Technical Studies

State Route 68/Corral de Tierra Road Intersection Improvement Project

Monterey County, California
05-MON-68-PM 12.8/13.2
Project ID: 05-0000-0085 (05-0H8230)

Volume 3 of 4

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Technical Studies included in Vol. 3

Noise Impact Analysis (February 2013) and Addendum (June 2015)

Traffic Operations Technical Memorandum (February 2005) and Addendums (March 2011, October 2014, and June 2015)

Water Quality Assessment Report (February 2013) and Addendum (June 2015)

NOISE IMPACT ANALYSIS

SR-68/CORRAL DE TIERRA ROAD INTERSECTION IMPROVEMENT PROJECT
MONTEREY COUNTY, CALIFORNIA

05-MON-68 PM-12.8/13.2

EA: 05-0H8230

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I. EXECUTIVE SUMMARY

The Monterey County Department of Public Works, in cooperation with the California Department of Transportation (Caltrans) proposes to improve the intersection of State Route 68 (SR-68) and Corral de Tierra Road.

Caltrans District 5 will be the Lead Agency for California Environmental Quality Act (CEQA) compliance. The County of Monterey (County) Public Works Department will be a Responsible Agency under CEQA. Current funding for the project is local, and it is not anticipated that federal funds will be utilized.

FHWA regulation 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I, Type II, or Type III projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or the vertical alignment, or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. A Type III project is a project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis. As the proposed project does not significantly alter the horizontal or vertical alignment of SR-68 or Corral de Tierra Road and does not increase the capacity, the proposed project is considered to be a Type III project. Type III projects are not expected to substantially alter the long-term traffic noise levels in the project area. Therefore, no long-term abatement measures are required.

Construction of the proposed project would result in potentially high short-term, intermittent noise levels reaching 91 dBA L_{max} at existing residences immediately adjacent to the proposed project. Limiting construction activities to the hours between 7:00 a.m. and 6:00 p.m. on weekdays would reduce the exposure to construction noise impacts.

II. NOISE IMPACT TECHNICAL REPORT

A. INTRODUCTION

The SR-68/Corral de Tierra Road Intersection Improvement project (proposed project) addresses operational improvements at the SR-68/Corral de Tierra Road intersection, located in the unincorporated area of Monterey County approximately 13 miles (mi) east of the City of Monterey and approximately 9 mi west of the City of Salinas. Figure 1 shows the regional location of the project and the project vicinity. The operational improvements will widen the SR-68/Corral de Tierra Road intersection to accommodate the construction of a second left-turn lane from westbound SR-68 to southbound Corral de Tierra Road and the construction of a second receiving lane on Corral de Tierra Road.

Caltrans District 5 will be the Lead Agency for California Environmental Quality Act (CEQA) compliance. The County of Monterey (County) Public Works Department will be a Responsible Agency under CEQA. Current funding for the project is State and local, and it is not anticipated that federal funds will be utilized.

B. PROJECT DESCRIPTION

One Build Alternative (as described below) and the No-Build Alternative are being considered for improving the SR-68/Corral de Tierra Road intersection.

No-Build Alternative

The No-Build Alternative assumes that no new improvements would be constructed, other than projects already approved in the area. Under the No-Build Alternative, the roadway's operational conditions will remain at or above the standard of Level of Service D (refer to Traffic Operations Technical Memorandum). Projections indicated that the unimproved intersection would operate at a Level of Service of E in the a.m. peak hour and a Level of Service of F in the p.m. peak hour by 2024, and therefore, the No-Build Alternative fails to meet the purpose and need of this project.

Build Alternative: Operational Improvements

The proposed project would widen the SR-68/Corral de Tierra intersection to the north of the existing alignment to accommodate the construction of a second (additional) left turn lane from westbound SR-68 onto southbound Corral de Tierra Road. Both of the left turn lanes (in the median of State Route 68) would have sufficient length to accommodate deceleration from 53 miles per hour. An additional receiving lane would also be constructed on southbound Corral de Tierra Road. The paved shoulders of Corral de Tierra Road within the project area would be widened to 8 feet (ft) to better accommodate pedestrians and facilitate the future addition of Class II bicycle lanes to Corral de Tierra Road.

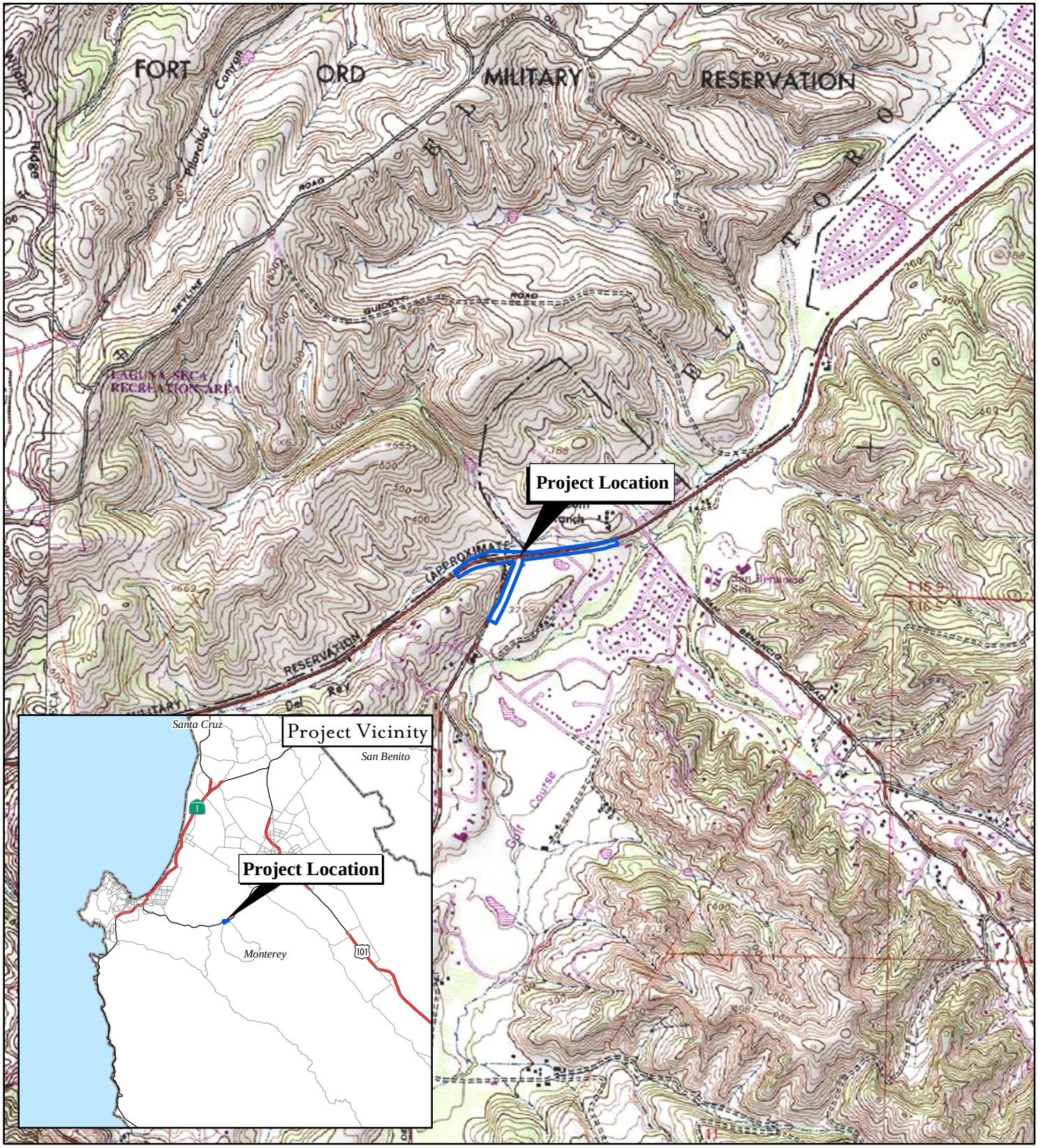

FIGURE 1

0 1,000 2,000 Feet

0 300 600 Meters

SR 68 / Corral de Tierra Road
Intersection Improvement Project
Project Location Map

SOURCE: USGS 7.5' QUAD, SPRECKELS, CA (1984); Wood Rodgers (2006)

I:\WRS0605\GIS\Fig1.mxd (4/18/2007)

About 520 ft of Steel Crib retaining wall (or equivalent) would be constructed west of Corral de Tierra Road along the north embankment of SR-68. The retaining wall would lie below the existing road grade and therefore would not be visible from SR-68. The retaining wall would minimize the footprint of the embankment needed to accommodate the widened road section.

A left turn lane would also be constructed from westbound SR-68 into the Corral de Tierra Country Club driveway. The Corral de Tierra County Club driveway is located east of Corral de Tierra Road on the south side of SR-68.

No provisions for left turns to or from the residential driveway on the north side of SR-68 would be made. As part of the proposed project, a painted median island would be created in front of the residential driveway restricting drivers to right-in, right-out access. Drivers needing to make left-in, left-out movements would need to make a U-turn at the traffic signal at either San Benancio Road or at Corral de Tierra Road. U-turn movements at these signalized intersections are both legal and safe.

Construction of the retaining wall would require removal of any landscape vegetation present (including one young oak tree) along the north embankment of SR-68. The landscape vegetation is not visible to motorist traveling along SR-68 and does not provide any habitat value. As part of the proposed project native vegetation would be planted within the project limits. Additionally, the proposed project would relocate and replace the existing guardrails along the north side of SR-68 and west of the intersection of Corral de Tierra Road. If new or relocated guardrails are erected with metal posts, the posts would be darkened to reduce glare and reflectivity.

All of the work would be constructed within existing State and County rights-of-way, except for a small area of new State right-of-way that would be acquired on the north side of SR-68 just east of the intersection to accommodate relocation of a bus stop, widening and grading. Also, a temporary construction easements would be acquired along the east side of Corral de Tierra Road to accommodate grading near the edge of the County right-of-way (refer to Figure 1-3: Build Alternative Design Plan). Temporary staging areas for construction equipment and materials would be located in those areas of the existing State and County rights-of-way that are not designated as environmentally sensitive areas. Construction is expected to be completed in a single season.

C. FUNDAMENTALS OF TRAFFIC NOISE

The following is a brief discussion of fundamental traffic noise concepts. For a detailed discussion, refer to the Caltrans Technical Noise Supplement (California Department of Transportation 1998), which is available on the Caltrans Web site at www.dot.ca.gov/hq/env/noise.

Sound, Noise, and Acoustics

Sound is a disturbance created by a moving or vibrating source in a gaseous or liquid medium or the elastic stage of a solid and is capable of being detected by the hearing organs. Sound may be thought of as the mechanical energy of a vibrating object transmitted by pressure waves through a medium to a hearing organ, such as a human ear. For traffic sound, the medium of concern is air. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired. Sound is actually a process that consists of three components: the sound source, the sound path, and the sound receiver. All three

components must be present for sound to exist. Without a source to produce sound, there is no sound. Likewise, without a medium to transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound.

Frequency and Hertz

A continuous sound can be described by its frequency (pitch) and its amplitude (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch, like the low notes on a piano, whereas high-frequency sounds are high in pitch, like the high notes on a piano. Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz). A frequency of 250 cycles per second is referred to as 250 Hz. High frequencies are sometimes more conveniently expressed in units of kilo-Hertz (kHz), or thousands of Hertz. The extreme range of frequencies that can be heard by the healthiest human ear spans 16–20 Hz on the low end to about 20,000 Hz (or 20 kHz) on the high end.

Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases and decreases with increasing and decreasing amplitude. Sound pressure amplitude is measured in units of micro-Newton per square meter (N/m^2), also called micro-Pascal (µPa). One µPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million µPa, or 10 million times the pressure of the weakest audible sound (20 µPa). Because expressing sound levels in terms of µPa would be cumbersome, sound pressure level (SPL) is used instead to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called bels, named after Alexander Graham Bell. To provide a finer resolution, a bel is subdivided into 10 decibels, abbreviated dB.

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted by ordinary arithmetic means. For example, if one automobile produces an SPL of 70 dB as it passes an observer, two cars passing simultaneously would not produce 140 dB; they would, in fact, combine to produce 73 dB. When two sounds of equal SPL are combined, they will produce a combined SPL 3 dB greater than the original individual SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sound levels differ by 10 dB or more, the combined SPL is equal to the higher SPL; in other words, the lower sound level does not increase the higher sound level.

A-Weighted Decibels

SPL alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies but also in the way it perceives the SPL in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, and it perceives a sound within that range as being more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of SPL adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency dependent.

The A-scale weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-scale, C-scale, D-scale), but these scales are rarely, if ever, used in conjunction with highway traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted dBs, referred to as dBAs. In environmental noise studies, A-weighted SPLs are commonly referred to as noise levels. Table A shows typical A-weighted noise levels.

Table A: Typical Noise Levels

Common Outdoor Activities	Noise Level dBA	Common Indoor Activities
	—110—	Rock Band
Jet Flyover at 1,000 ft	—100—	
Gas Lawn Mower at 3 ft	—90—	
Diesel Truck at 50 ft, at 50 mph	—80—	Food Blender at 3 ft Garbage Disposal at 3 ft
Noisy Urban Area, Daytime Gas Lawn Mower, 100 ft	—70—	Vacuum Cleaner at 10 ft
Heavy Traffic at 300 ft	—60—	Normal Speech at 3 ft
Quiet Urban, Daytime	—50—	Large Business Office Dishwasher Next Room
Quiet Urban, Nighttime	—40—	Theater, Large Conference
Quiet Suburban, Nighttime	—30—	Room (Background) Library
Quiet Rural Nighttime	—20—	Bedroom at Night, Concert Hall (Background)
	—10—	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, October 1998.

Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dB when exposed to steady, single-frequency signals in the midfrequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dB in

normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dB. A change of 5 dB is readily perceptible, and a change of 10 dB is perceived as being twice or half as loud. As discussed above, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

Noise Descriptors

Noise in the daily environment fluctuates over time. Some of the fluctuations are minor; some are substantial. Some noise levels occur in regular patterns; others are random. Some noise levels fluctuate rapidly, others slowly. Some noise levels vary widely; others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following is a list of the noise descriptors most commonly used in traffic noise analysis:

- Equivalent Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. L_{eq} is, in effect, the steady-state sound level that, in a stated period, would contain the same acoustical energy as the time-varying sound that actually occurs during the same period. The one-hour A-weighted equivalent sound level, $L_{eq}(h)$, is the energy average of the A-weighted sound levels occurring during a one-hour period and is the basis for the NAC used by Caltrans and the Federal Highway Administration (FHWA).
- Percentile-Exceeded Sound Level (L_x): L_x represents the sound level exceeded for a given percentage of a specified period. For example, L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time.
- Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period.
- Community Noise Equivalent Level (CNEL): The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.

Sound Propagation

When sound propagates over a distance, it changes in both level and frequency content. The manner in which noise reduces with distance depends on the following factors.

Geometric Spreading. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates (or drops off) at a rate of 6 dBA for each doubling of distance. Highway noise is not a single, stationary point source of sound. The movement of the vehicles on a highway makes the source of the sound appear to emanate from a line (i.e., a line source) rather than a point. This line source results in cylindrical spreading rather than the spherical spreading that results from a point source. The change in sound level from a line source is 3 dBA per doubling of distance from the sound source to the receptor.

Ground Absorption. Most often, the noise path between the highway and the observer is very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the

attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is done for simplification only; for distances of less than 60 meters (200 ft), prediction results based on this scheme are sufficiently accurate. For acoustically hard sites (i.e., those sites with a reflective surface, such as a parking lot or a smooth body of water, between the source and the receiver), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, between the source and the receiver), an excess ground attenuation value of 1.5 dBA per doubling of distance is normally assumed. When added to the geometric spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dBA per doubling of distance for a line source and 7.5 dBA per doubling of distance for a point source.

Atmospheric Effects. Research by Caltrans and others has shown that atmospheric conditions can have a substantial effect on noise levels within 60 meters (200 ft) of a highway. Wind has been shown to be the most important meteorological factor within approximately 150 meters (500 ft) of the source, whereas vertical air temperature gradients are more important for greater distances. Other factors such as air temperature, humidity, and turbulence also have substantial effects. Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lower noise levels. Increased sound levels can also occur as a result of temperature inversion (i.e., increasing temperature with elevation).

Shielding by Natural and Human-Made Features. A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by this shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dBA of noise reduction.

D. FEDERAL AND STATE REGULATIONS, STANDARDS, AND POLICIES

FHWA Regulations

23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I, Type II, or Type III projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or the vertical alignment, or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. A Type III project is a project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis. As the proposed project does not significantly alter the horizontal or vertical alignment of SR-68 or Corral de Tierra Road and does not increase the capacity, the proposed project is considered to be a Type III project.

The following is a brief discussion of applicable federal and state regulations, standards, and policies.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) is a federal law that establishes environmental policy for the nation, provides an interdisciplinary framework for federal agencies to prevent environmental damage, and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account. Under NEPA, impacts, avoidance minimization, and mitigation measures to mitigate adverse impacts must be identified, including the identification of impacts for which no mitigation or only partial mitigation is available. The FHWA regulations discussed above. 23 CFR 722, constitute the federal noise standard. Projects complying with this standard are also in compliance with the requirements of NEPA.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) is the foundation of environmental law and policy in California. The main objectives of CEQA are to disclose to decision makers and the public the significant environmental effects of proposed activities and to identify ways to avoid or reduce those effects by requiring implementation of feasible alternatives or mitigation measures. Under CEQA, a substantial noise increase may result in a significant adverse environmental effect; if so, the noise increase must be mitigated or identified as a noise impact for which it is likely that only partial (or no) mitigation measures are available. Specific economic, social, environmental, legal, and technological conditions may make noise mitigation measures infeasible.

California Streets and Highways Code, Section 216

Section 216 of the California Streets and Highways Code relates to the noise level produced by the traffic on, or by the construction of, a state freeway measured in the classrooms, libraries, multipurpose rooms, and spaces used for pupil personnel services of a public or private elementary or secondary school. The Code states that if the interior noise level produced by freeway traffic or the construction of a freeway exceeds 52 dBA L_{eq}, Caltrans shall undertake a noise abatement program in any such classroom, library, multipurpose room, or space used for pupil personnel services to reduce the freeway traffic noise level therein to 52 dBA L_{eq} or less by measures including, but not limited to, installing acoustical materials, eliminating windows, installing air conditioning, or constructing sound baffle structures.

County of Monterey Health and Safety Noise Control Ordinance

Chapter 10.60.030 prohibits the operation of “any machine, mechanism, device, or contrivance which produces a noise level exceeding 85 dBA [A-weighted decibels], measured 50 ft” from the noise source. This ordinance is only applicable to noise generated within 2,500 ft of any Occupied dwelling unit. For the purposes of this analysis, this standard is interpreted as applying to noise generated by construction equipment and activities

E. FUTURE NOISE ENVIRONMENT, IMPACTS, AND CONSIDERED ABATEMENT/MITIGATION

Traffic Noise Impact Assessment

As discussed in Section B above, the proposed project will not significantly alter the vertical or horizontal alignment, or increase the capacity, of SR-68 or Corral de Tierra Road. Therefore, the proposed project is not a Type I or Type II project. Non-Type I or II projects are not expected to substantially alter the long-term traffic noise levels in the project area.

Abatement Measures

As the proposed project will not alter future traffic noise levels in the area, no abatement measures, such as sound barriers, are required.

F. CONSTRUCTION NOISE

Two types of short-term noise impacts would occur during construction of the project. The first type would be from construction crew commutes and the transport of construction equipment and materials to the project site would incrementally raise noise levels on access roads leading to the site. The pieces of heavy equipment for grading and construction activities will be moved on site, will remain for the duration of each construction phase, and will not add to the daily traffic volume in the project vicinity. A high single-event noise exposure potential at a maximum level of 87 dBA L_{max} from trucks passing at 50 ft will exist. However, the projected construction traffic will be small when compared to existing traffic volumes on SR-68, Corral de Tierra Road, and other affected streets, and its associated long-term noise level change will not be perceptible. Therefore, short-term construction-related worker commutes and equipment transport noise impacts would not be substantial.

The second type of short-term noise impact is related to noise generated during excavation, grading, and road construction. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated and, therefore, the noise levels along the project alignment as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table B lists typical construction equipment noise levels (L_{max}) recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

Typical noise levels at 50 ft from an active construction area range up to 91 dBA L_{max} during the noisiest construction phases. The site preparation phase, which includes grading and paving, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backhoes, bulldozers, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three or four minutes at lower power settings.

Construction of the proposed project is expected to require the use of dozers, scrapers, backhoes, graders, water trucks, and dump trucks. Noise associated with the use of construction equipment is estimated between 79 and 89 dBA L_{max} at a distance of 50 ft from the active construction area for the grading phase. As seen in Table B, the maximum noise level generated by each scraper is assumed to be approximately 87 dBA L_{max} at 50 ft from the scraper in operation. Each dozer would also generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks and dump trucks is approximately 86 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Each piece of construction equipment operates as an individual point source. The worst case composite noise level at the nearest noise-

sensitive receptor during this phase of construction would be 91 dBA L_{max} (at a distance of 50 ft) from an active construction area).

The closest residences are located within 50 ft of the project construction areas. Therefore, these receptor locations may be subject to short term noise reaching 91 dBA L_{max} or higher generated by construction activities along the project alignment. Construction noise is regulated by Caltrans' Standard Specifications in Section 14-8.02, "Noise Control." The noise levels from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBA at a distance of 50 ft. In addition, the Contractor shall equip all internal combustion engines with the manufacturer-recommended muffler and shall not operate any internal combustion engine on the job site without the appropriate muffler.

Abatement Measures

Initial construction has the potential to create noise impacts at the homes located along the project alignment. The following measures are recommended to reduce these impacts to the extent feasible.

- All construction equipment must conform to the provisions of Caltrans Standard Specifications, Section 14-8.02, "Noise Control." This section requires the contractor to comply with all local ordinances (i.e., County of Monterey) that apply to any work as part of the contract. The County of Monterey does not currently have restrictions on construction hours, therefore, the Caltrans standards of 86 dBA at a distance of 50 ft between the hours of 9:00 p.m. and 6:00 a.m. on weekdays will be used.
- Portable equipment shall be located as far as possible from the noise sensitive locations as is feasible.
- Construction vehicle staging areas and equipment maintenance areas shall be located as far as possible from sensitive receptors.
- All equipment shall have sound control devices no less effective than those provided on the original equipment. No equipment shall have an unmuffled exhaust.
- As directed by Caltrans, the contractor shall implement appropriate additional noise abatement measures including, but not limited to, shutting off idling equipment, rescheduling construction activities, notifying adjacent residents in advance of construction work, and utilizing construction equipment with tires, not tracks.

Table B: Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers, 12,000 to 18,000 ft-lb/blow	81–96	93
Rock Drills	83–99	96
Jackhammers	75–85	82
Pneumatic Tools	78–88	85
Pumps	74–84	80
Dozers	77–90	85
Scrapers	83–91	87
Haul Trucks	83–94	88
Cranes	79–86	82
Portable Generators	71–87	80
Rollers	75–82	80
Tractors	77–82	80
Front-End Loaders	77–90	86
Hydraulic Backhoe	81–90	86
Hydraulic Excavators	81–90	86
Graders	79–89	86
Air Compressors	76–89	86
Trucks	81–87	86

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman 1987.

G. REFERENCES

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APPENDIX A

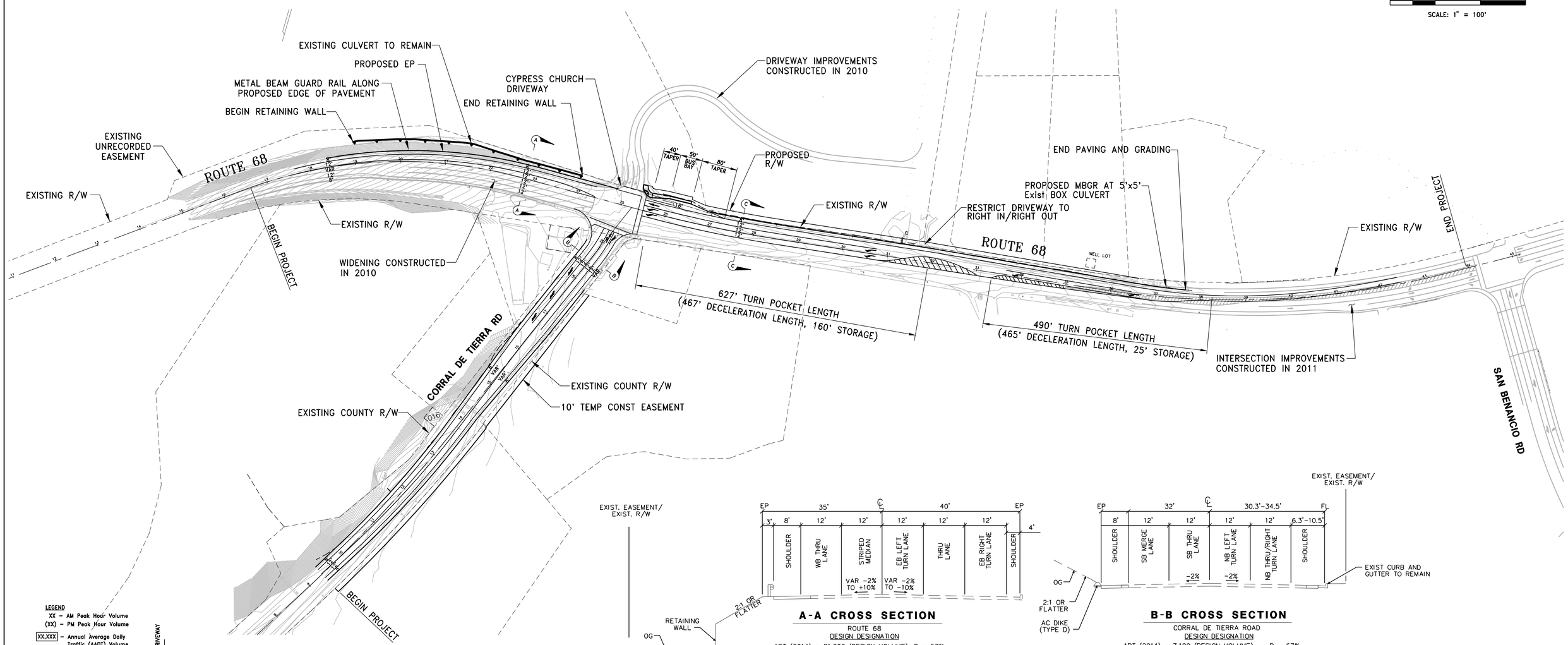
CONCEPT PLANS

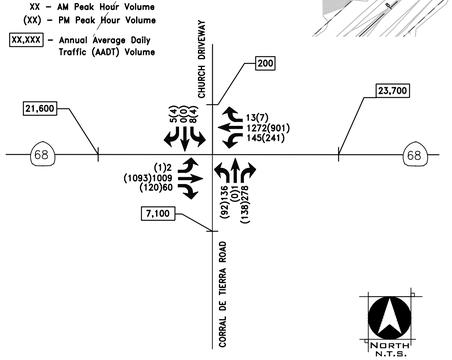
ROUTE 68/CORRAL DE TIERRA ROAD INTERSECTION IMPROVEMENTS

BUILD ALTERNATIVE

COUNTY OF MONTEREY CALIFORNIA

JANUARY, 2013





*NOTE: This volume scenario does not include traffic volumes from the proposed Shopping Center on the south-east quadrant of the project intersection.

TRAFFIC DESIGN VOLUME YEAR 2014

A-A CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

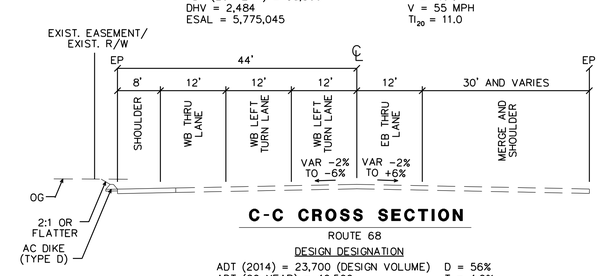
ADT (2014) = 21,600 (DESIGN VOLUME) D = 57%
ADT (20 YEAR) = 38,500 T = 4.0%
DHV = 2,484 V = 55 MPH
ESAL = 5,775,045 TI_{20} = 11.0

B-B CROSS SECTION

CORRAL DE TIERRA ROAD

DESIGN DESIGNATION

ADT (2014) = 7,100 (DESIGN VOLUME) D = 67%
ADT (20 YEAR) = 8,900 T = 2.0%
DHV = 619 V = 55 MPH
ESAL = 735,017 TI_{20} = 8.5



C-C CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

ADT (2014) = 23,700 (DESIGN VOLUME) D = 56%
ADT (20 YEAR) = 40,500 T = 4.0%
DHV = 2,725 V = 55 MPH
ESAL = 6,060,788 TI_{20} = 11.0

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NOISE IMPACT ANALYSIS

ADDENDUM

STATE ROUTE 68/CORRAL DE TIERRA INTERSECTION IMPROVEMENT PROJECT

Monterey County, California

05-Mon-68 PM 12.8/13.2

EA 05-0H8230

JUNE 2015

PURPOSE OF THE NOISE IMPACT ANALYSIS ADDENDUM

After the circulation of the Draft Initial Study with Proposed Mitigated Negative Declaration (Draft IS/MND) and in response to public comments, the County of Monterey and the California Department of Transportation (Caltrans) adopted project design modifications. The project design modifications included land outside of the previously analyzed project study area as identified in the Noise Impact Analysis, February 2013. This Addendum was prepared to address the expanded project study area. The expanded project study area, Figure 1, is provided at the end of this Addendum.

CHANGE IN PROJECT DESIGN

The project design modifications are shown in yellow in the Build Alternative Design Plan provided at the end of this Addendum and described in detail below.

CHANGE IN PROJECT DESCRIPTION

The project design modifications included the following components:

- The shoulder widening of Corral de Tierra Road in the southbound direction would be reduced from 8 feet to 6 feet.
- The driveway that serves the five homes on the north side of State Route 68 would be realigned so that access to these homes would be shared with the Cypress Community Church's driveway.
- A 110 foot-long merge lane on State Route 68 for vehicles turning left out of The Villas driveway would be provided.
- The existing gutter on Corral de Tierra Road would be replaced with a flatter gutter.

The project design modifications resulted in the following changes to the Noise Impact Analysis. Deletions are shown with strikethrough (~~strikethrough~~) and additions are shown with underline (<u>underline</u>).

Paragraph one, third sentence in the Build Alternative: Operational Improvements subsection under Section B., Project Description, in the Noise Impact Analysis has been revised as follows:

> ~~*The paved shoulders of Corral de Tierra Road within the project area would be widened to 8 feet (ft) to better accommodate pedestrians and facilitate the future addition of Class II bicycle lanes to Corral de Tierra Road.*~~ *The shoulder of Corral de Tierra Road in the northbound direction would be widened to at least 8 feet within the project area (except at one point where existing curb, sidewalk and utilities preclude widening). The shoulder of Corral de Tierra Road in the southbound direction would be widened to at least 6 feet within the project area.*

Paragraph two, first sentence in the Build Alternative: Operational Improvements subsection under Section B., Project Description, in the Noise Impact Analysis has been revised as follows:

> *About 520 ft of ~~S~~steel bin~~Crib~~ retaining wall (or equivalent) would be constructed west of Corral de Tierra Road along the north embankment of SR-68.*

Paragraph three, in the Build Alternative: Operational Improvements subsection under Section B., Project Description, in the Noise Impact Analysis has been revised as follows:

> ~~*A left-turn lane would also be constructed from westbound SR-68 into the Corral de Tierra Country Club driveway. The Corral de Tierra County Club driveway is located east of Corral de Tierra Road on the south side of SR-68.*~~ *A left-turn lane to the driveway of The Villas on the south side of SR-68 would be constructed. A 110-foot-long merge lane would be provided for vehicles that turn left onto SR-68 from The Villas driveway heading westbound on SR-68.*

Paragraph four, in the Build Alternative: Operational Improvements subsection under Section B., Project Description, in the Noise Impact Analysis has been revised as follows:

> ~~*No provisions for left turns to or from the residential driveway on the north side of SR-68 would be made. As part of the proposed project, a painted median island would be created in front of the residential driveway restricting drivers to right-in, right-out access. Drivers needing to make left-in, left-out movements would need to make a U-turn at the traffic signal at either San Benancio Road or at Corral de*~~

~~Tierra Road. U-turn movements at these signalized intersections are both legal and safe.~~ On the north side of SR-68 the there is an existing private driveway that serves five homes. This driveway would be removed as part of the proposed project. The private road that leads to the homes would be realigned to connect to the driveway that currently serves the Cypress Community Church. With implementation of the proposed project, vehicles would share a portion of the church's driveway and the traffic signal at Corral de Tierra Road/SR-68 to access the homes.

Paragraph six, second sentence in the Build Alternative: Operational Improvements subsection under Section B., Project Description, in the Noise Impact Analysis has been revised as follows:

Also, ~~a~~ temporary construction easements would be acquired along the east side of Corral de Tierra Road to accommodate grading near the edge of the County right-of-way and on the north side of SR-68 for construction of the residential driveway realignment(refer to Figure 1-3: Build Alternative Design Plan).

The following sentence has been added following sentence three in paragraph six in the Build Alternative: Operational Improvements subsection under Section B., Project Description, in the Noise Impact Analysis:

The proposed project would also replace the existing drainage gutter on Corral de Tierra Road with a flatter gutter.

REGULATIONS, STANDARDS, AND POLICIES

The expanded project study area is located adjacent to the previously identified project study area. Therefore the same regulations, standards, and policies applicable to the previously identified project study area are also applicable to the expanded project study area. The regulations, standards, and policies as described in the Noise Impact Analysis remains the same.

ENVIRONMENTAL IMPACTS

As stated in the Noise Impact Analysis, the proposed project will not significantly alter the vertical or horizontal alignment, or increase the capacity, of SR-68 or Corral de Tierra Road. Therefore, the proposed project is not a Type I or Type II project. Non-Type I or II projects are not expected to substantially alter the long-term traffic noise levels in the project area. As also concluded in the Noise Impact Analysis, the worst case composite noise level at the nearest noise-sensitive receptor would be 91 dBA Lmax (at a distance of 50 feet) from an active construction area. Implementation of the project design modifications would not alter the conclusions presented in the Noise Analysis Report.

ABATEMENT AND MITIGATION MEASURES

The abatement measures identified in the Noise Impact Analysis, February 2013, remain applicable to the expanded project study area and no additional abatement or mitigation measures are required.

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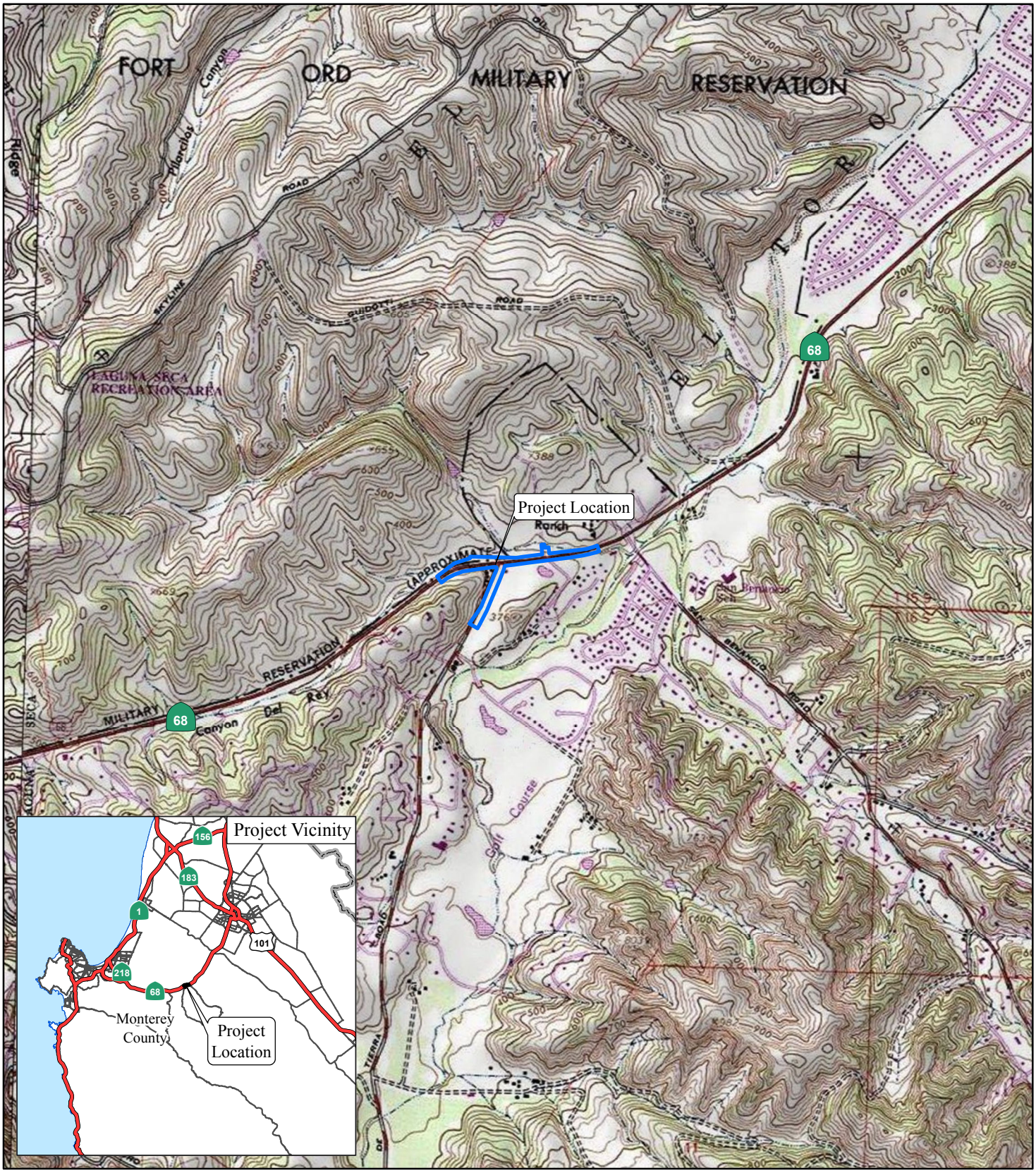

LEGEND

Project Location

FIGURE 1

0 1000 2000
FEET

SOURCE: USGS 7.5' Quad - Spreckels (1984), CA

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SR 68 / Corral de Tierra Road
Intersection Improvement Project

Project Location Map

MON-68, P.M. 12.8/13.2
05-OH8230

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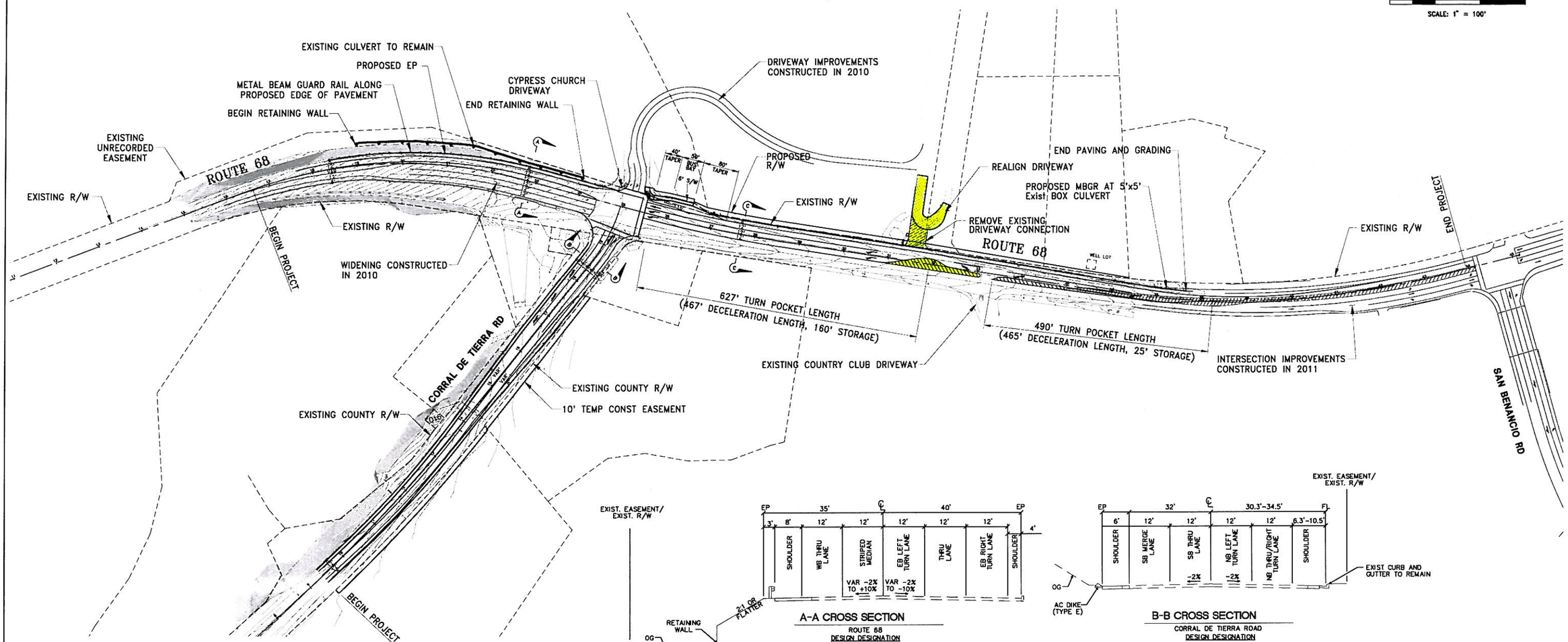
ROUTE 68/CORRAL DE TIERRA ROAD INTERSECTION IMPROVEMENTS

BUILD ALTERNATIVE

COUNTY OF MONTEREY CALIFORNIA

MAY, 2015



A-A CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

ADT (2014) = 21,600 (DESIGN VOLUME)
ADT (20 YEAR) = 38,500
DHV = 2,484
ESAL = 5,775,045

D = 57%
T = 4.0%
V = 55 MPH
TI_{20} = 11.0

B-B CROSS SECTION

CORRAL DE TIERRA ROAD

DESIGN DESIGNATION

ADT (2014) = 7,100 (DESIGN VOLUME)
ADT (20 YEAR) = 8,900
DHV = 619
ESAL = 735,017

D = 67%
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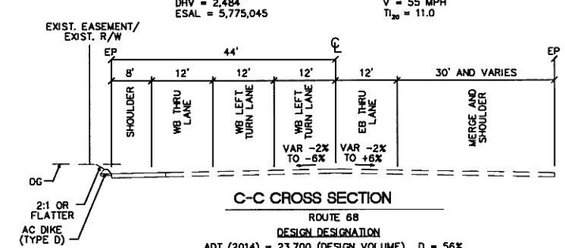
V = 55 MPH
TI_{20} = 8.5



C-C CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

ADT (2014) = 23,700 (DESIGN VOLUME)
ADT (20 YEAR) = 40,500
DHV = 2,725
ESAL = 6,060,788

D = 56%
T = 4.0%
V = 55 MPH
TI_{20} = 11.0

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Technical Memorandum

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Job #: 8091.001

To: **Project Development Team**
Monterey County Public Works – Enrique Saavedra
Transportation Assoc. for Monterey County (*TAMC*) – Lisa Rheinheimer
Caltrans District 5 – Dave Rasmussen, Paul McClintic
Wood Rodgers – Ali Hemmati, Keith Hallsten

CC: Project Stakeholders

From: *Wood Rodgers* – Ravi Narayanan, P.E.

Date: Original: 01/12/2005
Revised: 02/28/2005

File: SR68_CTD Traffic Operations 02252005.doc

Re: SR 68 / Corral De Tierra Road (05-MON-68, PM 12.95) Intersection Improvements
***Project Study Report* (PSR) - Traffic Operations Analysis**

INTRODUCTION & BACKGROUND

Monterey County has initiated a study to identify operational improvements at the SR 68/Corral De Tierra Road intersection, located in the unincorporated area of Monterey County, approximately 13 miles to the east of the City of Monterey and approximately 9 miles to the west of City of Salinas. The east-west legs of this project study intersection are State Route 68, which falls under Caltrans District 5 jurisdiction, requiring the preparation of a *Project Study Report* (PSR) document to obtain Caltrans approval of the operational improvement project. Wood Rodgers has been retained by Monterey County to provide planning/engineering studies in support of this intersection improvements project. This technical memorandum has been prepared by Wood Rodgers to document traffic forecasting and operational analyses in support of the PSR.

The project vicinity map and the project location are illustrated on Figure 1 in the Appendix.

This Technical Memorandum includes the following elements:

- A discussion of Existing (2003/2004) base-year background transportation conditions and base-year traffic operations analysis.
- A Safety analysis consistent with Caltrans District 5 requirements – involving analysis of three-year TASAS accident data, as well as analysis of County accident data.
- A discussion of future (including "project opening day") traffic volumes and traffic operational analysis both without and with the proposed operational improvement project.

It is envisioned that this memorandum will be updated/revised through the course of the PSR study process, as more project information becomes available, and review comments/feedback are received from the County, TAMC and Caltrans District 5. The final version of this memorandum will be ultimately attached as a "Traffic Report" exhibit to the PSR document.

CURRENT SETTING

Monterey County is located on the Central coast of California. The study intersection area is located within the Toro Planning area in Monterey County, along State Route 68 approximately 13 miles to the east of the City of Monterey and approximately 9 miles to the west of the City of Salinas. Figure 1 in the Appendix illustrates the project location and vicinity map. The following describes the study area roadway system.

State Route 68 (SR 68) is an east-west state highway serving Monterey County. SR 68, which is also known as the "Monterey-Salinas Highway", links the City of Monterey located on the southern edge of Monterey Bay, to the City of Salinas, the County seat to the east. SR 68 also serves as a regional facility connecting between State Route 1 (SR 1) at the Monterey peninsula and State Route 101 (SR 101) at the City of Salinas. The entire length of the route is approximately 22 miles. SR 68 carries both commuter and recreational/tourist traffic between Salinas and Monterey. Through the project area, the westbound direction on SR 68 is currently the predominant commute direction in the morning peak hour periods and the eastbound direction is the predominant commute direction in the afternoon peak hour periods. Within and through the project area, SR 68 is functionally classified as a Principal Arterial. SR 68 is designated as a Federal Aid Primary Route. SR 68 is not a SHELL (State Highway Extra Legal Load) route. Through the project area and through a majority of the rural segment between Monterey and Salinas, SR 68 currently has a two-lane arterial/highway type cross-section, and has a posted speed limit of 55 miles per hour. According to 2003 Caltrans traffic volumes data (available from Caltrans website), SR 68 mainline carries an Annual Average Daily Traffic (AADT) of approximately 22,000 vehicles through the Corral De Tierra Road study intersection. According to 2002 Caltrans truck traffic volume data (available from Caltrans website), trucks comprise less than 5% of the average daily traffic on SR 68 segment through the same intersection.

Corral De Tierra Road is a predominantly north-south two-lane County roadway that serves large rural low-density residential parcels located south of SR 68. Corral De Tierra Road has a posted speed limit of 35 miles per hour. Corral De Tierra Road currently forms a signalized T-intersection with SR 68. According to 2004 traffic count data provided by Monterey County, Corral De Tierra Road currently carries a two-way average daily traffic volume of 6,800 vehicles for the segment south of SR 68. ***Laureles Grade Road*** and ***San Benancio Road*** are adjacent County roads that form signalized intersections with SR 68 approximately 1.7 miles west of and 0.4 mile east of the Corral De Tierra Road intersection, respectively. Approximately 700 feet east of the SR 68/Corral De Tierra Road intersection, a private driveway providing access to/from the Cypress Community Church currently intersects with SR 68.

Appendix Figure 2 presents an aerial exhibit of the existing study area facilities.

ANALYSIS METHODOLOGY

In this analysis, traffic operations have been quantified through the computation of "Level of Service" (LOS). Level of Service is a qualitative measure of traffic operating conditions, used as an industry standard for describing transportation facility operations, whereby a letter grade "A" through "F" is assigned to an intersection or roadway segment, representing progressively worsening traffic operations.

Levels of Service have been computed using methods documented in the Transportation Research Board (TRB) Publication *Highway Capacity Manual, Fourth Edition, 2000* (referred to as HCM-2000). For signalized intersections and all-way-stop-controlled (AWSC) intersections, the intersection delays and LOS reported are the average values for the whole intersection. For two-way-stop-controlled (TWSC) intersections, the average delays and LOS are reported for the "worst-case" movement. The delay-based LOS criteria for different types of intersection control are summarized in Table 1. The average daily traffic (ADT) carrying-capacity based LOS thresholds for different roadway types, developed using HCM-2000 methods, are shown in Table 2A. Table 2B shows the speed-based LOS threshold for different types of urban street classifications.

TABLE 1
HCM-2000 BASED LEVEL-OF-SERVICE DEFINITIONS AND CRITERIA FOR INTERSECTIONS

Level of Service	Flow Type	Operational Characteristics	Intersection Control Delay (seconds/vehicle)	
			Signal Control	Two-Way-Stop or All-Way Stop Control
"A"	Stable Flow	Free-flow conditions with negligible to minimal delays. Excellent progression with most vehicles arriving during the green phase and not having to stop at all. Nearly all drivers find freedom of operation.	≤ 10	0 – 10
"B"	Stable Flow	Good progression with slight delays. Short cycle-lengths typical. Relatively more vehicles stop than under LOS "A". Vehicle platoons are formed. Drivers begin to feel somewhat restricted within groups of vehicles.	> 10 – 20	> 10 – 15
"C"	Stable Flow	Relatively higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, although many still pass through without stopping. Most drivers feel somewhat restricted.	> 20 – 35	> 15 – 25
"D"	Approaching Unstable Flow	Somewhat congested conditions. Longer but tolerable delays may result from unfavorable progression, long cycle lengths, and/or high volume-to-capacity ratios. Many vehicles are stopped. Individual cycle failures may be noticeable. Drivers feel restricted during short periods due to temporary back-ups.	> 35 – 55	> 25 – 35
"E"	Unstable Flow	Congested conditions. Significant delays result from poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures occur frequently. There are typically long queues of vehicles waiting upstream of the intersection. Driver maneuverability is very restricted.	> 55 – 80	> 35 – 50
"F"	Forced Flow	Jammed or grid-lock type operating conditions. Generally considered to be unacceptable for most drivers. Zero or very poor progression, with over-saturation or high volume-to-capacity ratios. Several individual cycle failures occur. Queue spillovers from other locations restrict or prevent movement.	> 80	> 50

Source: HCM-2000, Exhibits 16-2, 17-2 and 17-22

TABLE 2A
HCM-2000 BASED LEVEL-OF-SERVICE (LOS) CRITERIA FOR ROADWAY SEGMENTS

Roadway Type	Maximum Two-way Average Daily Traffic (ADT) Volume-carrying Capacity for each LOS Designation				
	LOS "A"	LOS "B"	LOS "C"	LOS "D"	LOS "E"
4-Lane Divided Freeway	28,000	43,200	61,600	74,400	80,000
2-Lane Rural Highway	2,400	4,800	7,900	13,500	22,900
6-Lane Divided Arterial (with left-turn lane)	32,000	38,000	43,000	49,000	54,000
4-Lane Divided Arterial (with left-turn lane)	22,000	25,000	29,000	32,500	36,000
4-Lane Undivided Arterial (no left-turn lane)	18,000	21,000	24,000	27,000	30,000
2-Lane Arterial (with left-turn lane)	11,000	12,500	14,500	16,000	18,000
2-Lane Arterial (no left-turn lane)	9,000	10,500	12,000	13,500	15,000
2-Lane Collector/Local Street	6,000	7,500	9,000	10,500	12,000

Source: Based on Highway Capacity Manual, Fourth Edition, 2000.
Notes: All volume thresholds are approximate and assume ideal roadway characteristics. Actual threshold volumes for each Level of Service listed above may vary depending on a variety of factors including (but not limited to) roadway curvature and grade, intersection or interchange spacing, driveway spacing, percentage of trucks, RVs, and other heavy vehicles, travel lane widths, speed limits, signal timing characteristics, on-street parking, volume of cross traffic and pedestrians, etc.

TABLE 2B
HCM-2000 BASED LEVEL-OF-SERVICE (LOS) CRITERIA FOR ROADWAY SEGMENTS

Urban Street Class	**I**	**II**	**III**	**IV**
Free Flow Speed Range	55-45 mph	45-35 mph	35-30 mph	30-25 mph
Typical Free Flow Speed	50 mph	40 mph	35 mph	30 mph
LOS	**Average Travel Speed (mph)**			
A	> 42	> 35	> 30	> 25
B	34 – 42	38 – 35	24 – 30	19 – 25
C	27 – 34	22 – 28	18 – 24	13 – 19
D	21 – 27	17 – 22	14 – 18	9 – 13
E	16 – 21	13 – 17	10 – 14	7 – 9
F	≤ 16	≤ 13	≤ 10	≤ 7

Source: HCM-2000, Exhibit 15-2 – "Urban Street LOS by Class"

The Caltrans *Guide for the Preparation of Traffic Impact Studies* (dated December 2002) states the following:

> *"Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not be always feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS."*

The *SR 68 Route Concept Report* (last updated in 1990) notes that Caltrans' "Concept LOS" for SR 68 through the study area is LOS "C". Monterey County has established LOS "C" as the general threshold for acceptable traffic operations on County facilities. In this study, LOS "C" has been generally regarded as the desired target LOS for the study intersection.

In this study, a general "Peak Hour Factor" (PHF) of 0.92 (default recommended by HCM-2000) has been used under all scenarios. Appropriate heavy-vehicle percentages have been specified by intersection movement. Under signalized conditions, the HCM-recommended suburban traffic signal default cycle length of 100 seconds has been generally used, with 4 seconds of "lost time" per critical signal phase. *Synchro 6/Simtraffic 6* and *Traffix 7.7* software have been used to implement the HCM-2000 analysis procedures.

SAFETY ANALYSIS

State Facilities: Caltrans District 5 provided TASAS Table B accident data summary for the SR 68 study segment through the intersection with Corral De Tierra Road, for the three-year period extending from January 1, 2001 through December 31, 2003. The accident data summary is presented in Table 3.

TABLE 3
SR 68 STUDY SEGMENT - ACCIDENT RATES
(JANUARY 1, 2001 THROUGH DECEMBER 31, 2003)

05-MON-68	**Actual Rates**				**Statewide Average Rates**			
Study Segment	**Fatal**	**F + I**	**Total**		**Fatal**	**F + I**	**Total**	
SR 68	0.000	0.12	**0.99**		0.015	0.21	0.41	
PM 12.900 thru PM 13.099	**Number of Accidents**							
(KP 20.81 thru KP 21.13)	**Total**	**Fatal**	**Inj**	**F+I**	**Multi-Veh**	**Wet**	**Dark**	**P K/I**
	24	0	3	3	24	6	3	0 / 3

Notes: KP = Kilometer Post, PM = Post-Mile
F + I = Fatal + Injury; P K/I = Persons Killed/Injured
Accident rates are indicated in "number of accidents per million vehicle miles".
Actual accident rates that exceed the corresponding statewide average rates are indicated in bold.

As seen from Table 3, for the SR 68 study segment, the actual rate of "Total" number of accidents exceeded the respective statewide average rates for similar facilities. A total of twenty-four accidents were reported along the study segment, over the three-year analysis period extending from January 1, 2001 through December 31, 2003. Although no "fatal" accidents were reported during this period, a total of three "injury" type accidents were reported, with a total of three (3) persons reported injured. All twenty-four reported accidents involved more than one vehicle, with six of these accidents happening under "dark" lighting conditions. TSAR data on the type of collisions is not available.

County Facilities: For use in this study, Monterey County Department of Public Works (Traffic Section) provided "Collision Report" for Corral De Tierra Road (PM 0.00 to PM 1.00) segment south of the intersection with SR 68. The accident data report provided was for the time period beginning from 01/01/2000 and extending through 10/28/2004. A total of five accidents were reported over the aforementioned almost five-year time frame. Of these, three accidents happened under "dark" lighting conditions, although data on the type of collisions is not available. One person was reported injured in these accidents.

EXISTING TRAFFIC VOLUMES

Wood Rodgers obtained and reviewed most current traffic count data as well as recently completed traffic studies within study intersection vicinity, as provided by Monterey County Department of Public Works. The existing AM peak hour intersection traffic counts used in the study were counted on March 4, 2004, and the existing PM peak hour traffic counts were obtained on September 15, 2004. The AM peak hour is defined as the highest one hour of traffic flow counted between 7:00 AM and 9:00 AM on a typical weekday, and the PM peak hour is defined as the highest one hour of traffic flow counted between 4:00 PM and 6:00 PM on a typical weekday. The most recent intersection traffic count data available was supplemented with 2003 Annual Average Daily Traffic (AADT) data and 2002 truck count data obtained from Caltrans data publications and with 2004 AADT data for Corral De Tierra Road provided by the County of Monterey.

Appendix Figure 3 illustrates existing AM peak hour, PM peak hour and Average Daily Traffic (ADT) volumes within the study area.

EXISTING CONDITIONS' TRAFFIC OPERATIONS

Intersection Operations

Table 4 presents existing (2004) intersection traffic operations under current intersection geometrics and control, with no operational improvements in place. (*Note:* The County Planning Commission has recently approved an application by the Cypress Community Church to realign their access through the north leg of the study intersection. This realignment is included as a part of the proposed intersection improvements project description, as presented in a later section of this memorandum. For analysis purposes, this study has assumed the realignment of the Cypress Church driveway to form the northern leg of the study intersection under all scenarios, including existing conditions.)

TABLE 4
EXISTING (2004) CONDITIONS - INTERSECTION TRAFFIC OPERATIONS

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 68 / Corral De Tierra Road	Signal	30.3	C	36.7	D
Notes: For analysis purposes, the Cypress Church driveway access was modeled as the northern leg of the signalized study intersection under existing conditions.					

As shown in Table 4, the study intersection is currently operating at LOS "C" in the AM peak hour and LOS "D" conditions in the PM peak hour period.

Roadway Operations

Table 5A summarizes existing conditions' roadway traffic operations under existing roadway capacity configurations.

TABLE 5A
EXISTING (2003/2004) CONDITIONS ROADWAY TRAFFIC OPERATIONS

Highway/Roadway Segment	Existing Capacity Configuration	Average Daily Traffic Volume	LOS
SR 68 – West of Corral De Tierra Road	Two-lane Highway/Arterial	20,000	E
SR 68 – East of Corral De Tierra Road	Two-lane Highway/Arterial	22,000	E
Corral De Tierra Road – South of SR 68	Two-lane Arterial	6,800	A
Notes: LOS = Level of Service			

As seen from Table 5A, the SR 68 two-lane rural highway/arterial segment through Corral De Tierra Road is currently operating at LOS "E" conditions on an annual average daily traffic (AADT) volume basis.

Table 5B shows arterial/highway directional segment operations under existing 2004 volumes.

TABLE 5B
EXISTING CONDITIONS ROADWAY TRAFFIC OPERATIONS

Arterial Segment	Arterial Class	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
			Speed	LOS	Speed	LOS
SR 68 (thru Corral De Tierra Road)	I	Eastbound	18.7	E	16.9	E
SR 68 (thru Corral De Tierra Road)	I	Westbound	28.6	C	35.0	B
Corral De Tierra Road (south of SR 68)	II	Northbound	11.4	F	11.8	F
Corral De Tierra Road (south of SR 68)	II	Southbound	7.3	F	8.0	F

Notes: 1. Speed = Average Travel Speed in miles per hour
2. With a free flow speed of approx.55 mph for SR 68 and 40 mph for Corral De Tierra Road, the study roadway segments are regarded as a HCM-2000 Class I and Class II Arterial, respectively.

As seen from Table 5B, the study highway/roadway segments are currently generally operating at AM and PM peak hour LOS "E" or worse conditions under existing traffic volumes.

PROJECT "OPENING DAY" OPERATIONS

Project Description: The proposed "operational improvement" project for interim improvements to the SR 68/Corral De Tierra Road intersection is based on a prior recommendation that had been developed by the *Highway 68 Improvement Advisory Committee* (sponsored by Monterey County). With the proposed operational improvement project, the SR 68/Corral De Tierra Road study intersection would be widened to accommodate two westbound left-turn lanes (addition of a second lane from westbound SR 68 to southbound Corral De Tierra Road). In conjunction with the intersection widening, the Cypress Church private driveway access to/from the north of SR 68 will be realigned to the west, to form the northern leg of the SR 68/Corral De Tierra Road "four-legged" intersection. Appendix Exhibit A-1 shows the proposed project improvements under Alternative 1 (northside widening on SR 68) and Appendix Exhibit A-2 illustrates Alternative 2 (southside widening on SR 68).

Based on discussions with Caltrans and County Staff, it is understood that there is currently an application pending before the County for an approximately 5.5-acre Shopping Center on the southeast quadrant of the project intersection. The proposed Shopping Center project's environmental documentation process is currently ongoing. Caltrans has required that traffic generation from the proposed Shopping Center be included as a possible/potential development scenario that could happen prior to the "opening day" of the proposed operational improvement project. Based on discussions with the County, three "opening day" alternatives/scenarios were investigated and are listed as follows:

- Opening day (Year 2008) without the proposed Shopping Center.
- Opening day (Year 2008) with the Shopping Center Access Alternative A - full access. Two full-access driveways for the Shopping Center were assumed – the first on SR 68, approximately 420 feet east of SR 68/Corral De Tierra Road intersection and the second on Corral De Tierra Road, approximately 580 feet south of SR 68/Corral De Tierra Road intersection. Full access (all movements permitted) with two-way-stop control (TWSC) configurations were assumed for both of the "three-legged" driveway intersections under this access alternative.
- Opening day (Year 2008) with Shopping Center Access Alternative B - limited access. Under this access alternative, the Shopping Center access points and controls are the same as Alternative A, but limited access (right-turns in and out only) was assumed for the SR 68/Shopping Center Driveway intersection.

Based on anticipated project funding status and schedule, the proposed operational improvement project will complete construction and be opened for operation by year 2008. Applying a 3% per year traffic growth rate (as explained in a subsequent section of this document) between existing (2004) and opening-day (2008) conditions, year 2008 base traffic volumes were estimated. "Shopping Center Only" traffic projections, as

obtained from the Shopping Center traffic study (Hexagon Transportation Consultants, 2004) were superimposed on top of the year 2008 base volumes to derive "with Shopping Center" scenario volume projections.

Appendix Figure 4A illustrates "project opening day" (2008) traffic volume forecasts for conditions without the Shopping Center. Appendix Figure 4B illustrates "project opening day" (2008) traffic volume forecasts for conditions with the Shopping Center under Access Alternatives A and B.

Intersection Operations

Table 6 presents year 2008 intersection traffic operations with the proposed operational improvement project in place.

TABLE 6
OPERATIONAL IMPROVEMENT PROJECT OPENING DAY (2008) CONDITIONS - INTERSECTION TRAFFIC OPERATIONS

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 68 / Corral De Tierra Road	Signal	31.8 (30.6) [28.8]	C (C) [C]	34.0 (33.0) [44.0]	C (C) [D]
SR 68 / Shopping Center Driveway	TWSC	N/A (159.6) [26.8]	N/A (F) [D]	N/A (328.3) [29.2]	N/A (F) [D]
Corral De Tierra Rd / Shopping Center Drwy.	TWSC	N/A (12.7) [12.7]	N/A (B) [B]	N/A (14.3) [14.9]	N/A (B) [B]

Notes: 1. Cypress Church driveway forms the northern (fourth) leg of the study intersection
2. XX (YY) [ZZ] = Without Shopping Center (With Shopping Center Alt A) [With Shopping Center Alt B]
3. N/A = Not Applicable
4. TWSC = Two-Way Stop Control
5. For TWSC intersection, worst-case movement delay (in seconds/vehicle) are indicated. "Average" control delay(in seconds/vehicle) are indicated for AWSC and signal-controlled intersections.

As shown in Table 6, the SR 68/Corral De Tierra Road intersection is projected to operate at acceptable AM and PM peak hour LOS "C" conditions through project opening day (year 2008) without the proposed Shopping Center. As also shown in Table 6, the SR 68/Corral De Tierra Road intersection is projected to operate at AM and PM peak hour LOS "C" conditions through project opening day (year 2008) under Shopping Center Access Alternative A, and at AM peak hour LOS "C" and PM peak hour LOS "D" under Shopping Center Access Alternative B. The SR 68/Shopping Center Driveway (unsignalized) intersection (outbound left-turn movement from the driveway) is projected to operate at AM and PM peak hour LOS "F" under Shopping Center Access Alternative A. The Corral De Tierra Road/Shopping Center Driveway (unsignalized) intersection (outbound left-turn movement from the driveway) is projected to operate at AM and PM peak hour LOS "B" under both Shopping Center Access Alternatives A and B.

As seen from Table 6, it appears that with the inclusion of the proposed Shopping Center, LOS "C" operating conditions may be sustained at the SR 68/Corral De Tierra Road intersection, if full-access is provided at the SR 68/Shopping Center Driveway intersection. However, intersection spacing and arterial progression patterns along SR 68 are projected to become issues if full-access is provided at the SR 68/Shopping Center Driveway intersection. With a recommended 250-foot (per lane) westbound left-turn minimum storage length plus a recommended 485-foot (148-meter) deceleration distance for an approach speed of 55 mph (88 kph) on SR 68, a total minimum spacing of approximately 735 feet is projected to be needed between the SR 68 intersections with Corral De Tierra Toad and the Shopping Center driveway. This recommended minimum spacing clearly exceeds the approximately 420-foot spacing as indicated in preliminary site concepts for the Shopping Center. Furthermore, the lack of a two-way left-turn median lane on the SR 68 segment through the Shopping Center driveway intersection is projected to cause the outbound (northbound) left-turn movements from the Shopping Center driveway to operate at unacceptable levels of delay, thus representing a potential safety concern for the outbound left-turn movement. A traffic signal at the SR 68/Shopping Center driveway may not be an operationally desirable solution. A limited access scenario (Alternative B) at the SR 68/Shopping Center Driveway (right-turns in/out only permitted) is projected to result in year 2008 PM peak hour LOS "D" conditions at the project intersection. Nevertheless, intersection spacing and arterial progression along SR 68 are projected to be relatively more efficient under this scenario. A potential recommended strategy may be for Caltrans and County to consider adopting LOS "D" as an acceptable standard for "opening-day" operations at the project intersection, should the proposed Shopping Center be developed prior to project opening day.

Roadway Operations

Table 7A summarizes year 2008 roadway segment operations with the proposed operational improvement project in place.

TABLE 7A
OPERATIONAL IMPROVEMENT PROJECT OPENING DAY (2008) CONDITIONS - ROADWAY TRAFFIC OPERATIONS

Highway/Roadway Segment	Proposed Capacity Configuration	Average Daily Traffic Volume	LOS
SR 68 – West of Corral De Tierra Road	Two-lane Highway/Arterial*	21,600 (23,420) [23,420]	E (F) [F]
SR 68 – East of Corral De Tierra Road	Two-lane Highway/Arterial*	23,700 (24,850) [24,780]	F (F) [F]
Corral De Tierra Road – South of SR 68	Two-lane Arterial	7,100 (9,930) [10,500]	A (A) [A]

Notes: LOS = Level of Service
** implies "with proposed operational improvement project".*
XX (YY) [ZZ] = Without Shopping Center (With Shopping Center Alt A) [With Shopping Center Alt B]

As seen from Table 7A, the SR 68 segments through the study intersection are projected to operate at year 2008 LOS "E" or worse conditions on an AADT volume basis, with the proposed operational improvement project in place, under all three alternatives. Since the study intersection peak hour operations are regarded as being more representative or dictative of actual operating conditions through the study segment, the AADT-based LOS "E" or worse roadway operations are not generally considered significant.

Table 7B shows arterial/highway directional segment operations under opening day (2008) traffic volumes.

TABLE 7B
PROJECT OPENING DAY (YEAR 2008) CONDITIONS ROADWAY TRAFFIC OPERATIONS

Arterial Segment	Arterial Class	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
			Speed	LOS	Speed	LOS
SR 68 (thru Corral De Tierra Road)	I	Eastbound	17.2 (17.2) [16.9]	E (E) [E]	15.7 (13.2) [14.4]	E (F) [F]
SR 68 (thru Corral De Tierra Road)	I	Westbound	22.3 (24.6) [25.1]	D (D) [D]	32.9 (31.3) [32.3]	C (C) [C]
Corral De Tierra Road (thru SR 68)	II	Northbound	16.4 (17.7) [18.3]	E (D) [D]	11.9 (6.5) [5.0]	F (F) [F]
Corral De Tierra Road (thru SR 68)	II	Southbound	6.9 (5.7) [5.7]	F (F) [F]	8.2 (6.1) [6.0]	F (F) [F]

Notes: 1. Speed = Average Travel Speed in miles per hour
2. With a free flow speed of approx.55 mph for SR 68 and 40 mph for Corral De Tierra Road, the study roadway segments are regarded as a HCM-2000 Class I and Class II Arterial, respectively.
3. XX (XX) [XX] = Without Shopping Center (With Shopping Center Alt A) [With Shopping Center Alt B]

As seen from Table 7B, practically all of the directional highway/roadway segments are projected to operate at year 2008 AM and/or PM peak hour LOS "D" or worse conditions, under all three alternatives. However, since the study intersection peak hour operations are regarded as being more representative or dictative of actual operating conditions through the study segment, the LOS "D" or worse arterial segment operations are not generally considered significant.

FUTURE TRAFFIC FORECASTS

Caltrans has typically required STIP-candidate transportation projects to have a minimum design life of twenty (20) years subsequent to the opening date of the improvements, and "operational" improvements affecting the State highway system to operate acceptably on "opening day". (Reference: *Highway Design Manual, Section 103.2*) The proposed intersection widening project is an interim "operational improvement" impacting the State highway system. Based upon a preliminary review of project funding status, the County has indicated that the proposed operational improvement project is anticipated to complete construction by no earlier than year 2008. Consistent with PDT discussions, traffic operations through a ten-year forecast period (i.e., through Year 2015/2016) have also been generally investigated in this study.

LONG-TERM (YEAR 2025) TRAFFIC PROJECTIONS

In order to develop long-term future traffic projections, traffic circulation/planning studies already adopted by the County or currently undergoing completion, were reviewed. Wood Rodgers reviewed cumulative traffic forecasts for the study intersection area as projected by the Year 2025 Association of Monterey Bay Area Governments (AMBAG) regional travel demand forecast model, and as presented in the recently completed

Cypress Community Church Access Study (Higgins Associates, October 2004). This study presents by far the most up-to-date, reasonable source of future traffic projections within the project study area.

YEAR 2015 TRAFFIC PROJECTIONS

SR 68 Traffic Growth Projections: In order to develop reasonable traffic growth rates that could occur over the next ten years, recent traffic growth trends through the study area were reviewed. SR 68 study segments' traffic growth beginning from 1992 and extending through 2003 (a span of twelve years) was reviewed and is summarized in Table 8.

TABLE 8
SR 68 SEGMENTS THROUGH STUDY INTERSECTION - RECENT TRAFFIC GROWTH TRENDS

Year	SR 68 Mainline Two-Way Annual Average Daily Traffic (AADT) Volume Just East of Corral De Tierra Road Intersection
1992	19,800
1993	19,000
1994	18,700
1995	20,700
1996	22,700
1997	21,200
1998	21,500
1999	22,000
2000	22,000
2001	22,500
2002	22,000
2003	22,000

Source: Caltrans Traffic Volumes Publications
Notes: For certain segments and time-frames, Caltrans counts may have been conducted only once in three years.

As seen from Table 8, between 1992 and 2003, the AADT growth on SR 68 segment through the study intersection have been somewhat fluctuating or minimally increasing. Over the entire twelve year time-frame, the net growth rate has been 11%, which corresponds to an average compounded growth rate of approximately 1% per year.

A review of cumulative (year 2025) traffic projections (as discussed in a subsequent section of this memorandum) for the SR 68 corridor indicates that approximately 3% per year average traffic growth rate could occur over the next 20+ years. With the continued growth of both City of Salinas to the east and City of Monterey to the west, and with the planned future land developments that could be reasonably constructed over the next ten years, it appears reasonable and conservative to project that SR 68 ADT growth rate of approximately 3% per year could be sustainable over the next ten years, or through year 2015. This represents a net growth of almost 40% in SR 68 ADT volumes through year 2015, over existing (2004) volumes.

Appendix Figure 5 illustrates year 2015 traffic forecasts.

YEAR 2015 "NO-BUILD" CONDITIONS' TRAFFIC OPERATIONS

Year 2015 intersection traffic operations were quantified for the existing study facilities with no operational improvements in place, and are presented in this section.

Intersection Operations

Table 9 presents year 2015 intersection traffic operations under current intersection lane geometrics and control, with no operational improvements in place.

TABLE 9
YEAR 2015 "NO-BUILD" CONDITIONS - INTERSECTION TRAFFIC OPERATIONS

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 68 / Corral De Tierra Road	Signal	75.3	E	90.4	F

Notes: Cypress Church driveway is modeled as the northern (fourth) leg of the study intersection

As shown in Table 9, the study intersection is projected to operate at LOS "E" conditions under year 2015 AM peak hour period and LOS "F" under year 2015 PM peak hour periods, with the existing intersection lane configurations, and no operational improvements in place.

Roadway Operations

Table 10A summarizes year 2015 roadway segment operations under current capacity configurations, with no operational improvements in place.

TABLE 10A
YEAR 2015 "NO BUILD" CONDITIONS - ROADWAY TRAFFIC OPERATIONS

Highway/Roadway Segment	Existing Capacity Configuration	Average Daily Traffic Volume	LOS
SR 68 – West of Corral De Tierra Road	Two-lane Highway/Arterial	28,000	F
SR 68 – East of Corral De Tierra Road	Two-lane Highway/Arterial	30,500	F
Corral De Tierra Road – South of SR 68	Two-lane Arterial	7,800	A

Notes: LOS = Level of Service

As seen from Table 10A, the SR 68 segment through Corral De Tierra Road is generally projected to operate at LOS "F" conditions under year 2015 ADT demands under existing two-lane highway/arterial capacity configurations, and with no operational improvements in place.

Table 10B shows arterial/highway directional segment operations under year 2015 traffic volumes.

TABLE 10B
YEAR 2015 "NO BUILD" CONDITIONS - ROADWAY TRAFFIC OPERATIONS

Arterial Segment	Arterial Class	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
			Speed	LOS	Speed	LOS
SR 68 (thru Corral De Tierra Road)	I	Eastbound	10.9	F	5.6	F
SR 68 (thru Corral De Tierra Road)	I	Westbound	11.5	F	28.3	C
Corral De Tierra Road (thru SR 68)	II	Northbound	12.5	F	25.8	F
Corral De Tierra Road (thru SR 68)	II	Southbound	7.1	F	7.2	C

Notes: 1. Speed = Average Travel Speed in miles per hour
2. With a free flow speed of approx.55 mph for SR 68 and 40 mph for Corral De Tierra Road, the study roadway segments are regarded as a HCM-2000 Class I and Class II Arterial, respectively.

As seen from Table 10B, practically all of the directional highway/roadway segments are projected to operate at year 2015 AM and/or PM peak hour LOS "F" conditions with no operational improvements in place.

YEAR 2015 OPERATIONS WITH PROPOSED OPERATIONAL IMPROVEMENT PROJECT

Intersection Operations

Table 11 presents year 2015 intersection traffic operations with the proposed operational improvement project in place.

TABLE 11
YEAR 2015 CONDITIONS WITH PROPOSED OPERATIONAL IMPROVEMENT PROJECT - INTERSECTION TRAFFIC OPERATIONS

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 68 / Corral De Tierra Road	Signal	68.6	E	70.1	E

Notes: Cypress Church driveway forms the northern (fourth) leg of the study intersection

As shown in Table 11, the SR 68/Corral De Tierra Road intersection is generally projected to operate at year 2015 peak hour LOS "E" conditions, with the proposed operational improvement project in place. This represents operations well below the Caltrans target of LOS "C" for the study intersection.

It generally appears that subsequent to the opening of the proposed interim operational improvement project in 2008, unacceptable operations would begin to re-occur well before year 2015. An incremental traffic growth analysis (using interpolation between 2008 and 2015 traffic demands) indicates that the operational improvement project, as proposed, would provide acceptable intersection operations at LOS "C" or better for

approximately two (2) years subsequent to year 2008 (opening day), or through year 2010, for conditions without the proposed Shopping Center on the southeast quadrant of the project intersection.

Roadway Operations

Table 12A summarizes year 2015 roadway segment operations with the proposed operational improvement project in place.

TABLE 12A
YEAR 2015 CONDITIONS WITH PROPOSED OPERATIONAL IMPROVEMENT PROJECT - ROADWAY TRAFFIC OPERATIONS

Highway/Roadway Segment	Proposed Capacity Configuration	Average Daily Traffic Volume	LOS
SR 68 – West of Corral De Tierra Road	Two-lane Highway/Arterial*	28,000	F
SR 68 – East of Corral De Tierra Road	Two-lane Highway/Arterial*	30,500	F
Corral De Tierra Road – South of SR 68	Two-lane Arterial	7,800	A

Notes: LOS = Level of Service
** implies"with proposed operational improvement project".*

As seen from Table 12A, the SR 68 two-lane highway segment through Corral De Tierra Road is generally projected to operate at AADT-based year 2015 LOS "F" conditions, with the proposed operational improvements in place. Thus it generally appears that significant SR 68 highway capacity (widening) improvements (above and beyond the operational improvement project evaluated in this study) will be needed to provide sufficient capacities through year 2015.

Table 12B shows arterial/highway directional segment operations under year 2015 traffic volumes.

TABLE 12B
YEAR 2015 CONDITIONS WITH PROPOSED OPERATIONAL IMPROVEMENT PROJECT- ROADWAY TRAFFIC OPERATIONS

Arterial Segment	Arterial Class	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
			Speed	LOS	Speed	LOS
SR 68 (thru Corral De Tierra Road)	I	Eastbound	11.9	F	6.7	F
SR 68 (thru Corral De Tierra Road)	I	Westbound	8.1	F	28.0	C
Corral De Tierra Road (thru SR 68)	II	Northbound	12.2	F	25.5	C
Corral De Tierra Road (thru SR 68)	II	Southbound	7.1	F	7.1	F

Notes: 1. Speed = Average Travel Speed in miles per hour
2. With a free flow speed of approx.55 mph for SR 68 and 40 mph for Corral De Tierra Road, the study roadway segments are regarded as a HCM-2000 Class I and Class II Arterial, respectively.

As seen from Table 12B, practically all of the directional highway/roadway segments are projected to operate at AM and PM peak hour LOS "F" conditions even with the proposed operational improvements in place.

YEAR 2025 TRAFFIC PROJECTIONS AND OPERATIONS

Caltrans has typically required PSR improvements (regarded as candidate projects for potential STIP funding) to be analyzed under 20-year traffic forecasts. Given that the proposed "operational improvement" project is anticipated to complete construction by 2008, a 20-year forecast time-frame represents approximately year 2025-28. Year 2025 traffic forecasts shown in this study are based on the Year 2025 AMBAG regional travel demand forecast model, and as presented in the recently completed *Cypress Community Church Access Study* (Higgins Associates, October 2004). The year 2025 traffic forecasts represent a net ADT growth in the 80%-100% range, over existing (2004) conditions. Appendix Figure 6 illustrates year 2025 traffic forecasts.

Since the proposed project is envisioned as an interim "operational improvement" project, a formal 20-year (i.e. year 2025-28) operational analysis is NOT required as part of this study. However, a preliminary planning-level evaluation of year 2025 operations indicates that the proposed interim operational improvement project would completely fail (LOS "F") to provide adequate capacities to accommodate year 2025 traffic demands. Based on projected traffic volume growth, additional through lanes on SR 68 are projected to become necessary to provide acceptable operations through year 2025. According to Caltrans' *SR 68 Route Concept Report* (last updated in 1990), a "four-lane freeway" facility has been indicated as the "proposed route concept" for the SR

68 corridor segment through the study area. A comprehensive long-term study (outside of the current study's scope) is needed to investigate SR 68 corridor improvements needed through year 2025 and beyond.

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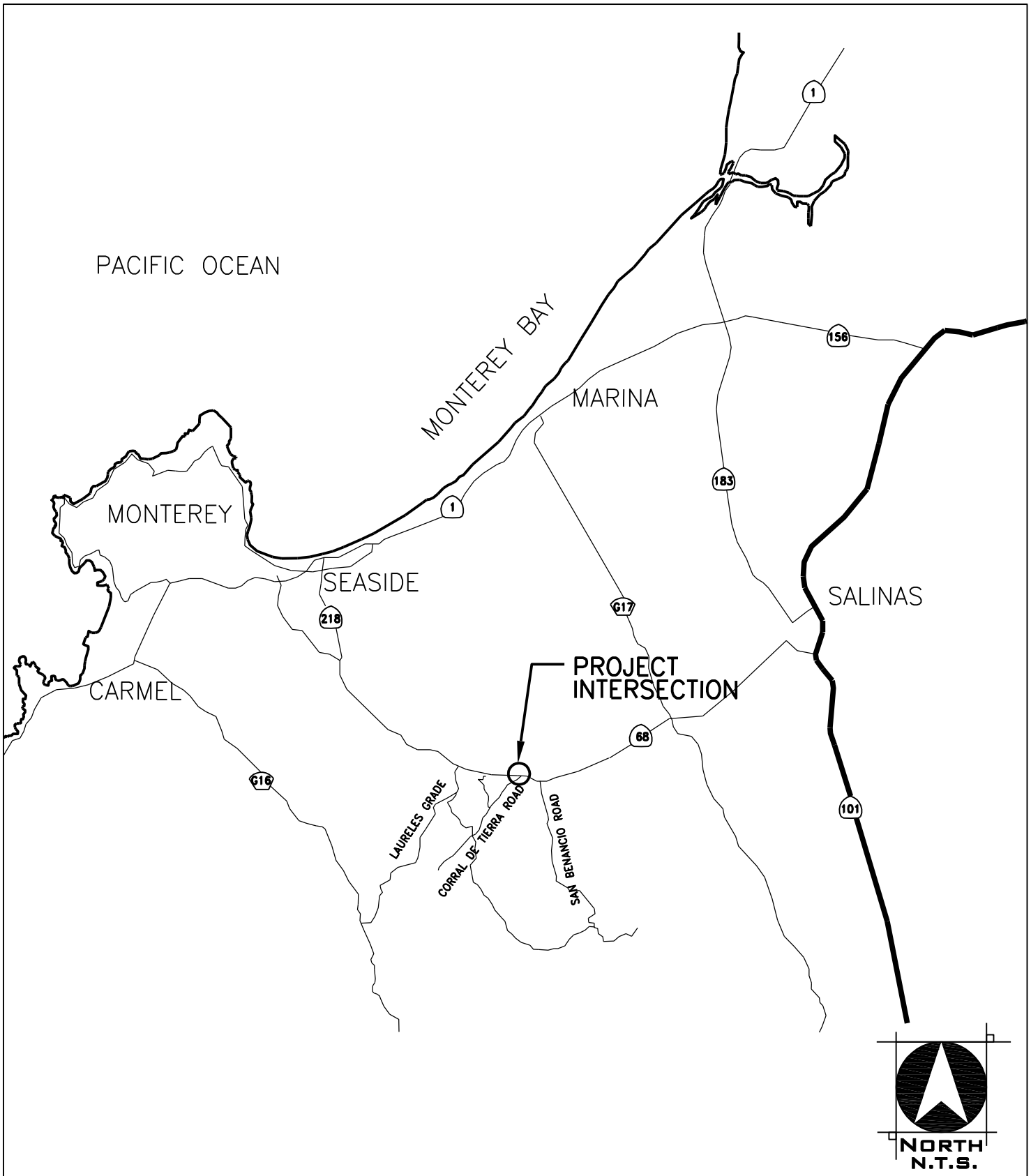
A-2 – Proposed Improvement Alternative 2

List of Attachments

Operational Analysis Worksheets

Caltrans' TASAS Table B and County's Accident Data Records

Caltrans' *SR 68 Route Concept Report* (Available upon Request)



SR 68/CORRAL DE TIERRA ROAD INTERSECTION IMPROVEMENTS PSR **FIGURE 1**

VICINITY MAP AND PROJECT LOCATION

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SR 68/CORRAL DE TIERRA ROAD INTERSECTION IMPROVEMENTS PSR FIGURE 2

EXISTING FACILITIES

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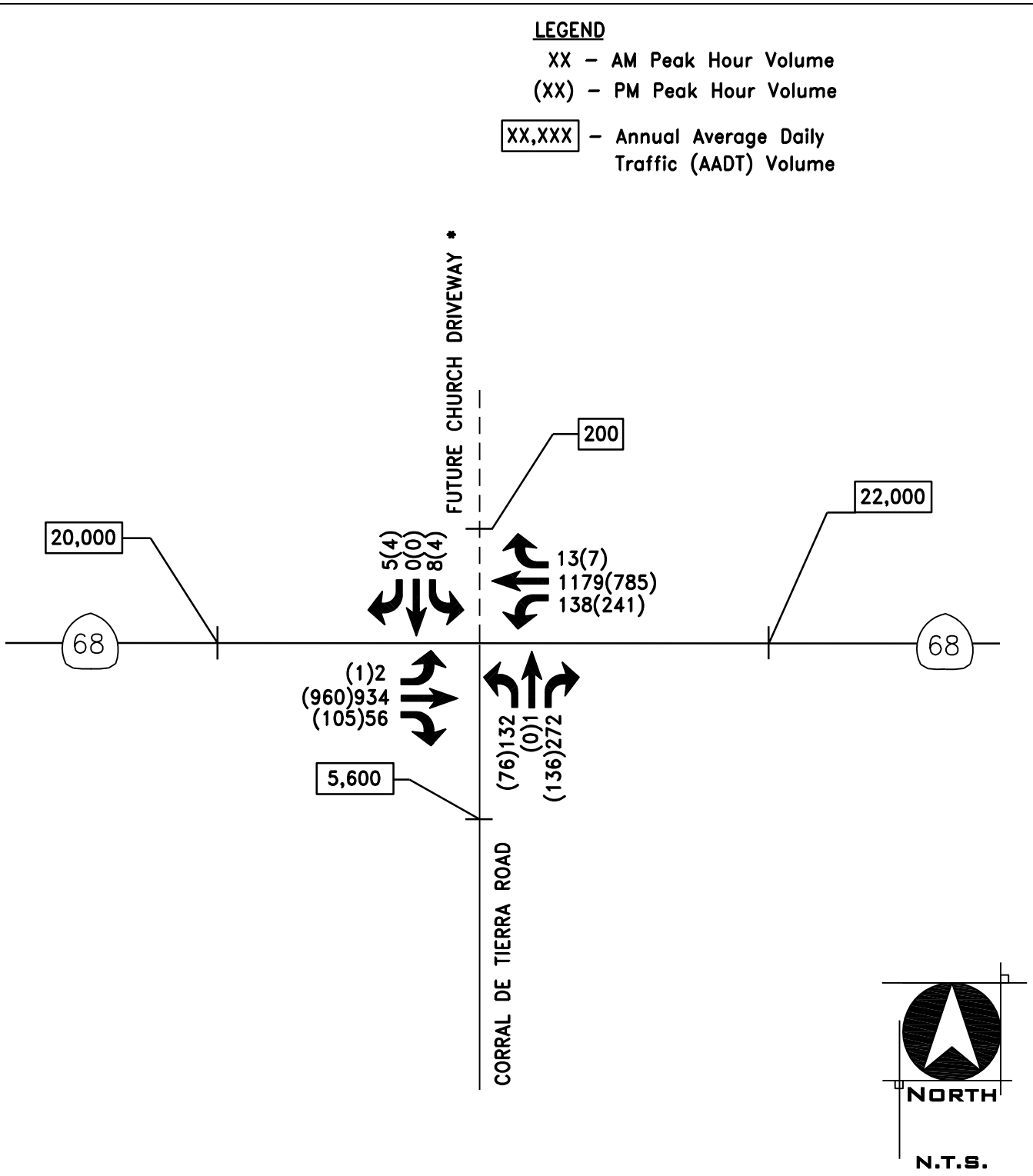

* NOTE: This graphic shows existing (2004) Traffic volumes, as adjusted to reflect conditions with the proposed realignment of the Cypress Church driveway to form the northern leg of the study intersection.

SR 68 /CORRAL DE TIERRA INTERSECTION IMPROVEMENTS PSR FIGURE 3

EXISTING (YEAR 2004) TRAFFIC VOLUMES

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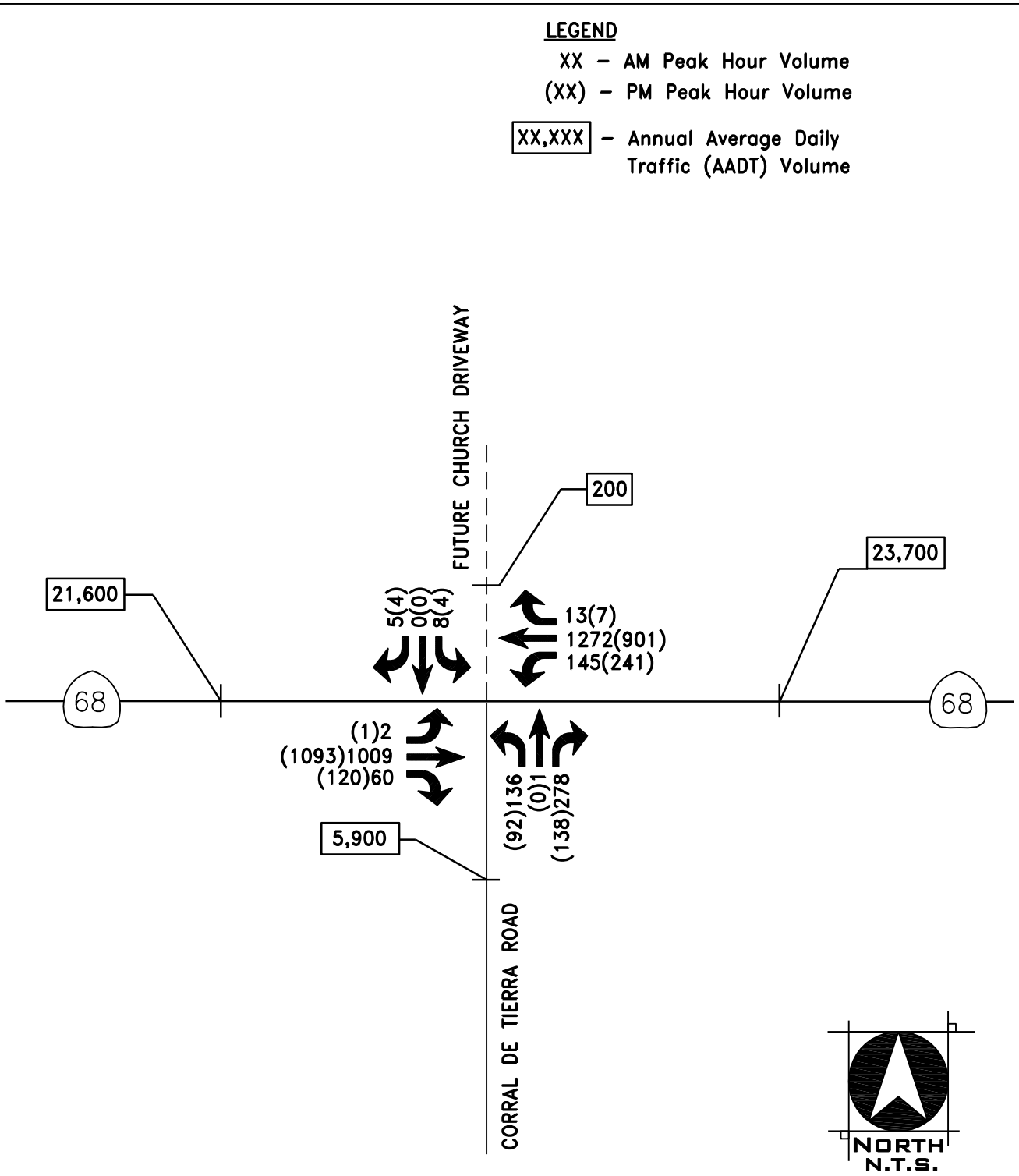

SR 68 /CORRAL DE TIERRA INTERSECTION IMPROVEMENTS PSR FIGURE 4

OPENING DAY (YEAR 2008) TRAFFIC VOLUME PROJECTIONS

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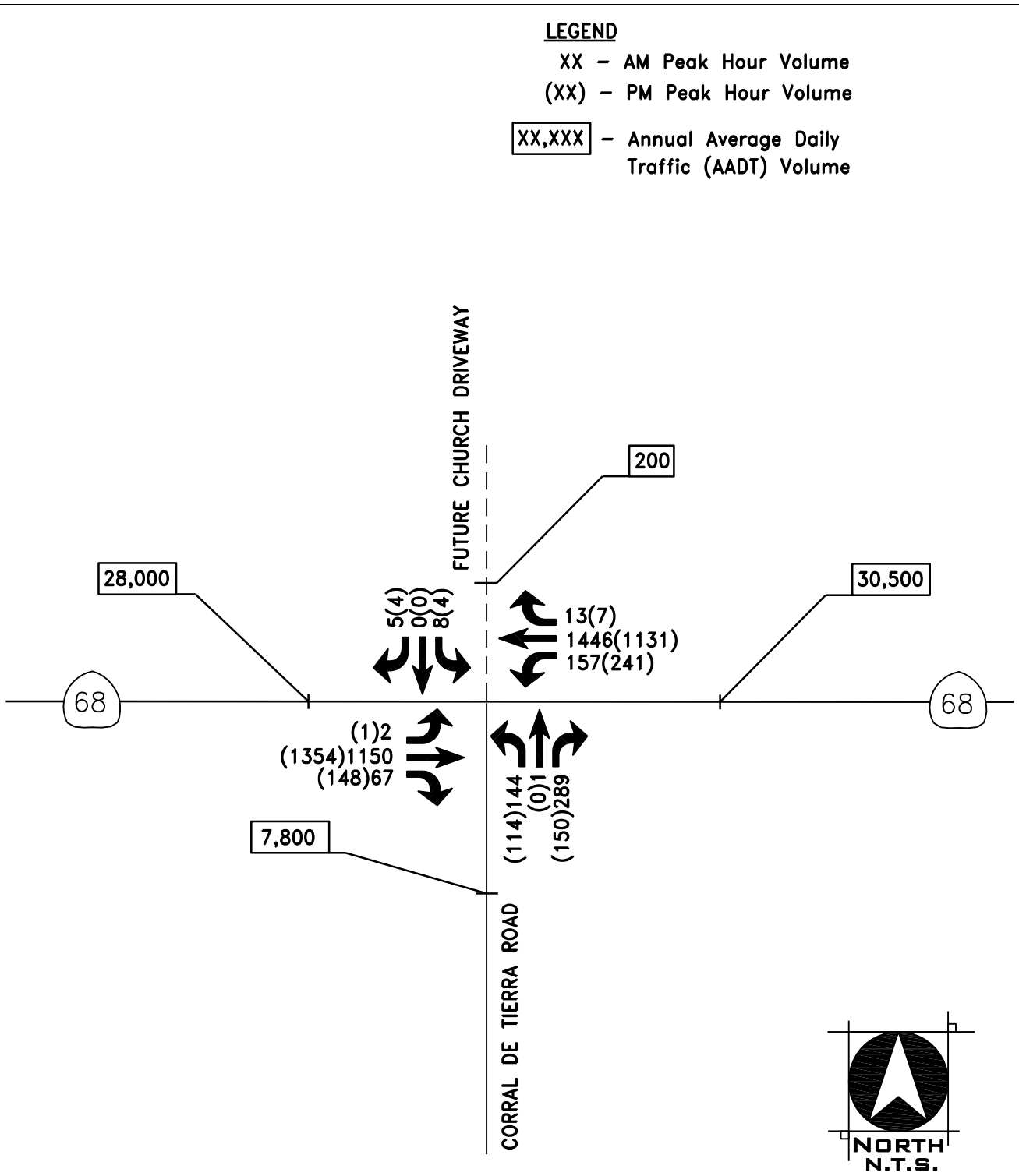

SR 68 /CORRAL DE TIERRA INTERSECTION IMPROVEMENTS PSR FIGURE 5

YEAR 2015 TRAFFIC VOLUME PROJECTIONS

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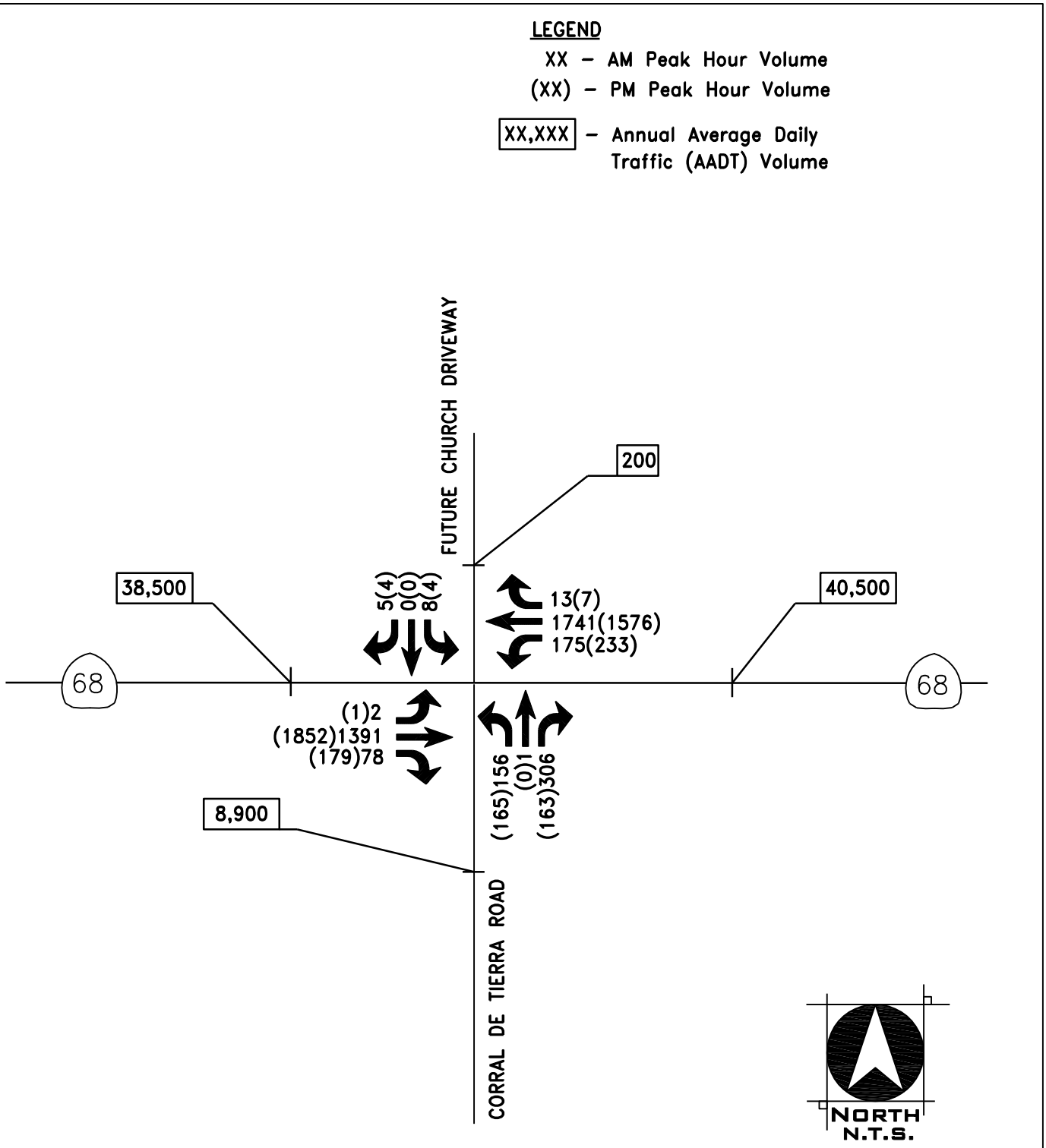

SR 68 /CORRAL DE TIERRA INTERSECTION IMPROVEMENTS PSR FIGURE 6

YEAR 2025 TRAFFIC VOLUME PROJECTIONS

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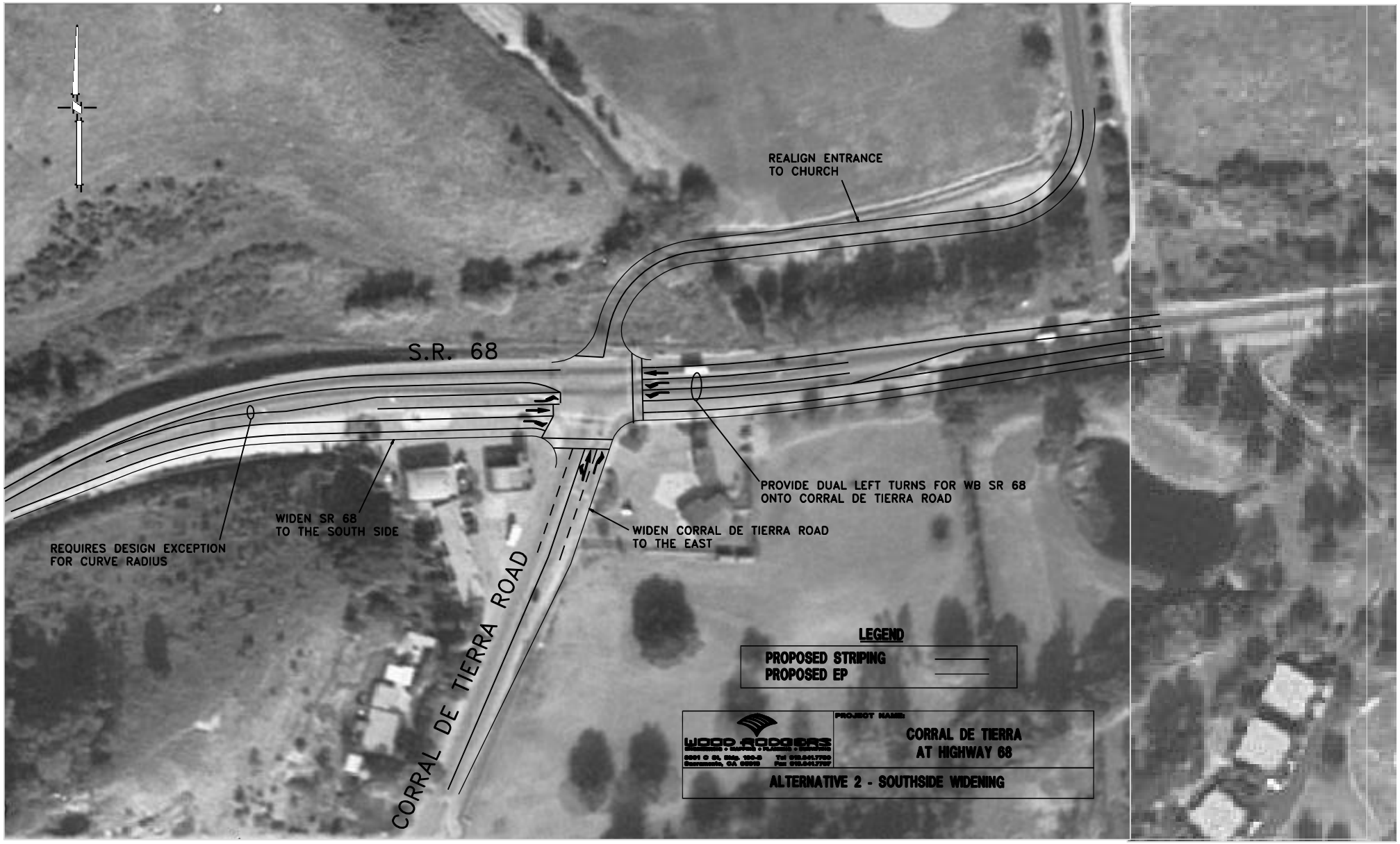
REALIGN ENTRANCE
TO CHURCH
WIDEN SR 68
TO THE NORTH SIDE
S.R. 68
PROVIDE DUAL LEFT TURNS FOR WB SR 68
ONTO CORRAL DE TIERRA ROAD
WIDEN CORRAL DE TIERRA ROAD
TO THE EAST
REQUIRES DESIGN EXCEPTION
FOR CURVE RADIUS
CORRAL DE TIERRA ROAD
LEGEND
PROPOSED STRIPING
PROPOSED EP
WOOD RODGERS
PROJECT NAME:
CORRAL DE TIERRA
AT HIGHWAY 68
ALTERNATIVE 1 - NORTHSIDE WIDENING

EXHIBIT A-1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TO CHURCH
S.R. 68
PROVIDE DUAL LEFT TURNS FOR WB SR 68
ONTO CORRAL DE TIERRA ROAD
WIDEN SR 68
TO THE SOUTH SIDE
WIDEN CORRAL DE TIERRA ROAD
TO THE EAST
REQUIRES DESIGN EXCEPTION
FOR CURVE RADIUS
CORRAL DE TIERRA ROAD
LEGEND
PROPOSED STRIPING
PROPOSED EP
PROJECT NAME:
CORRAL DE TIERRA
AT HIGHWAY 68
ALTERNATIVE 2 - SOUTHSIDE WIDENING

EXHIBIT A-2

Technical Memorandum

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

To:	***Caltrans District 5*** **– David Rasmussen, Paul McClintic, Kelso Vidal**
Cc:	*Monterey County Department of Public Works* – Arturo Adlawan *Wood Rodgers, Inc.* – Ali Hemmati
From:	*Wood Rodgers, Inc.* – Ravi Narayanan, PE, TE; Keith Hallsten PE
Date:	March 21, 2011
File:	J:\Jobs\8091-MontereyCounty\003-PR_SR68_CorralDeTierra\Docs\400 Design Support\480 Traffic\8091_TrafOpsMemo_Mar11.doc
Job No.:	8091.003 EA 05-0H8230
RE:	SR 68 / Corral De Tierra Road (05-MON-68, PM 12.95) Intersection Operational Improvements **Traffic Operations Analysis Addendum**

INTRODUCTION

A Traffic Operations Analysis memorandum (Wood Rodgers, dated 02/28/2005) was completed in support of the *Project Study Report* (PSR) for the construction of operational improvements to the intersection of State Route 68 (SR 68) and Corral de Tierra Road (05-MON-068, PM 12.95), located in the unincorporated area of Monterey County, approximately 13 miles east of the City of Monterey and 9 miles west of the City of Salinas. Caltrans approved the PSR in October 2006. The Project Approval and Environmental Documentation (PA&ED) phase has now been initiated by Monterey County. As part of the current effort, we have prepared this brief evaluation to determine if a significant change to existing traffic volumes for the study facilities has occurred subsequent to the Project Initiation phase that could require an updated traffic operations analysis for the *Project Report* and environmental document. This technical memorandum addendum presents the results of our review of recent traffic trends between year 2003-2004 (existing conditions' analysis year in the PSR) and current year 2009-2010 (existing conditions' analysis year for the PR) on State Route 68 (SR 68) at its intersection with Corral de Tierra Road.

This technical memorandum is intended to serve as a technical addendum to the Traffic Operations Analysis memorandum prepared for the PSR (Wood Rodgers, dated 02/28/2005).

RECENT TRAFFIC GROWTH TRENDS

Caltrans-published Average Daily Traffic (ADT) count data from the years 2003 through year 2009 were reviewed for the segment of SR 68 containing the study intersection with Corral de Tierra Road. *Table 8* of the PSR Traffic Operations Analysis memorandum has been expanded as Table 1 of this addendum to include year 2004 thru year 2009 traffic volumes and the volumes for the study segment and the adjacent highway segments.

TABLE 1
SR 68 SEGMENTS NEAR STUDY INTERSECTION - RECENT TRAFFIC GROWTH TRENDS

Year	SR 68 Mainline Two-Way Annual Average Daily Traffic (AADT) Volume		
	West of Laureles Grade	At Corral De Tierra Road Intersection	East of San Benancio Road
1992	21,300	19,800	23,500
1993	20,600	19,000	22,800
1994	20,300	18,700	22,200
1995	22,500	20,700	24,500
1996	24,700	22,700	27,000
1997	23,000	21,200	25,500
1998	23,500	21,500	26,000
1999	24,000	22,000	26,500
2000	24,000	22,000	26,500
2001	24,500	22,500	27,000
2002	25,000	22,000	26,500
2003	25,000	22,000	26,500
2004	25,500	22,500	27,000
2005	24,300	22,000	25,500
2006	22,500	23,900	26,400
2007	22,500	23,900	26,400
2008	22,500	23,900	26,400
2009	22,100	23,400	25,900

Source: Caltrans Traffic Volumes Publications
Notes: For certain segments and time-frames, Caltrans counts may have been conducted only once in three years.

As illustrated in Table 1 above, the AADT on segment of SR 68 at the Corral de Tierra Road study intersection grew significantly (by 14%) between 1992 and 2001. However, the AADT has only slightly increased (4%) on SR 68 at Corral de Tierra Road from 2001 through 2009, possibly due to slow economic conditions and tourism decline within the study vicinity in recent years. Year 2009 also shows a 4% increase in AADT as compared to 2004, the base year for the PSR traffic analysis. However, it should be noted that the adjacent segment of SR 68 west of Laureles Grade has shown a 13% decline in AADT between years 2004 and 2009. Likewise, the adjacent highway segment east of the study intersection has shown a 4% decline in traffic volumes since 2004. Also, the AADT at the study intersection was lower in 2009 than in the 2006-2008 period. Therefore, it appears unlikely that the small increase in traffic volumes on the SR 68 roadway segment containing the Corral de Tierra Road intersection since 2004 is evidence of a significant upward trend.

RECOMMENDATION

Based on this review, it is Wood Rodgers' general finding and conclusion that the 2005 PSR traffic operations analysis memorandum (dated 02/28/2005) continues to represent a reasonable and current evaluation of existing and forecast traffic operations at the study intersection both with and without the proposed SR 68/Corral de Tierra Road intersection improvement project. Furthermore, Caltrans Traffic Operations staff has acknowledged that the proposed project improvements are scoped adequately based on the traffic operations analysis completed in the PSR phase. An updated traffic operations analysis for the Project Report and environmental document is therefore not recommended to be necessary.

Technical Memorandum

To:	***Caltrans District 5* – David Rasmussen, Paul McClintic, Kelso Vidal**
Cc:	*Monterey County Department of Public Works* – Jonathan Pascua *Wood Rodgers, Inc.* – Ali Hemmati
From:	*Wood Rodgers, Inc.* – Nawid Nessar, PE, TE
Date:	October 28, 2014
File:	J:\Jobs\8091-MontereyCounty\003-PR_SR68_CorralDeTierra\Docs\400 Design Support\480 Traffic\8091_TrafOpsMemo_Oct14.doc
Job No.:	8091.003 EA 05-0H8230
RE:	SR 68 / Corral De Tierra Road (05-MON-68, PM 12.95) Intersection Operational Improvements **Traffic Operations Analysis Addendum**

INTRODUCTION

A Traffic Operations Analysis memorandum (Wood Rodgers, dated 02/28/2005) was completed in support of the *Project Study Report* (PSR) for the construction of operational improvements to the intersection of State Route 68 (SR 68) and Corral de Tierra Road (05-MON-068, PM 12.95), located in the unincorporated area of Monterey County, approximately 13 miles east of the City of Monterey and 9 miles west of the City of Salinas. Caltrans approved the PSR in October 2006. The Project Approval and Environmental Documentation (PA&ED) phase has now been initiated by Monterey County. As part of the current effort, we have prepared this brief evaluation to determine if a significant change to existing traffic volumes for the study facilities has occurred subsequent to the Project Initiation phase that could require an updated traffic operations analysis for the *Project Report* and environmental document. This technical memorandum addendum presents the results of our review of recent traffic trends between year 2003-2004 (existing conditions' analysis year in the PSR) and current year 2013-2014 (existing conditions' analysis year for the PR) on State Route 68 (SR 68) at its intersection with Corral de Tierra Road.

This technical memorandum is intended to serve as a technical addendum to the Traffic Operations Analysis memorandum prepared for the PSR (Wood Rodgers, dated 02/28/2005).

RECENT TRAFFIC GROWTH TRENDS

Caltrans-published Average Daily Traffic (ADT) count data from the years 2003 through year 2013 were reviewed for the segment of SR 68 containing the study intersection with Corral de Tierra Road. *Table 8* of the PSR Traffic Operations Analysis memorandum has been expanded as Table 1 of this addendum to include year 2004 thru year 2013 traffic volumes and the volumes for the study segment and the adjacent highway segments.

TABLE 1
SR 68 SEGMENTS NEAR STUDY INTERSECTION - RECENT TRAFFIC GROWTH TRENDS

Year	SR 68 Mainline Two-Way Annual Average Daily Traffic (AADT) Volume		
	West of Laureles Grade	At Corral De Tierra Road Intersection	East of San Benancio Road
1992	21,300	19,800	23,500
1993	20,600	19,000	22,800
1994	20,300	18,700	22,200
1995	22,500	20,700	24,500
1996	24,700	22,700	27,000
1997	23,000	21,200	25,500
1998	23,500	21,500	26,000
1999	24,000	22,000	26,500
2000	24,000	22,000	26,500
2001	24,500	22,500	27,000
2002	25,000	22,000	26,500
2003	25,000	22,000	26,500
2004	25,500	22,500	27,000
2005	24,300	22,000	25,500
2006	22,500	23,900	26,400
2007	22,500	23,900	26,400
2008	22,500	23,900	26,400
2009	22,100	23,400	25,900
2010	22,100	23,400	25,900
2011	22,100	23,400	25,900
2012	22,200	23,000	25,000
2013	22,200	23,000	25,000

Source: Caltrans Traffic Volumes Publications

As shown in Table 1, the AADT on segment of SR 68 at the Corral de Tierra Road study intersection grew significantly (by 14%) between 1992 and 2001. However, the AADT has only slightly increased (2%) on SR 68 at Corral de Tierra Road from 2001 through 2013, possibly due to slow economic conditions and tourism decline within the study vicinity in recent years. Year 2013 also shows a 2% increase in AADT as compared to 2004, the base year for the PSR traffic analysis. However, it should be noted that the adjacent segment of SR 68 west of Laureles Grade has shown a 13% decline in AADT between years 2004 and 2013. Likewise, the adjacent highway segment east of the study intersection has shown a 7% decline in traffic volumes since 2004. Also, the AADT at the study intersection was lower in 2012-2013 than in the 2006-2011 period. Therefore, it appears unlikely that the small increase in traffic volumes on the SR 68 roadway segment containing the Corral de Tierra Road intersection since 2004 is evidence of a significant upward trend.

RECOMMENDATION

Based on this review, it is Wood Rodgers' general finding and conclusion that the 2005 PSR traffic operations analysis memorandum (dated 02/28/2005) continues to represent a reasonable and current evaluation of existing and forecast traffic operations at the study intersection both with and without the proposed SR 68/Corral de Tierra Road intersection improvement project. Furthermore, Caltrans Traffic Operations staff has acknowledged that the proposed project improvements are scoped adequately based on the traffic operations analysis completed in the PSR phase. An updated traffic operations analysis for the Project Report and environmental document is therefore not recommended to be necessary. The project Opening Day traffic volumes stated as 2008 in the 2005 memo can be taken to apply to year 2016. The traffic volumes forecast for 20 years after construction can be taken to apply to year 2036.

TRAFFIC OPERATIONS ANALYSIS TECHNICAL MEMORANDUM

ADDENDUM

STATE ROUTE 68/CORRAL DE TIERRA INTERSECTION IMPROVEMENT PROJECT

Monterey County, California

05-Mon-68 PM 12.8/13.2

EA 05-0H8230

JUNE 2015

PURPOSE OF THE TRAFFIC OPERATIONS ANALYSIS TECHNICAL MEMORANDUM UPDATED ADDENDUM

After the circulation of the Draft Initial Study with Proposed Mitigated Negative Declaration (Draft IS/MND) and in response to public comments received, the County of Monterey and the California Department of Transportation (Caltrans) adopted project design modifications. This Addendum was prepared to address the project design modifications.

CHANGE IN PROJECT DESIGN

The project design modifications are shown in yellow in the Build Alternative Design Plan provided at the end of this Addendum and described in detail below.

CHANGE IN PROJECT DESCRIPTION

The project design modifications included the following components:

- The shoulder widening of Corral de Tierra Road in the southbound direction would be reduced from 8 feet to 6 feet.
- The driveway that serves the five homes on the north side of State Route 68 would be realigned so that access to these homes would be shared with the Cypress Community Church's driveway.
- A 110 foot-long merge lane on State Route 68 for vehicles turning left out of The Villas driveway would be provided.
- The existing gutter on Corral de Tierra Road would be replaced with a flatter gutter.

PROJECT IMPACTS

Project design modifications including construction of a 110 foot-long merge lane along SR-68 to facilitate left turn movements onto SR-68 from The Villa's driveway on the south side

of SR-68 would not result in traffic recirculation; therefore, the findings and recommendations identified in the Traffic Operations Analysis Technical Memorandum remain valid.

Implementation of the proposed driveway realignment would result in re-routing the traffic volumes generated by the five existing residences serviced by this driveway to the driveway servicing the Cypress Community Church (which forms the fourth leg of the SR-68/Corral de Tierra intersection). The re-routing of these volumes is not anticipated to have a significant impact on the SR-68/Corral de Tierra intersection because these volumes were included in the original traffic analysis and are not considered new or additional volumes. Therefore, the findings and recommendations identified in the Traffic Operations Analysis Technical Memorandum remain valid.

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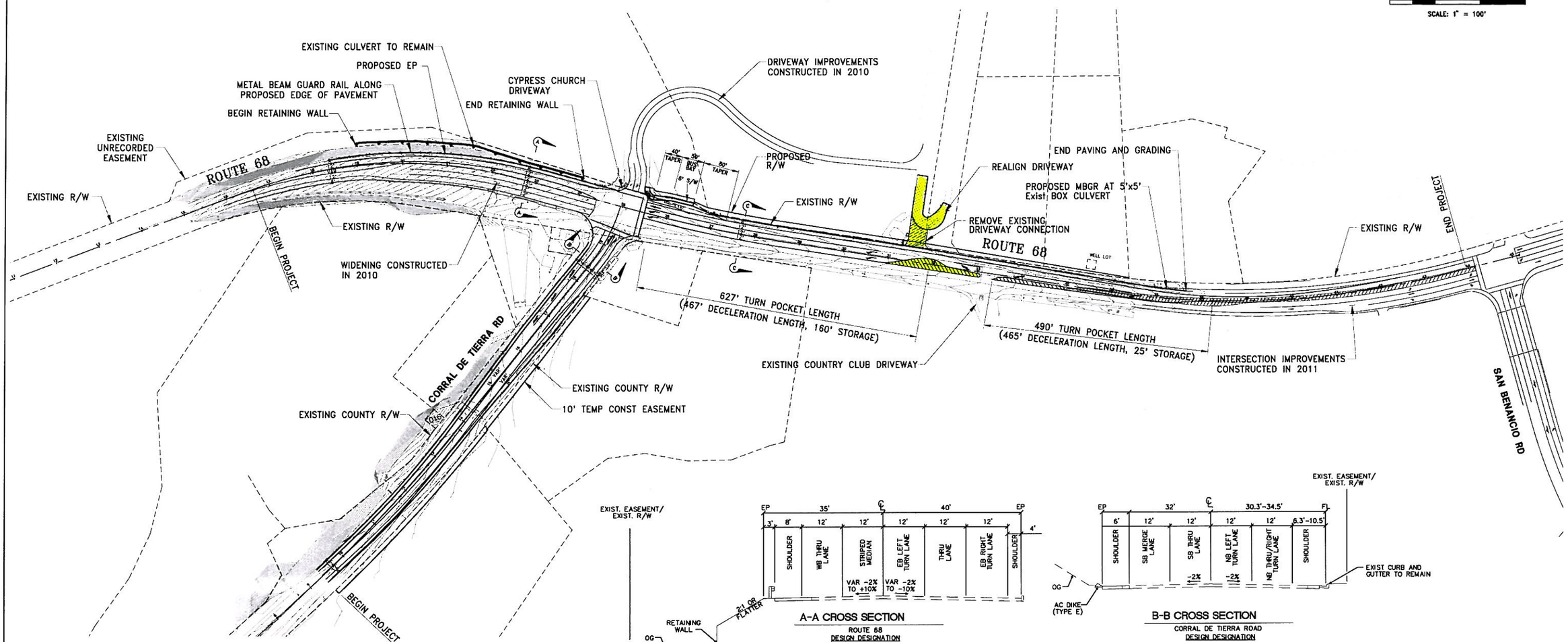
ROUTE 68/CORRAL DE TIERRA ROAD INTERSECTION IMPROVEMENTS

BUILD ALTERNATIVE

COUNTY OF MONTEREY CALIFORNIA

MAY, 2015



A-A CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

ADT (2014) = 21,600 (DESIGN VOLUME)
ADT (20 YEAR) = 38,500
DHV = 2,484
ESAL = 5,775,045

D = 57%
T = 4.0%
V = 55 MPH
TI_{20} = 11.0

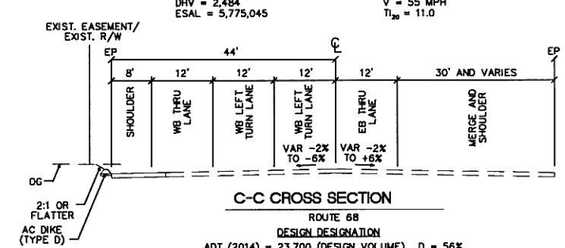
B-B CROSS SECTION

CORRAL DE TIERRA ROAD

DESIGN DESIGNATION

ADT (2014) = 7,100 (DESIGN VOLUME)
ADT (20 YEAR) = 8,900
DHV = 619
ESAL = 735,017

D = 67%
T = 2.0%
V = 55 MPH
TI_{20} = 8.5



C-C CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

ADT (2014) = 23,700 (DESIGN VOLUME)
ADT (20 YEAR) = 40,500
DHV = 2,725
ESAL = 6,060,788

D = 56%
T = 4.0%
V = 55 MPH
TI_{20} = 11.0

WOOD RODGERS
ENGINEERING - MAPPING - PLANNING - SURVEYING
3301 C St, Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

J:\Jobs\8291-MONTEREYCOUNTY\003-PM_SR68_CorralDeTierra\Graphics\CAD\ER-A11.dwg 5/8/2015 4:53 PM Noomi Liang

WATER QUALITY ASSESSMENT REPORT

STATE ROUTE 68/CORRAL DE TIERRA ROAD
INTERSECTION IMPROVEMENT PROJECT
MONTEREY COUNTY, CALIFORNIA

05-MON-068-PM 12.8/13.2
EA# 05-0H8230

Prepared for:

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Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, California 93401

and

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LSA Project No. WRS0605

February 2013

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LIST OF ACRONYMS

AGR	Agricultural Supply
Basin Plan	CCRWQCB Board Water Quality Control Plan
BAT	Best Available Technology
BCT	Best Control Technology
BMPs	Best Management Practices
Caltrans	California Department of Transportation\
CCRWQCB	Central Coast Regional Water Quality Control Board
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
COLD	Cold Fresh Water Habitat
COMM	Commercial and Sport Fishing
Corps	United States Army Corps of Engineers
County	County of Monterey
CWA	Clean Water Act
FRESH	Freshwater Replenishment
ft	feet
km	kilometer
LOS	level of service
m	meters
MEP	Maximum Extent Practicable
mi	miles
MIGR	Migration of Aquatic Organisms
mg/l	milligrams per liter
MS4	Municipal Separate Storm Sewer System
MUN	Municipal and Domestic Supply
NAWQA	National Water Quality Assessment
NPDES	National Pollution Discharge Elimination System
SWIS	National Water Information System
NWP	Nationwide Permit
PR	Project Report
PS&E	Plans, Specifications, and Estimates
PSR	Project Study Report
REC-2	Noncontact Water Recreation
RWQCB	Regional Water Quality Control Board
SR-68	State Route 68
SWMP	Storm Water Management Plan (Caltrans)
SWMP	Storm Water Management Program (County)
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load

US	United States
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WARM	Warm Freshwater Habitat
WDR	Waste Discharge Requirements
WILD	Wildlife Habitat
WPCP	Water Pollution Control Program
WILD	Wildlife Habitat

EXECUTIVE SUMMARY

The proposed project consists of operational improvements of the existing State Route 68 (SR-68)/Corral de Tierra Road intersection, including widening of the SR-68/Corral de Tierra Road intersection to accommodate the construction of a second left-turn lane from westbound SR-68 to southbound Corral de Tierra Road and the construction of a second receiving lane on Corral de Tierra Road.

The California Department of Transportation, District 5 (Caltrans) is required to incorporate water quality controls into a project during the Project Study Report (PSR); Project Report (PR); and Plans, Specifications, and Estimates (PS&E) phases of project development. The Storm Water Management Plan (SWMP) provides the framework for management of storm water discharges and water quality controls. Storm water quality controls that are applied are either temporary (during construction) or permanent (after construction and part of operation of the project).

During construction, the project would disturb 1.44 acre (ac) of soil. The proposed project would qualify for an Erosivity Waiver; therefore, a Water Pollution Control Program (WPCP) would be prepared for the proposed project. The WPCP identifies the specific best management practices (BMPs) to be implemented during project construction so as not to cause or contribute to an exceedance of any applicable water quality standard contained in a statewide Water Quality Control Plan and/or the applicable Central Coast Regional Water Quality Control Board's (RWQCB) Basin Plan. Construction Site BMPs are designed to meet the technology requirement as stipulated in the Caltrans National Pollution Discharge Elimination System (NPDES) permit. If Construction Site BMPs are properly designed, implemented, and maintained as required by the Caltrans NPDES permit, then no adverse water quality impacts would occur during construction of the proposed project.

The implementation of the SR-68/Corral de Tierra Road Intersection Improvement project would not represent a substantial change from the existing condition with respect to water quality. The increase in impervious surface would be minor and would not appreciably change the amount of runoff from the proposed project. Preliminary engineering for the project indicates that the change in the velocity and volume of storm water runoff from the site with project implementation would be negligible. As part of the Caltrans Project Delivery Storm Water Management Program described in the SWMP, selected Design Pollution Prevention BMPs would be incorporated into the design of the proposed project, where feasible. These BMPs would be implemented so as to meet or exceed the requirements of the Caltrans Statewide NPDES Permit. If Design Pollution Prevention BMPs are properly designed, implemented, and maintained as required by the Caltrans NPDES permit, no adverse water quality impacts would occur during operation of the proposed project.

1.0 INTRODUCTION

This Chapter provides a description of the proposed project alternatives as well as the approach to the Water Quality Assessment in evaluating the potential impacts related to project implementation.

The SR-68/Corral de Tierra Road Intersection Improvement project (proposed project) addresses operational improvements at the SR-68/Corral de Tierra Road intersection, located in the unincorporated area of Monterey County approximately 13 miles (mi) east of the City of Monterey and approximately 9 mi west of the City of Salinas. Figure 1 shows the regional location of the project and the project vicinity. The operational improvements will widen the SR-68/Corral de Tierra Road intersection to accommodate the construction of a second left-turn lane from westbound SR-68 to southbound Corral de Tierra Road and the construction of a second receiving lane on Corral de Tierra Road.

Caltrans District 5 will be the Lead Agency for California Environmental Quality Act (CEQA) compliance. The County of Monterey (County) Public Works Department will be a Responsible Agency under CEQA. Current funding for the project is local, and it is not anticipated that federal funds will be utilized.

1.1 PURPOSE AND NEED

The existing SR-68/Corral de Tierra Road intersection exhibits an evening peak-hour level of service (LOS) D. Both Caltrans and County planning documents cite LOS C as the standard for operations on SR-68. The purpose of the project is to improve traffic operations within the intersection to LOS C upon completion of project construction.

1.2 PROJECT DESCRIPTION

The Build Alternative (as described below) and the No Build Alternative are being considered for improving the SR-68/Corral de Tierra Road intersection.

1.2.1 No Build Alternative

The No Build Alternative assumes that no new improvements would be constructed. Under the No Build Alternative, the roadway's operational conditions will remain at or above the standard of Level of Service D (refer to Traffic Operations Technical Memorandum). Projections indicated that the unimproved intersection would operate at a Level of Service of E in the a.m. peak hour and Level of Service F in the p.m. peak hour by 2024, and therefore, the No Build Alternative fails to meet the purpose and need of this project.

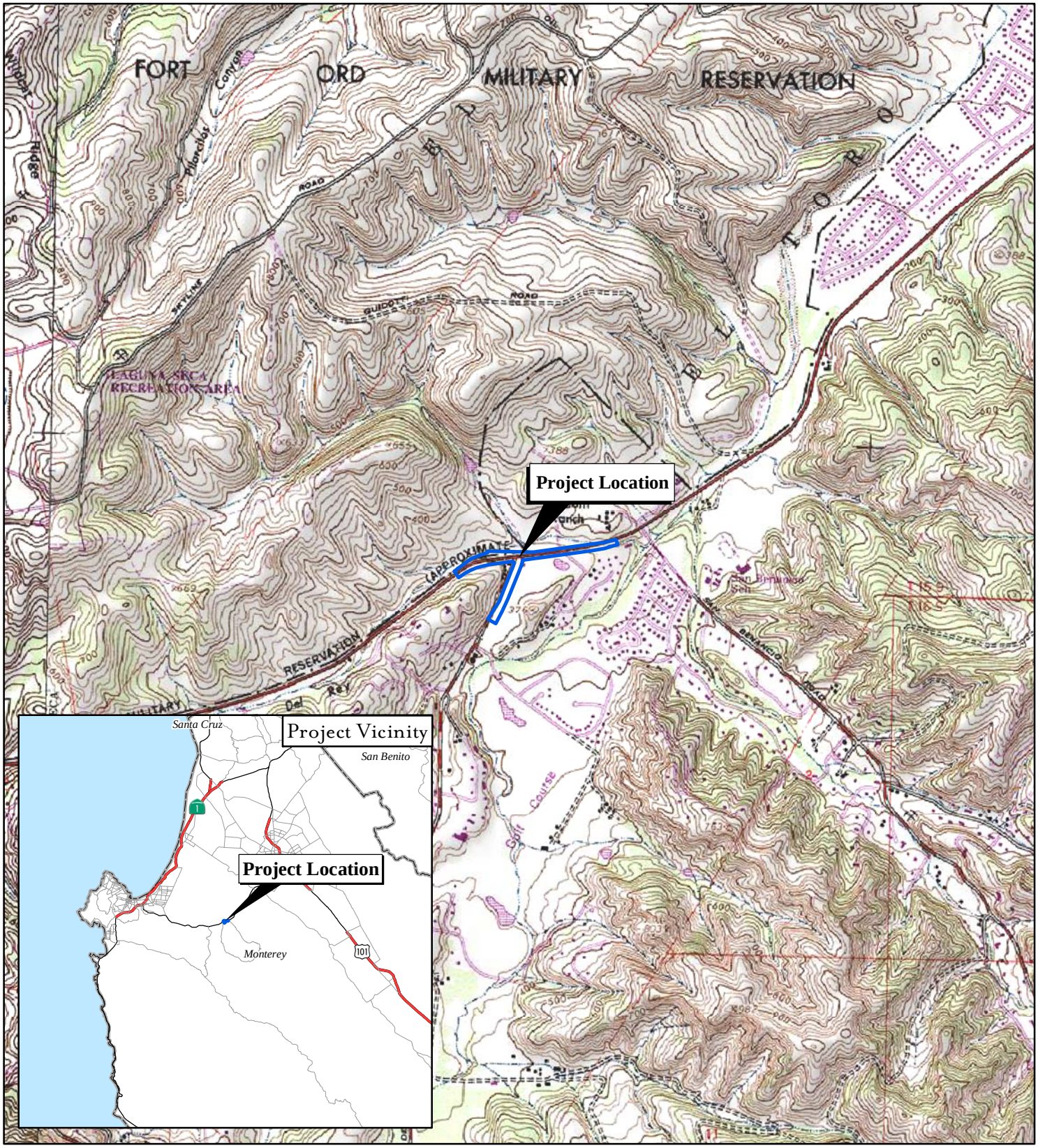

FIGURE 1

0 1,000 2,000 Feet

0 300 600 Meters

SR 68 / Corral de Tierra Road
Intersection Improvement Project
Project Location Map

SOURCE: USGS 7.5' QUAD, SPRECKELS, CA (1984); Wood Rodgers (2006)

I:\WRS0605\GIS\Fig1.mxd (4/18/2007)

1.2.2 Build Alternative

The proposed project would widen the SR-68/Corral de Tierra intersection to the north of the existing alignment to accommodate the construction of a second (additional) left turn lane from westbound SR-68 onto southbound Corral de Tierra Road. Both of the left turn lanes (in the median of SR-68) would have sufficient length to accommodate deceleration from 53 miles per hour. An additional receiving lane would also be constructed on southbound Corral de Tierra Road. The paved shoulders of Corral de Tierra Road within the project area would be widened to 8 feet to better accommodate pedestrians and facilitate the future addition of Class II bicycle lanes to Corral de Tierra Road.

About 520 feet of Steel Crib retaining wall (or equivalent) would be constructed west of Corral de Tierra Road along the north embankment of SR-68. The retaining wall would lie below the existing road grade and therefore would not be visible from SR-68. The retaining wall would minimize the footprint of the embankment needed to accommodate the widened road section.
A left turn lane would also be constructed from westbound SR-68 into the Corral de Tierra County Club driveway. The Corral de Tierra County Club driveway is located east of Corral de Tierra Road on the south side of SR-68.

No provisions for left turns to or from the residential driveway on the north side of SR-68 would be made. As part of the proposed project, a painted median island would be created in front of the residential driveway restricting drivers to right-in, right-out access. Drivers needing to make left-in, left-out movements would need to make a U-turn at the traffic signal at either San Benancio Road or at Corral de Tierra Road. U-turn movements at these signalized intersections are both legal and safe.

All of the work would be constructed within existing State and County rights-of-way, except for a small area of new State right-of-way that would be acquired on the north side of SR-68 just east of the intersection to accommodate relocation of a bus stop, widening and grading. Also, a temporary construction easements would be acquired along the east side of Corral de Tierra Road to accommodate grading near the edge of the County right-of-way (refer to Figure 1-3: Build Alternative Design Plan). Temporary staging areas for construction equipment and materials would be located in those areas of the existing State and County rights-of-way that are not designated as environmentally sensitive areas. Construction is expected to be completed in a single season.

1.3 APPROACH TO WATER QUALITY ASSESSMENT

The purpose of this Water Quality Assessment Report is to determine whether improvement to the SR-68/Corral de Tierra Road intersection will have an adverse impact on water quality based on the proposed build alternative. The determination of impacts is based on the anticipated change in pollutant sources due to changes in land use and changes in the impervious area percentage between the existing condition and the postproject condition. The analysis includes consideration of BMPs to be implemented as part of the project. This assessment also discusses existing water quality regulations and Caltrans methods of complying with those regulations.

2.0 REGULATORY SETTING

Discharges into waters of the United States (U.S.) are subject to the regulatory authority of the Unites States Army Corps of Engineers (Corps) under Section 404 of the federal Clean Water Act (CWA); the State Water Resources Control Board (SWRCB) and the CCRWQCB under Sections 401, 402, and 303(d) of the CWA and the California Porter-Cologne Water Quality Act; and the California Department of Fish and Wildlife (CDFW) under Section 1602 of the California Fish and Game Code.

2.1 FEDERAL REQUIREMENTS OF THE CLEAN WATER ACT

2.1.1 Section 404

The Corps regulates discharges or fills into Waters of the U.S. under Section 404 of the CWA via the Nationwide Permit (NWP) or Individual Permit program. There are several categories of NWPs, and these can be used for projects that fall under specific categories. A Preconstruction Notification (PCN) to the Corps' district engineer is required for most activities that result in the loss of greater than 0.1 ac of Waters of the U.S.. The Corps reviews the PCN on a case-by-case basis to determine whether the adverse effects (on the aquatic environment) of proposed work are minimal. The Corps will also determine whether a particular drainage is considered Waters of the U.S. and whether it is subject to regulation under Section 404.

2.1.2 Section 402

Direct discharges of pollutants into Waters of the U.S. are not allowed, except in accordance with the NPDES program established in Section 402 of the CWA. The major purpose of the NPDES program is to protect human health and the environment. Pursuant to the NPDES program, permits that apply to storm water discharges from MS4s, specific industrial activities, and construction activities (1 ac or more) have been issued. NPDES permits establish enforceable effluent limitations on discharges, require monitoring of discharges, designate reporting requirements, and require the permittee to perform BMPs. Industrial (point source) storm water permits are required to meet effluent limitations; municipal permits are governed by the maximum extent practicable (MEP) or Best Available Technology (BAT)/Best Control Technology (BCT) application of BMPs.

2.1.3 Section 401

Section 401 of the CWA specifies that any applicant for a federal license or permit to conduct any activity, including but not limited to the construction or operation of facilities that may result in any discharge into navigable waters, shall provide the federal licensing or permitting agency with a certification from the State in which the discharge originates or will originate from the State agency with jurisdiction over those waters (CCRWQCB) that the project will comply with water quality standards, protect beneficial uses, meet water quality objectives, and comply with the State antidegradation policy.

2.1.4 Section 303

Section 303(d) of the CWA requires that the State adopt water quality objectives for surface waters. The CCRWQCB Basin Plan and Resolution No. R8-2004-0001 contain water quality objectives that are considered necessary to protect the specific beneficial uses the Basin Plan identifies. In addition, because California had not established a complete list of acceptable water quality criteria for toxic pollutants, United States Environmental Protection Agency (USEPA) Region IX established numeric water quality criteria for toxic constituents in the form of the California Toxics Rule. Section 303(d) also specifically requires the State to develop a list of impaired water bodies and subsequent numeric Total Maximum Daily Loads (TMDL)[1] for whichever constituents impair a particular water body. These constituents include inorganic and organic chemical compounds, metals, sediment, and biological agents.

2.2 STATE REQUIREMENTS

2.2.1 Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code)

The Porter-Cologne Act establishes a regulatory program to protect water quality and beneficial uses of State waters. For all areas within the regions, it empowers the Regional Boards to formulate and adopt a Basin Plan that designates beneficial uses and establishes such water quality objectives that in their judgment will ensure reasonable protection of beneficial uses. Each Regional Board establishes water quality objectives that will ensure the reasonable protection of beneficial uses and the prevention of nuisance. The Water Code provides flexibility for some change in water quality, provided that beneficial uses are not adversely affected.

2.2.2 California Fish and Game Code Section 1602

The CDFW, through provisions of the California Fish and Game Code (Section 1602), is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. Streams and rivers are defined by the presence of a channel bed and banks and at least an intermittent flow of water. CDFW typically extends the limits of its jurisdiction laterally beyond the channel banks for streams that support riparian vegetation. In these situations, the outer edge of the riparian vegetation is generally used as the lateral extent of the stream and CDFW jurisdiction.

The California Fish and Game Code Section 1602 requires any person, State or local governmental agency, or public utility to notify the CDFW before beginning any activity that will result in one or more of the following: (1) substantial obstruction or diversion of the natural flow of a river, stream, or lake, (2) substantial change in or use of any material from the bed, channel, or bank of a river, stream, or lake, or (3) deposit or disposal of debris, waste, or other material containing crumbled, flaked, or

[1] The TMDL is the total amount of a constituent that can be discharged while meeting water quality objectives and protecting beneficial uses. It is the sum of the individual load allocations for point source inputs (e.g., an industrial plant), load allocations for nonpoint source inputs (e.g., runoff from urban areas), and natural background, with a margin of safety.

ground pavement where it can pass into a river, stream, or lake. The Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.[1]

2.2.3 State Requirements under Section 402 of the CWA

Construction General Permit. On September 2, 2009, the State Water Resources Control Board adopted the *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Final Order No. 2012-011-DWQ, NPDES No. CAS000003), as amended by Order No. 2010-0014-DWQ. In accordance with NPDES regulations, the State of California requires that any construction activity disturbing 1 ac or more of soil comply with the Construction General Permit. To obtain authorization for proposed storm water discharges pursuant to this permit, the landowner (discharger) is required to submit a Notice of Intent and Permit Registration Documents, including a risk assessment, site map, SWPPP, annual fee, and signed certification statement to the State Water Resources Control Board. Dischargers are required to implement BMPs meeting the technological standards of Best Available Technology/Best Control Technology to reduce or eliminate storm water pollution. BMPs include programs, technologies, processes, practices, and devices that control, prevent, or remove or reduce pollution. Permittees must also maintain BMPs and conduct inspection and sampling programs as required by the permit. Dischargers are also required to comply with monitoring and reporting requirements to ensure that discharges comply with the numeric action levels and numeric effluent limitations specified in the permit.

Projects that disturbed between 1 and 5 ac can qualify for an Erosivity Waiver by certifying to the State Water Resources Control Board that the construction activity would occur only when the Rainfall Erosivity Factor is less than 5 ("R" in the Revised Universal Soil Loss Equation). The Rainfall Erosivity Factor was calculated as 1.3 for the proposed project using construction dates of May 1, 2014 and October 1, 2014. Because the Rainfall Erosivity factor is less than 5 and the disturbed soil area would be between 1 and 5 ac, the proposed project qualifies for a Rainfall Erosivity Waiver.

Caltrans Statewide NPDES Permit. On September 19, 2012, the SWRCB issued a statewide general NPDES Storm Water Permit (Order No. 2012-0011- DWQ) to Caltrans, which regulates storm water discharges from Caltrans properties, facilities, and (maintenance) activities and requires that the Caltrans construction program comply with the requirements of the State General Construction Activity Storm Water Permit (Order No. 2009-0009-DWQ). The Caltrans Statewide Storm Water Management Plan (SWMP) describes the methods for complying with the Caltrans NPDES Permit. This permit requires preparation of a Water Pollution Control Program (WPCP) for projects that disturb between 1 and 5 ac of soil and qualify for an Erosivity Waiver. Operation of the project is subject to the requirements of the Caltrans NPDES permit for the portion of the project that is within State right-of-way.

MS4 Permit. The County of Monterey is subject to the requirements of the *State Water Resources Control Board (SWRCB) Water Quality Order No. 2003-0005-DWQ, National Pollutant Discharge*

[1] California Department of Fish and Game Web site: www.dfg.ca.gov/1600/qa.html.

Elimination System (NPDES) General Permit No. CAS000004, Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4 Permit).[1] The region within the County subject to these requirements must at least include all urbanized areas. The General Permit requires permittees to develop and implement an SWMP that describes BMPs, measurable goals, and timetables for implementation in the following six program areas:

- Public Education
- Public Participation
- Illicit Discharge Detection and Elimination
- Construction Site Storm Water Runoff Control
- Postconstruction Storm Water Management
- Pollution Prevention/Good Housekeeping for Municipal Operations

In particular, the MS4 Permit requires that the County develop and implement strategies that include a combination of appropriate structural and/or nonstructural BMPs to be incorporated into new development and redevelopment projects. Source Control BMPs are pollution prevention practices that are designed to reduce pollutants in runoff from a project site (e.g., street sweeping, drainage system maintenance). Treatment BMPs are structural devices that physically remove pollutants in runoff (e.g., infiltration basins, vegetated swales). The Monterey Regional Storm Water Management Program was adopted on November 15, 2006, which requires the County to develop, implement, and enforce a program to reduce pollutants in storm water runoff from construction activities, development projects, and redevelopment projects that disturb more than 1 ac of soil.

2.2.4 Regional and Local Requirements

The County of Monterey requires an Erosion Control Plan that identifies the proposed methods for controlling runoff, erosion, and sediment movement for review and approval by the appropriate director for projects within its jurisdiction (Municipal Code, Chapter 16.12).

2.3 BENEFICIAL USES

Beneficial uses of water are defined in the CCRWQCB's Basin Plan as those necessary for the survival or well-being of humans, plants, and wildlife. Examples of beneficial uses include drinking water supplies, swimming, industrial and agricultural water supply, and the support of freshwater and marine habitats and their organisms.

[1] April 30, 2003.

2.3.1 Surface Water Beneficial Uses

There are no designated beneficial uses for El Toro Creek. Surface waterbodies that do not have designated beneficial uses are automatically assigned the following designations according to the Basin Plan:

- Municipal and domestic water supply
- Protection of both recreation and aquatic life

Beneficial uses for the Salinas River, downstream of Spreckels (downstream of the project site), are listed below.

- Agricultural Supply (AGR): Includes uses of water for farming, horticulture, or ranching.
- Cold Fresh Water Habitat (COLD): Includes uses of water that support cold water ecosystems.
- Migration of Aquatic Organisms (MIGR): Includes uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms.
- Freshwater Replenishment (FRESH): Includes uses of water for natural or artificial maintenance of surface water quantity or quality, such as reservoir supply.
- Commercial and Sport Fishing (COMM): Includes uses of water for commercial or recreation collection of fish, shellfish, or other aquatic organisms.
- Municipal and Domestic Supply (MUN): Includes uses of water for community, military, municipal, or individual water supply systems.
- Noncontact Water Recreation (REC-2): Includes the uses of water for recreational activities involving proximity to water but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
- Warm Freshwater Habitat (WARM): Includes uses of water that support warm water ecosystems. These uses include, but are not limited to, preservation or enhancement of aquatic habitats, vegetation, and fish and wildlife, including invertebrates.
- Wildlife Habitat (WILD): Includes uses of water that support terrestrial ecosystems, including but not limited to preservation and enhancement of terrestrial habitats, vegetation, wildlife (i.e., mammals, birds, reptiles, amphibians, invertebrates), and wildlife water and food sources.

2.3.2 Groundwater Beneficial Uses

According to the Basin Plan, groundwater in the Corral de Tierra Area subbasin of the Salinas River Groundwater Basin is suitable for agricultural, municipal, and domestic water supply and industrial use.

2.4 WATER QUALITY OBJECTIVES

As required by the Porter-Cologne Act, the CCRWQCB has developed water quality objectives for waters within its jurisdiction to protect the beneficial uses of those waters and has published them in the Basin Plan. The Basin Plan also establishes implementation programs to achieve these water quality objectives and requires monitoring to evaluate the effectiveness of these programs. Water quality objectives must comply with the State antidegradation policy (State Board Resolution No. 68-16), which is designed to maintain high-quality waters while allowing some flexibility if beneficial uses are not unreasonably affected.

2.4.1 Surface Water Quality Objectives

There are no specific water quality objectives listed for El Toro Creek in the Basin Plan. Surface water quality objectives for all inland waters are listed in Table A.

2.4.2 Groundwater Quality Objectives

General groundwater quality objectives for the Central Coast Region, including the Corral de Tierra Area subbasin, are provided in Table B.

As illustrated in Appendix A-32 of the Basin Plan, the aquifers in the Salinas Groundwater Basin that are in the vicinity of the project site are the 180-foot aquifer and the 400-foot aquifer. The median objectives for these aquifers are listed in Table C.

2.5 LIST OF IMPAIRED WATERS

The State Water Resources Control Board approved the 2010 Integrated Report (CWA Section 303(d) List/305(b) Report on August 4, 2010. On November 12, 2010, the EPA approved the 2010 California 303(d) List of Water Quality Limited Segments. The 2010 303(d) impaired waters list shows the lower Salinas River as impaired for chlordane, chloride, chlorpyrifos, dichlorodiphenyldichloroethane (DDD), diazinon, dieldrin, electrical conductivity, enterococcus, Escherichia coli (E. coli), fecal coliform, nitrate, polychlorinated biphenyls (PCBs), pesticides, sodium, total dissolved solids (TDS), toxaphene, turbidity, unknown toxicity, and pH. Sources of the impairments include agriculture, natural sources, urban runoff, unpermitted discharges, unknown sources, construction/land development, and unspecified point sources.[1] There are existing TMDLS for fecal coliform and pesticides (chloropyrifos and diazinon). A TMDL is currently being developed for the Salinas River nutrients pesticides.

[1] SWRCB. 2010. *Clean Water Act Section 303(d) List of Water Quality Limited Segments.*

Table A: Surface Water Quality Objectives for Inland Waters

Constituent	Concentration
Color	Shall not cause nuisance or adversely affect beneficial uses. Coloration attributable to materials of waste origin shall not be greater than 15 units or 10 percent above natural background color, whichever is greater.
Tastes and Odors	Shall not cause nuisance or adversely affect beneficial uses or cause undesirable tastes or odors to edible organisms.
Floating Material	Shall not cause nuisance or adversely affect beneficial uses.
Suspended Material	Shall not cause nuisance or adversely affect beneficial uses.
Settleable Material	Shall not cause nuisance or adversely affect beneficial uses.
Oil and Grease	Shall not cause nuisance or adversely affect beneficial uses or visible film on water surface.
Biostimulatory Substances	Shall not promote aquatic growths to the extent that causes nuisance or adversely affect beneficial uses.
Sediment	Shall not cause nuisance or adversely affect beneficial uses.
Turbidity	1. Where natural turbidity is between 0 and 50 Jackson Turbidity Units (JTU), increases shall not exceed 20 percent. 2. Where natural turbidity is between 50 and 100 JTU, increases shall not exceed 10 percent. 3. Where natural turbidity is greater than 100 JTU, increases shall not exceed 10 percent.
Dissolved Oxygen	Shall not be less than 5.0 mg/l (milligrams per liter). Median values should not fall below 85 percent saturation.
Toxicity	Shall be free of toxic substances in concentrations that are toxic to or that produce detrimental physiological responses in life forms. The discharges of wastes shall not cause concentrations of unionized ammonia (NH_3) to exceed 0.025 mg/L (as N).
Pesticides	Shall not reach concentrations that adversely affect beneficial uses. Shall not increase concentrations in bottom sediments or aquatic life. For waters where existing concentrations are presently nondetectable or where beneficial uses would be impaired by concentrations in excess of nondetectable levels, total identifiable chlorinated hydrocarbon pesticides shall not be present at concentrations detectable within the accuracy of analytical methods.
Bacteria (fecal coliform)	Five samples in a 30-day period shall not exceed a log mean of 200/100 ml. Ten percent of samples in a 30-day period shall not exceed 400/100 ml.
pH	Shall not be depressed below 7.0 nor raised above 8.5.
Radioactivity	Shall not be present in concentrations that are deleterious to life forms.
Not-to-Be-Exceeded Levels	
Methylene Blue Activated Substances	0.2 mg/L
Phenols	0.1 mg/L
PCBs	0.3 µg/L (micrograms per liter)
Phthalate Esters	0.002 µg/L

Source: *Water Quality Control Plan, Central Coast Region.*

Table B: General Groundwater Objectives for the Central Coast Region

Constituent	Concentration
Tastes and Odors	Shall not contain taste- or odor-producing substances in concentrations that adversely affect beneficial uses.
Radioactivity	Shall not be in excess of limits specified in 22 CCR, Chap. 15, Section 64443, Table 4.

Source: *Water Quality Control Plan, Central Coast Region.*

Table C: Median Groundwater Objectives for the Salinas River Groundwater Basin (mg/l)

	Total Dissolved Solids	Chlorine	Sulfate	Boron	Sodium	Nitrogen
180-foot aquifer	1,500	250	600	0.5	250	1
400-foot aquifer	400	50	100	0.2	50	1

Source: *Water Quality Control Plan, Central Coast Region.*

3.0 AFFECTED ENVIRONMENT

3.1 SURFACE WATER

The project lies within the Salinas Hydrologic Unit in the Monterey Peninsula Hydrologic Sub-Area (309.50). The watershed is approximately 75,113 ac in size and ultimately drains to the Pacific Ocean at Monterey Bay.

The nearest receiving water is an ephemeral drainage located to the north of the project site which is tributary to El Toro Creek (Figure 2)[1]. El Toro Creek flows into the Salinas River (approximately 5 mi downstream of the project site) and then to Monterey Bay, located 15 mi west of the project area. El Toro Creek is ephemeral (does not flow year-round). The Salinas River flows year-round; however, flow is controlled by monitored releases of water from the San Antonio and Nacimiento Reservoirs.[2]

3.2 GROUNDWATER

The project site is located in the Corral de Tierra Area subbasin of the Salinas River Groundwater Basin.[3] Groundwater flow in the region is from southwest to northeast, consistent with the topographic gradient.[4] A well approximately 0.25 mi southeast of the project site has been measured monthly since 1960. Depth to groundwater ranges between 16.8 and 87.0 ft.[5] Only minor earthwork will be required during construction; therefore, no groundwater dewatering activities are anticipated as part of the proposed project.[6]

3.3 TOPOGRAPHY AND SOILS

The eastern, southern, and northern portions of the proposed project area are on level floodplain in the El Toro Creek valley. The western portion is on a gently sloping hillside in Canyon Del Rey. Geologically, the eastern, southern, and intersection portions consist of Quaternary alluvium (1.8 million years ago to present). The western portion consists of Mesozoic marine rocks (245 to 65 million years ago).[7] Soils in the eastern, southern, and intersection portions consist of Gorgonio sandy

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1 United States Geological Survey (USGS). 2007. National Hydrography Dataset.
2 Monterey County. 1991. Toro Area Plan; A Part of the Monterey County General Plan.
3 Regional Water Quality Control Board, Central Coast. 1994. Water Quality Control Plan, Central Coast Region. September 8.
4 California Department of Water Resources. Bulletin 118. Updated January 20, 2006.
5 Personal communication, Peter Kwiek, Monterey County Water Resources Agency. March 19, 2007.
6 Wood Rodgers. 2006. Project Study Report on Route 68 at Corral de Tierra Road Intersection Operational Improvement.
7 Jennings and Strand. 1958. *Geologic Map of California: Santa Cruz Sheet*. California Division of Mines and Geology, Sacramento, California.

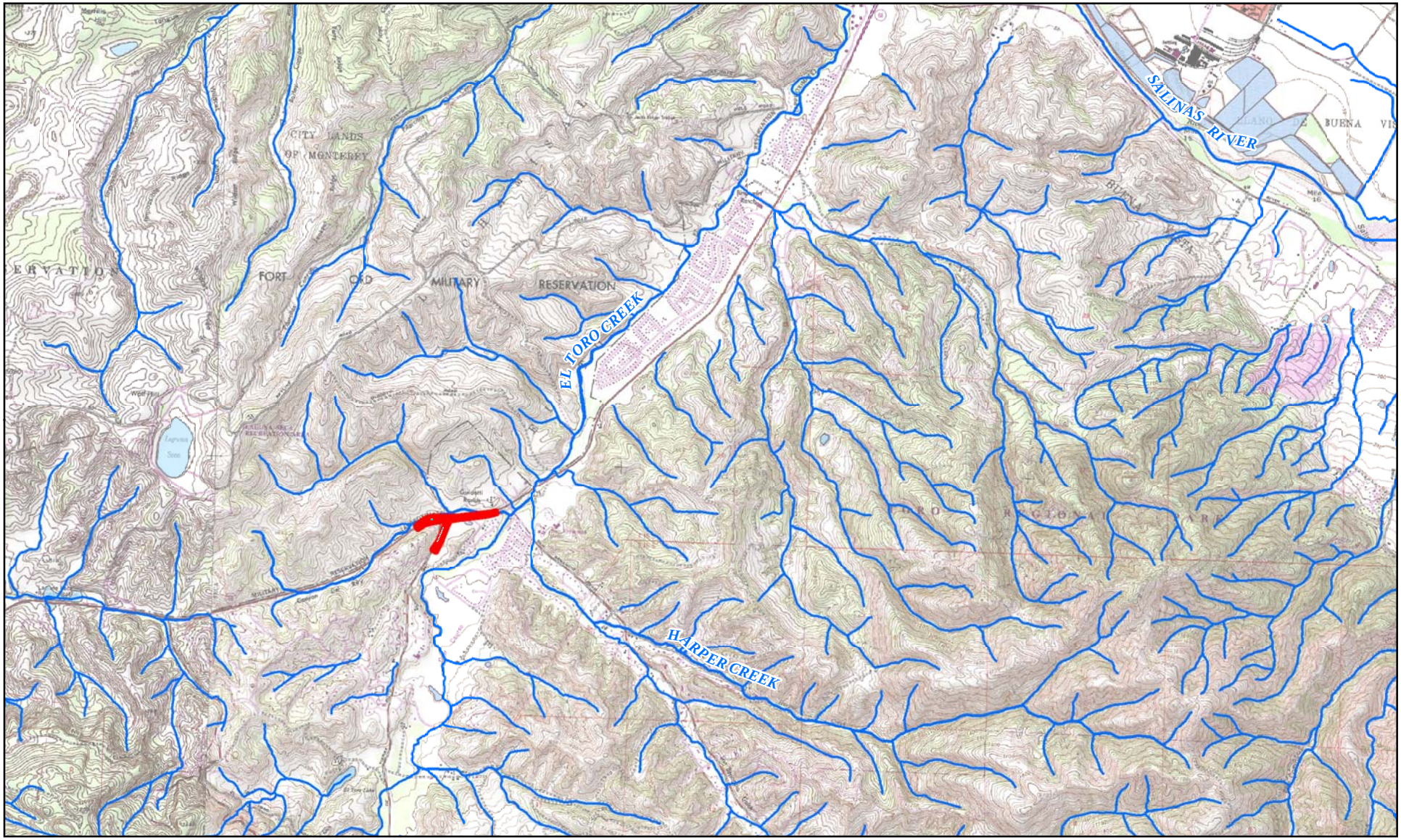

FIGURE 2

LEGEND

Project Area

Flowline

Waterbody

0 2,100 4,200 Feet

0 640 1,280 Meters

SR 68 / Corral de Tierra Road
Intersection Improvement Project
Surface Waters

SOURCE: Boundary - Wood Rodgers (2006), National Hydrography Dataset (2007)

I:\WRS0605\GIS\SurfaceWaters_031207.mxd (5/17/2007)

loam, which is an extremely well-drained, valley floor alluvium derived from granites and schistose rocks. Soils in the western portion consist of Santa Ynez fine, sandy loam, which is a hilly, moderately well-drained alluvium derived from granites and sandstones.[1] Gorgonio sandy loam has slow runoff potential and a slight erosion hazard. Runoff from Santa Ynez fine sandy loam is rapid, and erosion hazard is high.

3.4 CLIMATE

The climate in Monterey County and within the project area is characterized by warm dry summers and cool moist winters. The average temperature is approximately 59 degrees Fahrenheit. Average rainfall is approximately 14.9 inches per year. Approximately 90 percent of this rainfall occurs between November and April.

3.5 LAND USE

The surrounding land is characterized by low-density residential, low-density commercial, and rural uses.

3.6 EXISTING WATER QUALITY

3.6.1 Surface Water Quality

The United States Geological Survey (USGS) monitors water resources throughout the U.S. Most of the data from individual sites distributed in the National Water Information System (NWIS) are related to stream flow; however, some water quality data are available for a few select sites. In addition, USGS launched the National Water Quality Assessment (NAWQA) Program in 1991 and has been collecting water quality information on watersheds throughout the country. Constituents tested reflect limiting parameters for aquatic life but do not necessarily include typical urban runoff pollutants.

USGS water quality data are available for the Salinas River Station near Spreckels (Latitude 36°37′52″, Longitude 121°40′17″) from 1976 to 1986; data from a few dates are provided in Table A below. As seen in the table, not all constituents were tested for during each sampling period, and no explanation was provided. Runoff from the project site enters El Toro Creek, which discharges into the Salinas River near Speckles. Data for the Salina River near Spreckels is presented in Table D to illustrate water quality near the project site. No recent data for this area of the Salinas River is available.

[1] Cook et al. 1978. *Soil Survey of Monterey County, California*. United States Department of Agriculture, Soil Conservation Service.

Table D: USGS Water Quality Data for the Salinas River Station near Spreckels[1]

Constituent	Concentration			
	1/15/76	5/4/76	9/1/77	5/7/86
Temperature (°C)	14.0	17.0	22.5	16.5
Turbidity (JCU)	10	15	No data	No data
pH	7.9	7.1	7.2	No data
Dissolved Oxygen (mg/l)	No data	No data	7.8	No data
Total Dissolved Solids (mg/l)	746	534	663	No data
Suspended Sediment (mg/l)	No data	No data	11	No data
Total Nitrogen (mg/l)	15	22	No data	No data
Nitrogen as Nitrate (mg/l)	68	97.0	No data	No data
Total Phosphorus (mg/l)	4.5	11	15.0	No data
Total Hardness (mg/l as $CaCO_3$)	400	210	220	No data
Dissolved Sodium (mg/l)	110	99	110	No data
Dissolved Chloride (mg/l)	140	120	170	No data
Dissolved Sulfate (mg/l)	55	110	62.0	No data
Dissolved Boron (mg/l)	No data	No data	320	No data
Total Arsenic (µg/l)	6	No data	No data	No data
Total Cadmium (µg/l)	< =20	No data	< =20	No data
Total Recoverable Chromium (µg/l)	ND[2]	No data	40	No data
Total Recoverable Copper (µg/l)	30	No data	70	No data
Total Recoverable Lead (µg/l)	< =200	No data	< =200	No data
Total Recoverable Mercury (µg/l)	< = 0.5	No data	No data	No data
Total Recoverable Zinc (µg/l)	No data	No data	120	No data
Fecal Coliform (colonies/100 ml)	Estimated 10	120	No data	No data
Total Aldrin (µg/l)	No data	ND	No data	No data
Total Lindane (µg/l)	No data	ND	No data	No data
Total Chlordane (µg/l)	No data	0.2	No data	No data
P'-P-DDT (µg/l)	No data	0.100	No data	No data
Total Dieldrin (µg/l)	No data	ND	No data	No data
Endrin (µg/l)	No data	ND	No data	No data
Total Toxaphene (µg/l)	No data	ND	No data	No data
Total Heptachlor (µg/l)	No data	ND	No data	No data
Total Heptachlor Epoxide (µg/l)	No data	ND	No data	No data
Total Methoxychlor (µg/l)	No data	ND	No data	No data
Total Malathion (µg/l)	No data	ND	0.00	No data
Total Parathion (µg/l)	No data	ND	0.00	No data
Total Diazinon (µg/l)	No data	ND	0.08	No data
Total Methyl Parathion (µg/l)	No data	ND	0.00	No data
Atrazine (µg/l)	No data	ND	No data	No data
Total 2, 4-D (µg/l)	No data	ND	0.16	No data
Total 2,4,5-T (µg/l)	No data	ND	No data	No data
Silvex (µg/l)	No data	ND	0.03	No data
Carbophenothion (µg/l)	No data	ND	No data	No data
Total Methyltrithion (µg/l)	No data	ND	No data	No data

1 www.usgs.gov.
2 Not detected.

3.6.2 Groundwater Quality

Groundwater in the basin is very hard and is characterized by bicarbonate-chloride with calcium and sodium as the predominate cations.[1] Total dissolved solids (TDS) range from 355 to 679 milligrams per liter (mg/L).[2]

3.6.3 Regional Water Quality

The water quality of the Salinas River Watershed has been severely impacted by nonpoint source pollution. Agricultural runoff has contributed high levels of nutrients and pesticides to surface water resources. The Salinas Groundwater Basin has been contaminated with high levels of nitrate and seawater intrusion.[3] Also associated with the degradation of the Salinas River Watershed are urbanization; flood control activities; hydromodification of creeks; mining of sand, gravel, mineral, and oil reserves; and military activities.[2] The Central Coast Regional Water Quality Control Board (CCRWQCB) has designated this watershed as one of its highest priorities for cleanup.

1 A positively charged ion.
2 California Department of Water Resources. Bulletin 118. Updated January 20, 2006.
3 Regional Water Quality Control Board, Central Coast, Watershed Management Initiative, January 2002.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter discusses the potential environmental effects with implementation of the project, as well as the procedures and practices that will be applied to reduce those effects.

4.2 CALTRANS STANDARD PROCEDURES AND PRACTICES

While carrying out its mission to plan, develop, maintain, and manage interregional transportation in California, it is Caltrans policy to protect and enhance the environment and quality of life in accordance with the environmental, economic, and social goals of the State. With its statewide SWMP, implemented via Caltrans Stormwater Management Program, the agency is helping to prevent the adverse effects of storm water runoff from Caltrans roadways and facilities.

4.2.1 Project Planning and Design

Caltrans staff is required to evaluate and incorporate water quality controls into a project, if feasible, during the PSR, PR, and PS&E phases of project development. Caltrans SWMP provides the framework for management of storm water discharges and water quality controls. Storm water quality controls that are applied are either temporary (during construction) or permanent (after construction and part of operation of the project).

The BMPs that must be considered during the planning and design phase include Design Pollution Prevention, Treatment, and Construction Site BMPs. Design Pollution Prevention and Construction Site BMPs must be considered for every project. Treatment BMPs must be considered for all projects that are not considered exempt from consideration of treatment BMPs.[1]

Table E shows examples of the BMP categories and the responsible Caltrans divisions.

Design Pollution Prevention BMPs, permanent BMPs to reduce erosion, manage storm water discharges, etc., are listed in Table F. These BMPs are required to be incorporated, as appropriate, into the design of new facilities and reconstruction or expansion of existing facilities.

Pollutants of concern for highway projects and applicable Caltrans-approved treatment BMPs, permanent BMPs that physically remove pollutants, are provided in Table G.

[1] *Storm Water Quality Handbooks, Project Planning and Design Guide*, July 2010.

Table E: BMP Categories and Responsible Division

BMP	Description	Responsible Division for BMP Implementation
Design Pollution Prevention BMPs	Permanent soil stabilization and concentrated flow controls and slope protection systems, etc.	Division of Design
Treatment BMPs	Permanent treatment devices and facilities	Divisions of Design, Construction and Maintenance
Construction Site BMPs	Temporary soil stabilization and sediment control, non-stormwater management, and waste management	Divisions of Design and Construction
Maintenance BMPs	Litter pickup, toxics control, street sweeping, etc.	Division of Maintenance

Source: California Department of Transportation, *Storm Water Quality Handbooks, Project Planning and Design Guide*, Revised July 2010.

Table F: Design Pollution Prevention BMPs

Consideration of Downstream Effects Related to Potentially Increased Flow: • Peak Flow Attenuation Devices • Reduction of Paved Surface (i.e., increase pervious area) • Soil Modification • Energy Dissipation Devices
Preservation of Existing Vegetation[1]
Concentrated Flow Conveyance Systems: • Ditches, Berms, Dikes and Swales • Overside Drains, Downdrains, Paved Spillways • Channel Linings • Flared Culvert End Sections • Outlet Protection/Velocity Dissipation Devices
Slope/Surface Protection Systems: • Vegetated Surfaces • Benching/Terracing, Slope Rounding, Reduce Gradients • Hard Surfaces

Source: California Department of Transportation, *Storm Water Quality Handbooks, Project Planning and Design Guide*, Revised July 2010.

[1] For all Caltrans projects, Caltrans will maximize the vegetation-covered soil areas of a project.

Table G: Pollutants of Concern and Applicable Treatment BMPs

	Biofiltration Systems	Infiltration Basin	Detention Devices	Dry Weather Flow Diversions[1]	Gross Solids Removal Devices	Multi-Chambered Treatment Train	Media Filters	Wet Basins	Traction Sand Traps
Total suspended solids	√	√	√	√		√	√	√	√
Total dissolved solids				√					
Nutrients	√[4]	√	√[4]	√			√[2]	√[3]	
Pesticides		√		√					
Particulate metals	√	√	√	√		√	√	√	
Dissolved metals	√	√		√		√	√		
Pathogens		√		√				√	
Litter		√	√	√	√	√	√	√	
Biochemical oxygen demand		√		√				√	
Turbidity	√	√	√	√		√	√	√	√

Source: California Department of Transportation, *Storm Water Quality Handbooks, Project Planning and Design Guide*, Revised July 2010.

1 Dry Weather Flow Diversions address non-stormwater flows only.
2 Phosphorus and Nitrogen for the Austin Sand Filter; Phosphorus only for the Delaware Sand Filter.
3 Reductions observed for dry weather flow only.
4 Soil needs to have adequate infiltration capacity.

Caltrans lists several Construction Site BMPs, which are temporary pollution prevention activities to be employed during the construction phase. These BMPs are selected for their applicability to a specific project and are incorporated into the WPCP. All of the Caltrans-approved Construction Site BMPs are provided in Appendix C of the *Storm Water Quality Handbooks, Project Planning and Design Guide*.

4.2.2 Project Construction

The Caltrans *Construction Site Best Management Practices (BMPs) Manual* (2012) and the *Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual* (2011) provide the working details for critical, temporary Construction Site BMPs. These handbooks provide guidelines for the proper design, implementation, and maintenance of the BMPs. A WPCP will be prepared for the project, consistent with Caltrans requirements. The WPCP shall identify the specific BMPs to be implemented during project construction so as not to cause or contribute to an exceedance of any applicable water quality standard contained in a statewide Water Quality Control Plan and/or the applicable CCRWQCB's Basin Plan. These BMPs shall meet the BAT/BCT requirement as stipulated in the Caltrans NPDES permit.

4.2.3 Project Operation and Maintenance

The Caltrans NPDES permit also governs operation and maintenance of projects once they are completed. The discharges from a facility shall not create a condition of nuisance or adversely affect the beneficial uses of waters of the State. Under Caltrans standards and procedures, the proposed project is exempt from implementing postconstruction treatment BMPs because the project is not a new facility or a major reconstruction, there will be no change in line/grade or hydraulic capacity, and the disturbed soil area is less than 3 ac.

4.3 IMPACT ASSESSMENT METHODOLOGY

The purpose of this Water Quality Assessment Report is to analyze the difference between the existing condition and the project build condition with respect to water quality impacts. The assessment takes the following into consideration:

- Pollutant sources (change in land use)
- Impervious area and relation to amount of runoff (increase or decrease)
- Application of BMPs (number of BMPs, new technologies, effectiveness)
- Discharges into impaired waters (listed pursuant to Section 303[d] of the CWA)

4.4 POTENTIAL IMPACTS TO WATER QUALITY

4.4.1 Short-term Impacts During Construction

Pollutants of concern during construction include sediments, trash, petroleum products, and chemicals.[1] Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality.

4.4.2 No Build Alternative

Under the No Build Alternative, no improvements to the SR-68/Corral de Tierra Road intersection other than routine roadway maintenance would be made. Therefore, the No Build Alternative would result in no short-term impacts from construction-related activities.

4.4.3 Build Alternative

Construction activities under the Build Alternative would disturb 1.44 ac of soil. The proposed project would implement Construction Site BMPs using BAT/BCT, consistent with the requirement of the statewide Caltrans NPDES permit. These construction site BMPs would include soil stabilization, sediment control, housekeeping and waste management practices, and nonstorm water management BMPs. If Construction Site BMPs are properly designed, implemented, and maintained as required by the Caltrans NPDES permit, then no adverse water quality impacts would occur during construction of the proposed project.

4.4.4 Long-Term Impacts During Operation

Pollutants of concern during operation of a transportation facility include sediments, trash, petroleum products, metals, and chemicals.[2] An increase in impervious area increases the volume of runoff during a storm, which can more effectively transport pollutants to receiving waters and may lead to downstream erosion.

4.4.5 Alternative 1 (No Build)

Under the No Build Alternative, there would not be an increase in impervious area at the SR-68/ Corral de Tierra Road. Therefore, the No Build Alternative would not result in an increase in long-term pollutant loading or erosion potential.

4.4.6 Build Alternative

The Build Alternative would increase the area of impervious surface by 0.48 ac, an increase of less than 10.5 percent in the project area. The increase in impervious surface would slightly increase storm water discharges from the project site. However, the increase in impervious surface is not anticipated to substantially alter peak flow volumes or velocities of storm water discharges from the site. Because

[1] California Department of Transportation. 2003. *Statewide Storm Water Management Plan*. May.
[2] Ibid.

any increase in storm water runoff would be minor, the increase in pollutant loading from the project site will also be minor.

Design Pollution Prevention BMPs such as preservation of existing vegetation, installation of erosion control, energy dissipation, and flow conveyance devices would be incorporated into the project to address potential downstream impacts related to erosion.[1] If Design Pollution Prevention BMPs are properly designed, implemented, and maintained as required by the Caltrans NPDES permit, no adverse water quality impacts would occur during operation of the proposed project.

[1] Wood Rodgers. 2012. Draft Project Report on Route 68 at Corral de Tierra Road Intersection Operational Improvement.

5.0 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

As part of the Caltrans Project Delivery Storm Water Management Program described in the SWMP, selected Construction Site and Design Pollution Prevention BMPs will be incorporated into the final design of the reconstruction of the SR-68/Corral de Tierra Road intersection. Caltrans SWMP shall be implemented in accordance with the statewide NPDES permit. These standard requirements to minimize short-term and long-term water quality impacts are listed below.

WQ-1 Monterey County and Caltrans will assure that the Contractor develops and implements a Water Pollution Control Program during project construction to prevent water pollution during construction. The Water Pollution Control Program shall be consistent with the Caltrans *Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual*. Construction Site BMPs detailed in the Water Pollution Control Program shall be implemented during construction.

WQ-2 Monterey County shall incorporate design pollution prevention BMPs into the project to ensure that the project does not cause off-site erosion and to assure that the project site is permanently stabilized.

WQ-3 Prior to permit issuance for building, grading, or land clearing, an erosion control plan indicating proposed methods for the control of runoff, erosion, and sediment movement shall be submitted to and approved by the appropriate Monterey County Director.

WQ-4 Prior to construction, Monterey County shall obtain an Erosivity Waiver from the State Water Resources Control Board by demonstrating that the construction activity would occur only when the Rainfall Erosivity Factor is less than 5 ("R" in the Revised Universal Soil Loss Equation), in compliance with the provisions of the *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit) (Final Order No. 2012-011-DWQ, NPDES No. CAS000003), as amended by Order No. 2010-0014-DWQ.

6.0 REFERENCES

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WATER QUALITY ASSESSMENT REPORT

ADDENDUM

STATE ROUTE 68/CORRAL DE TIERRA INTERSECTION IMPROVEMENT PROJECT

Monterey County, California

05-Mon-68 PM 12.8/13.2

EA 05-0H8230

JUNE 2015

PURPOSE OF THE WATER QUALITY ASSESSMENT REPORT ADDENDUM

After the circulation of the Draft Initial Study with Proposed Mitigated Negative Declaration (Draft IS/MND) and in response to public comments, the County of Monterey and the California Department of Transportation (Caltrans) adopted project design modifications. The project design modifications included land outside of the previously analyzed project study area as identified in the Water Quality Assessment Report, February 2013. This Addendum was prepared to address the expanded project study area. The expanded project study area, Figure 1, is provided at the end of this Addendum.

CHANGE IN PROJECT DESIGN

The project design modifications are shown in yellow in the Build Alternative Design Plan provided at the end of this Addendum and described in detail below.

CHANGE IN PROJECT DESCRIPTION

The project design modifications included the following components:

- The shoulder widening of Corral de Tierra Road in the southbound direction would be reduced from 8 feet to 6 feet.
- The driveway that serves the five homes on the north side of State Route 68 would be realigned so that access to these homes would be shared with the Cypress Community Church's driveway.
- A 110 foot-long merge lane on State Route 68 for vehicles turning left out of The Villas driveway would be provided.
- The existing gutter on Corral de Tierra Road would be replaced with a flatter gutter.

The project design modifications resulted in the following changes to the Air Quality Analysis. Deletions are shown with strikethrough (~~strikethrough~~) and additions are shown with underline (underline).

Paragraph one, sentence four in Section 1.2.2, Build Alternative, in the Water Quality Assessment Report has been revised as follows:

> *~~The paved shoulders of Corral de Tierra Road within the project area would be widened to 8 feet to better accommodate pedestrians and facilitate the future addition of Class II bicycle lanes to Corral de Tierra Road.~~ The shoulder of Corral de Tierra Road in the northbound direction would be widened to at least 8 feet within the project area (except at one point where existing curb, sidewalk and utilities preclude widening). The shoulder of Corral de Tierra Road in the southbound direction would be widened to at least 6 feet within the project area.*

Paragraph two, sentence one in Section 1.2.2, Build Alternative, in the Water Quality Assessment Report has been revised as follows:

> *About 520 ft of ~~S~~steel bin ~~Crib~~ retaining wall (or equivalent) would be constructed west of Corral de Tierra Road along the north embankment of SR-68.*

Paragraph three, sentences one and two in Section 1.2.2, Build Alternative, in the Water Quality Assessment Report have been revised as follows:

> *~~A left turn lane would also be constructed from westbound SR-68 into the Corral de Tierra County Club driveway. The Corral de Tierra County Club driveway is located east of Corral de Tierra Road on the south side of SR-68.~~ A left-turn lane to the driveway of The Villas on the south side of SR-68 would be constructed. A 110-foot-long merge lane would be provided for vehicles that turn left onto SR-68 from The Villas driveway heading westbound on SR-68.*

Paragraph four, in Section 1.2.2, Build Alternative, in the Water Quality Assessment Report has been revised as follows:

> *~~No provisions for left turns to or from the residential driveway on the north side of SR-68 would be made. As part of the proposed project, a painted median island would be created in front of the residential driveway restricting drivers to right-in,~~*

~~right-out access. Drivers needing to make left-in, left-out movements would need to make a U-turn at the traffic signal at either San Benancio Road or at Corral de Tierra Road. U-turn movements at these signalized intersections are both legal and safe.~~ On the north side of SR-68 there is an existing private driveway that serves five homes. This driveway would be removed as part of the proposed project. The private road that leads to the homes would be realigned to connect to the driveway that currently serves the Cypress Community Church. With implementation of the proposed project, vehicles would share a portion of the church's driveway and the traffic signal at Corral de Tierra Road/SR-68 to access the homes.

Paragraph 5, sentence two in Section 1.2.2, Build Alternative, in the Water Quality Assessment Report has been revised as follows:

Also, ~~a~~ temporary construction easements would be acquired along the east side of Corral de Tierra Road to accommodate grading near the edge of the County right-of-way and on the north side of SR-68 for construction of the residential driveway realignment (refer to Figure 1-3: Build Alternative Design Plan).

The following sentence has been added following sentence three in paragraph 5 in Section 1.2.2, Build Alternative, in the Water Quality Assessment Report:

The proposed project would also replace the existing drainage gutter on Corral de Tierra Road with a flatter gutter.

AFFECTED ENVIRONMENT

The expanded project study area is located adjacent to the previously identified project study area and therefore shares the same affected environment. The affected environment including the proposed project's existing environmental setting and regulatory setting as described in the Water Quality Assessment Report remains the same.

ENVIRONMENTAL CONSEQUENCES

The proposed driveway realignment would require additional earthwork including approximately 4,015 square feet of new pavement and the removal of approximately 2,024 square feet of existing pavement. The total disturbed surface area (grading and excavation) for the proposed project would increase from 1.44 acres (ac) to 1.58 ac (a net increase of 0.14 ac). However, as concluded in the Water Quality Assessment Report, the proposed project would implement Construction Site Best Management Practices (BMPs) consistent with the requirement of the statewide Caltrans National Pollutant Discharge Elimination System (NPDES) permit; therefore, no adverse water quality impacts would occur during construction of the proposed project.

The proposed driveway realignment would result in 4,015 square feet (sf) of additional pavement but would remove 2,024 sf of existing pavement. Therefore, the amount of impervious surface area created by the proposed project would decrease from 0.48 ac to 0.46 ac (a net decrease of 0.02 ac) from implementation of the proposed driveway realignment. As concluded in the Water Quality Assessment Report, since the proposed project would increase impervious surface area, storm water discharges would slightly increase from the project site; however, any increase in storm water runoff or pollutant loading from the project site would be minor. In addition, Design Pollution Prevention BMPs would be incorporated into the proposed project to address potential downstream impacts related to erosion. Therefore, no adverse water quality impacts would occur during operation of the proposed project.

AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES (OR COMMITMENTS)

The avoidance, minimization, and mitigation measures identified in the Water Quality Assessment Report, February 2013, remain applicable to the expanded project study area and no additional avoidance, minimization, and mitigation measures are required.

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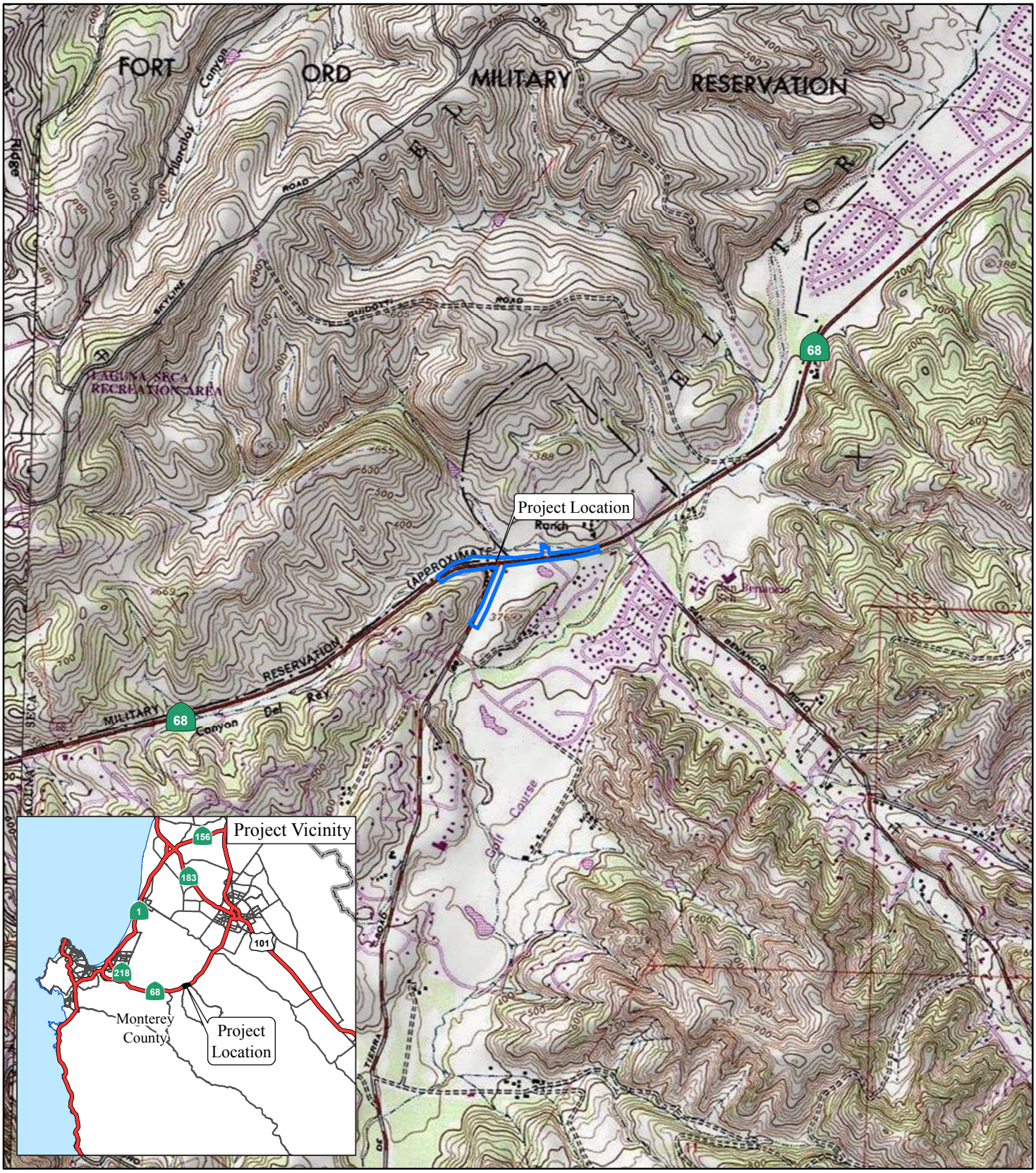

LEGEND

Project Location

FIGURE 1

0 1000 2000
FEET

SOURCE: USGS 7.5' Quad - Spreckels (1984), CA

I:\WRS0605\GIS\ProjectLocation_USGS.mxd (6/4/2015)

SR 68 / Corral de Tierra Road
Intersection Improvement Project

Project Location Map

MON-68, P.M. 12.8/13.2
05-OH8230

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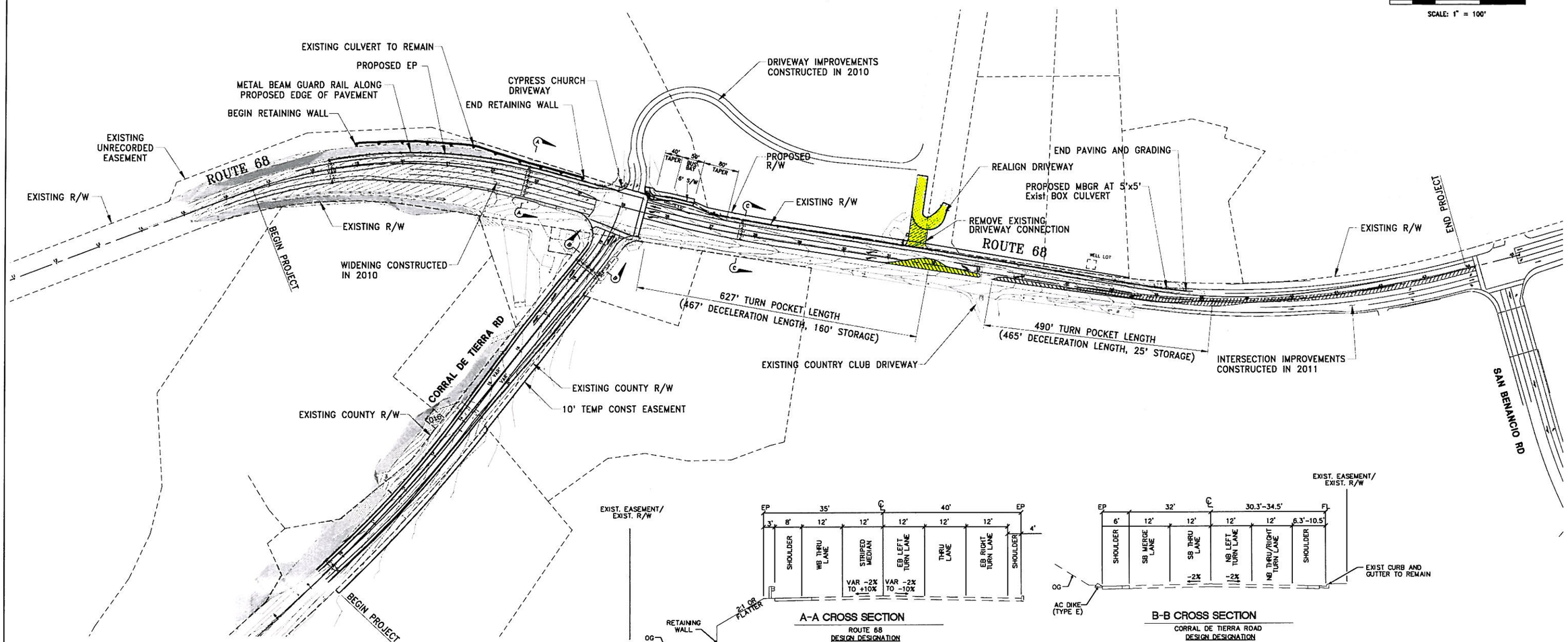
ROUTE 68/CORRAL DE TIERRA ROAD INTERSECTION IMPROVEMENTS

BUILD ALTERNATIVE

COUNTY OF MONTEREY CALIFORNIA

MAY, 2015



A-A CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

ADT (2014) = 21,600 (DESIGN VOLUME)
ADT (20 YEAR) = 38,500
DHV = 2,484
ESAL = 5,775,045

D = 57%
T = 4.0%
V = 55 MPH
TI_{20} = 11.0

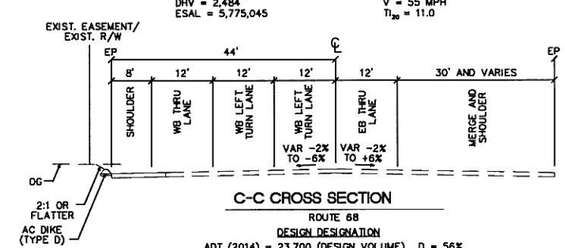
B-B CROSS SECTION

CORRAL DE TIERRA ROAD

DESIGN DESIGNATION

ADT (2014) = 7,100 (DESIGN VOLUME)
ADT (20 YEAR) = 8,900
DHV = 619
ESAL = 735,017

D = 67%
T = 2.0%
V = 55 MPH
TI_{20} = 8.5



C-C CROSS SECTION

ROUTE 68

DESIGN DESIGNATION

ADT (2014) = 23,700 (DESIGN VOLUME)
ADT (20 YEAR) = 40,500
DHV = 2,725
ESAL = 6,060,788

D = 56%
T = 4.0%
V = 55 MPH
TI_{20} = 11.0

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