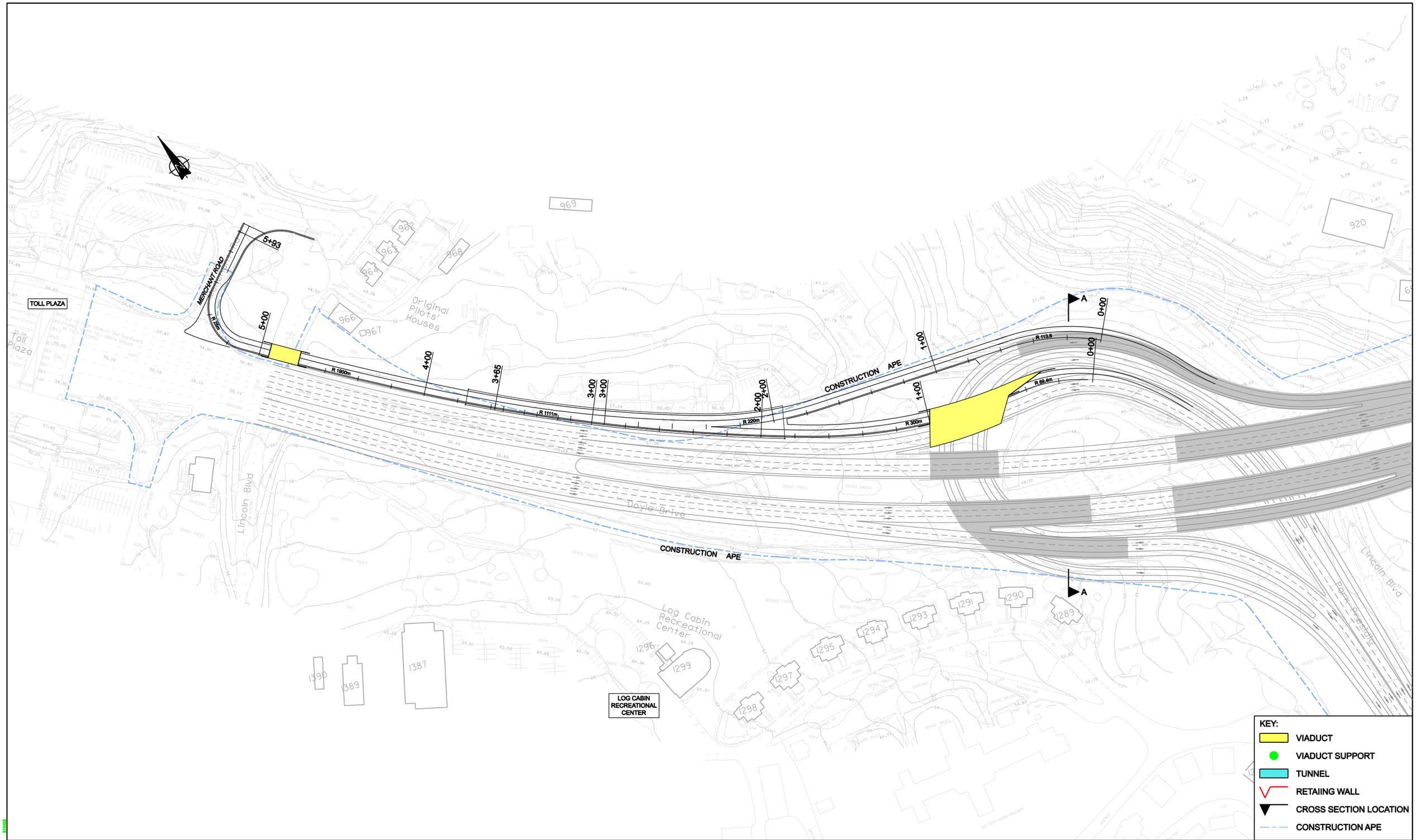


Issue	Date	By	Chkd	Appd

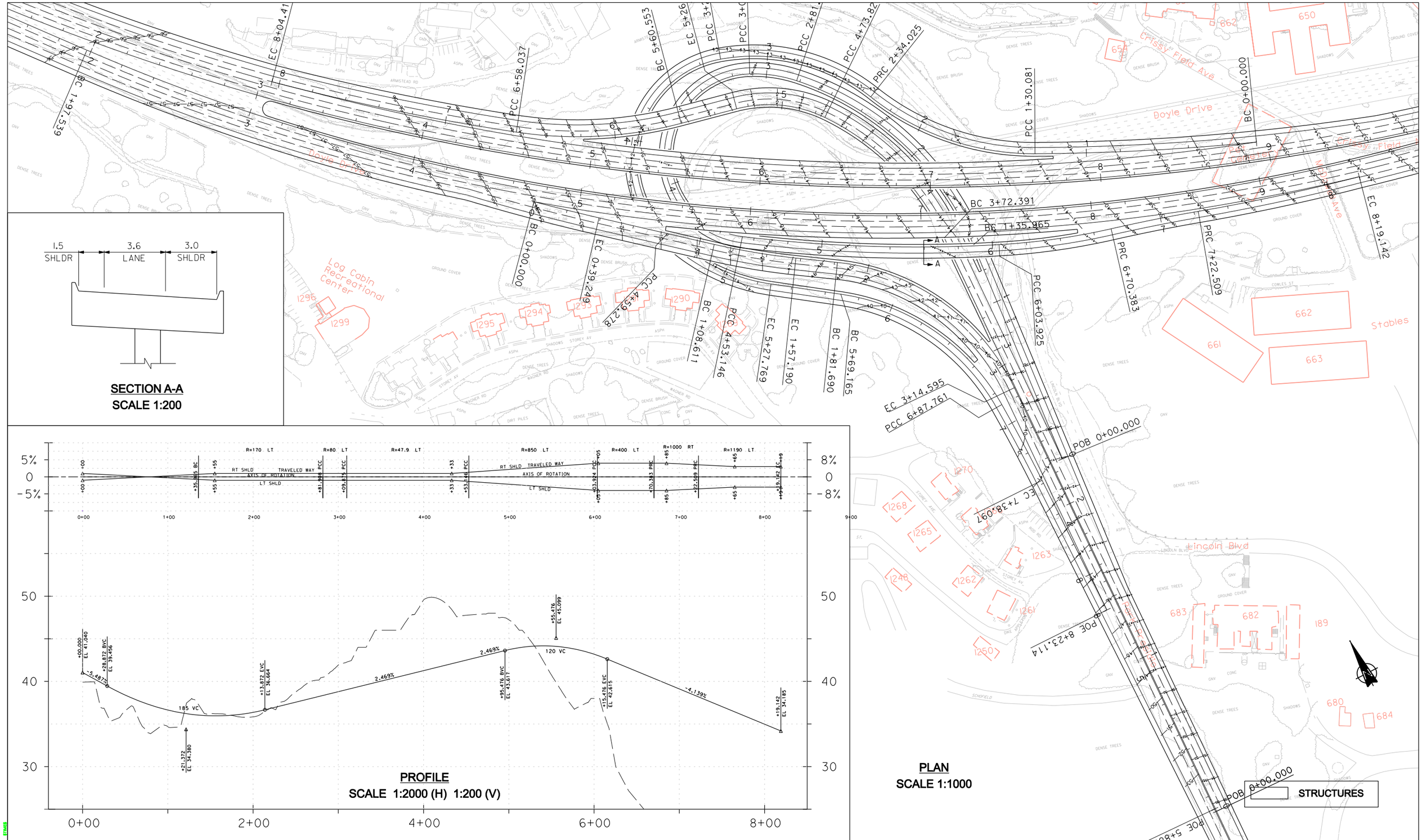
Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
LAYOUT PLAN
MERCHANT ROAD OFF-RAMP

Scale: 1:1000
File Name: SFSK-M01.DGN
Drawing Status: DRAFT

Job No	Drawing No	Issue
130168-00	SFSK-M01	-

19/84 Ove Arup Partnership Ltd



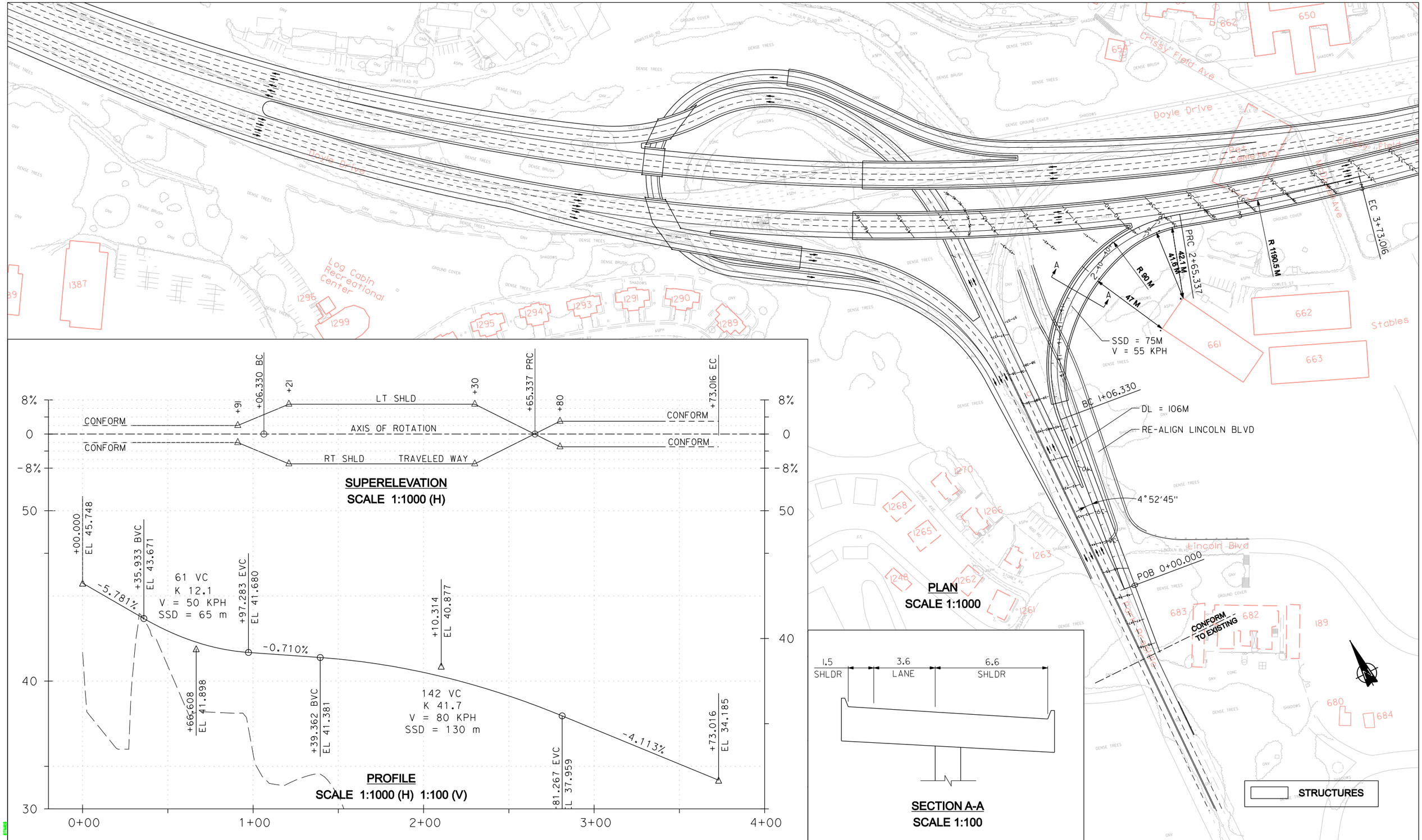
Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
OPTION 1: LOOP RAMP

Scale: AS SHOWN
File Name
Drawing Status
PRELIMINARY
Job No 130168-00
Drawing No SFSK-054A
Issue

19/84 Ove Arup Partnership Ltd



Issue	Date	By	Chkd	Appd

Job Title
ALTERNATIVE 5
PRESIDIO PARKWAY

Drawing Title
OPTION 2: HOOK RAMP (WITH GEOMETRIC REFINEMENTS)

Scale: AS SHOWN
File Name
Drawing Status: PERLIMINARY

Job No	Drawing No	Issue
130168-00	SFSK-054	

19/64 Ove Arup Partnership Ltd

APPENDIX B

PARK PRESIDIO ALTERNATIVE TUNNEL PORTAL MODEL RUN

08/10/04
14:01:18

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 95250 ***

Tunnel portal modeling, unit emissions

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =       VOLUME
   EMISSION RATE (G/S)        =      1.00000
   SOURCE HEIGHT (M)          =       2.0000
   INIT. LATERAL DIMEN (M)    =       1.2000
   INIT. VERTICAL DIMEN (M)   =       1.3000
   RECEPTOR HEIGHT (M)        =       1.5000
   URBAN/RURAL OPTION         =        URBAN


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	2975.	5	1.0	1.0	10000.0	2.00	11.94	8.60	NO
200.	936.6	5	1.0	1.0	10000.0	2.00	22.28	15.04	NO
300.	470.0	5	1.0	1.0	10000.0	2.00	32.26	20.85	NO
400.	289.4	5	1.0	1.0	10000.0	2.00	41.89	26.14	NO
500.	199.8	5	1.0	1.0	10000.0	2.00	51.21	31.01	NO
600.	148.3	5	1.0	1.0	10000.0	2.00	60.24	35.55	NO
700.	115.7	5	1.0	1.0	10000.0	2.00	69.00	39.79	NO
800.	93.62	5	1.0	1.0	10000.0	2.00	77.51	43.79	NO
900.	77.88	5	1.0	1.0	10000.0	2.00	85.79	47.58	NO
1000.	66.20	5	1.0	1.0	10000.0	2.00	93.84	51.18	NO
1100.	57.26	5	1.0	1.0	10000.0	2.00	101.68	54.61	NO
1200.	50.23	5	1.0	1.0	10000.0	2.00	109.33	57.90	NO
1300.	44.59	5	1.0	1.0	10000.0	2.00	116.80	61.06	NO
1400.	39.99	5	1.0	1.0	10000.0	2.00	124.09	64.10	NO
1500.	36.16	5	1.0	1.0	10000.0	2.00	131.22	67.04	NO
1600.	32.94	5	1.0	1.0	10000.0	2.00	138.19	69.88	NO
1700.	30.21	5	1.0	1.0	10000.0	2.00	145.01	72.63	NO
1800.	27.85	5	1.0	1.0	10000.0	2.00	151.70	75.30	NO
1900.	25.81	5	1.0	1.0	10000.0	2.00	158.25	77.89	NO
2000.	24.03	5	1.0	1.0	10000.0	2.00	164.67	80.41	NO
2100.	22.46	5	1.0	1.0	10000.0	2.00	170.98	82.87	NO
2200.	21.06	5	1.0	1.0	10000.0	2.00	177.17	85.27	NO
2300.	19.82	5	1.0	1.0	10000.0	2.00	183.25	87.61	NO
2400.	18.71	5	1.0	1.0	10000.0	2.00	189.22	89.89	NO
2500.	17.70	5	1.0	1.0	10000.0	2.00	195.09	92.13	NO
2600.	16.79	5	1.0	1.0	10000.0	2.00	200.87	94.32	NO
2700.	15.97	5	1.0	1.0	10000.0	2.00	206.55	96.47	NO
2800.	15.22	5	1.0	1.0	10000.0	2.00	212.14	98.57	NO
2900.	14.53	5	1.0	1.0	10000.0	2.00	217.65	100.64	NO
3000.	13.89	5	1.0	1.0	10000.0	2.00	223.08	102.67	NO
3500.	11.38	5	1.0	1.0	10000.0	2.00	249.07	112.30	NO
4000.	9.602	5	1.0	1.0	10000.0	2.00	273.39	121.23	NO
4500.	8.289	5	1.0	1.0	10000.0	2.00	296.31	129.58	NO
5000.	7.281	5	1.0	1.0	10000.0	2.00	318.01	137.45	NO

```
MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   100. M:
```

100.	2975.	5	1.0	1.0	10000.0	2.00	11.94	8.60	NO

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
   (M)   (UG/M**3)   STAB   (M/S)  (M/S)    (M)    HT (M)   Y (M)   Z (M)  DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------  -----
     2.   .0000        0      .0     .0      .0     .00     .00     .00
     4.   .6317E+05    5     1.0    1.0 10000.0    2.00    1.64    1.61    NO
     5.   .5793E+05    5     1.0    1.0 10000.0    2.00    1.75    1.69    NO
    10.   .4056E+05    5     1.0    1.0 10000.0    2.00    2.29    2.08    NO
    20.   .2407E+05    5     1.0    1.0 10000.0    2.00    3.38    2.84    NO
    50.   8453.        5     1.0    1.0 10000.0    2.00    6.62    5.07    NO
    80.   4237.        5     1.0    1.0 10000.0    2.00    9.83    7.21    NO
   100.   2975.        5     1.0    1.0 10000.0    2.00   11.94    8.60    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

     ****************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ****************************************

 CALCULATION       MAX CONC   DIST TO  TERRAIN
  PROCEDURE       (UG/M**3)   MAX (M)   HT (M)
--------------  -----------  -------  -------
SIMPLE TERRAIN    .6317E+05       4.       0.

****************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****************************************************
```